**WEB PROGRAMING**

**STEP MATERIAL**

**1.What are some of the common lists that can be used when designing a page?** Some of the common lists that can be used are:

a) Ordered list

b) Unordered list

c) Definition list

d) Menu list

e) Directory list

**2. What are new Media Elements in HTML5?**

Following are the New Media Elements are present in HTML5:

1. <audio> tag : For playing audio.

2. <video> tag : For playing video.

3. <source> tag : For media resources for media elements.

4. <embed> tag : For embedded content.

5. <track> tag : For text tracks used in media players.

**3. What is difference between HTML and HTML5?**

The differences between HTML and HTML5 are:

**1.** Document of HTML is very large as compare to the HTML5.

**2.** Audio and Video tags are not present in HTML whereas HTML5 contains audio and video tags.

**3.** Vector technology is not integral part of HTML whereas HTML5 Vector technology is the integral part of it.

**4.** HTML supported by all old browsers whereas HTML5 is supported by new browser. **5.** In HTML web sockets are not available whereas in HTML5 Full duplex

communication channel is present.

**4. What is the importance of Doctype in HTML?**

The doctype declaration should be the very first thing in an HTML document, before the html tag.

The doctype declaration is not an HTML tag; it is an instruction to the web browser about what version of the markup language the page is written in.

The doctype declaration refers to a Document Type Definition (DTD). The DTD specifies the rules for the markup language, so that the browsers can render the content correctly.

**5. What is the purpose of canvas in HTML?**

Canvas is an element that is used for the graphics for the web page. It uses JavaScript to bring the graphics functionality live. It allows easy way to draw the graphics and use different types of tools to create drawing on the web page. Canvas is just a rectangular area that controls the pixel of every element that is used in the web page. Canvas uses methods like paths, circles, etc.

The canvas element will be used as follows:

<canvas id="can" width="200" height="100"></canvas>

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**6. What are the different types of frames tags used in HTML?**

Frames consists of different types of tags and they are as follows:

**1.** <frameset>...</frameset> : It consists of the frames that includes the layout using the attributes of rows and cols.

**2.** <frame> or <frame/> : It consists of a single frame and gets included within the frameset. It is always come up with a src attribute that provides the source that has to be shown in a particular frame.

**3.** <noframes>...</noframes> : It consists of the normal HTML content that is used to show no frames.

**4.** <iframe>...</iframe> : It consists of internal frame that will contain the src attribute to include the frame that is internal to a particular region.

**7. What is the difference between HTML elements and tags?**

HTML elements communicate to the browser to render text. When the elements are surrounded by brackets <>, they form HTML tags. Most of the time, tags come in pair and surround content.

**8. What is a marquee?**

Marquee is used to put the scrolling text on a web page. You should put the text which you want to scroll within the <marquee> </marquee> tag.

**9. What is the difference between HTML tags <div> and <span>?**

The difference between **span** and **div** is that a span element is in-line and usually used for a small chunk of HTML inside a line (such as inside a paragraph) whereas a **div** (division) element is block-line (which is basically equivalent to having a line-break before and after it) and used to group larger chunks of code.

**10. What is CSS?**

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

**11. What are the components of a CSS Style?**

A style rule is made of three parts −

**Selector** − A selector is an HTML tag at which a style will be applied. This could be any tag like <h1> or <table> etc.

**Property** − A property is a type of attribute of HTML tag. Put simply, all the HTML attributes are converted into CSS properties. They could be color, border etc.

**Value** − Values are assigned to properties. For example, color property can have value either red or #F1F1F1 etc.

**12. What are the various ways of using CSS in an HTML page?**

There are four ways to associate styles with your HTML document. Most commonly used methods are inline CSS and External CSS.

**Embedded CSS** − The <style> Element: You can put your CSS rules into an HTML document using the <style> element.

**Inline CSS** − The style Attribute: You can use style attribute of any HTML element to define style rules.

**External CSS** − The <link> Element: The <link> element can be used to include an external stylesheet file in your HTML document.

**Imported CSS** − @import Rule: @import is used to import an external stylesheet in a manner similar to the <link> element.

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**13. What is the difference between form get and form post?**

**Get**

With GET the form data is encoded into a URL by the browser. The form data is visible in the URL allowing it to be bookmarked and stored in web history. The form data is restricted to ASCII codes. Because URL lengths are limited there can be limitations on how much form data can be sent.

**Post**

With POST all the name value pairs are submitted in the message body of the HTTP request which has no restrictions on the length of the string. The name value pairs cannot be seen in the web browser bar.

POST and GET correspond to different HTTP requests and they differ in how they are submitted. Since the data is encoded in differently, different decoding may be needed. **14. What is BOM?**

BOM stands for Browser Object Model. It provides interaction with the browser. The default object of browser is window.

**15. What is DOM? What is the use of document object?**

DOM stands for Document Object Model. A document object represent the html document. It can be used to access and change the content of html.

**16. What is the use of history object?**

The history object of browser can be used to switch to history pages such as back and forward from current page or another page. There are three methods of history object. history.back()

history.forward()

history.go(number): number may be positive for forward, negative for backward. **17. What is the difference between == and ===?**

The == operator checks equality only whereas === checks equality and data type i.e. value must be of same type.

**18. What does the isNaN() function?**

The isNan() function returns true if the variable value is not a number.

**19. Difference between Client side JavaScript and Server side JavaScript? Client side JavaScript** comprises the basic language and predefined objects which are relevant to running java script in a browser. The client side JavaScript is embedded directly by in the HTML pages. This script is interpreted by the browser at run time.

**Server side JavaScript** also resembles like client side java script. It has relevant java script which is to run in a server. The server side JavaScript are deployed only after compilation. **20. What is the difference between undefined value and null value?**

**Undefined value**: A value that is not defined and has no keyword is known as undefined value. For example:

**int number**;//Here, number has undefined value.

**Null value**: A value that is explicitly specified by the keyword "null" is known as null value. For example:

String str=null;//Here, str has a null value.

**21. What are the pop up boxes available in JavaScript?**

Alert Box

Confirm Box

Prompt Box

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**PART-B**

**1. Explain in detail about basic comments in HTML for designing aweb page**

⮚ HTML is a **markup** language for **describing** web documents (web pages). ⮚ HTML stands for **H**yper **T**ext **M**arkup **L**anguage

⮚ A markup language is a set of **markup tags**

⮚ HTML documents are described by **HTML tags**

⮚ Each HTML tag **describes** different document content

**Example**

!DOCTYPE html>

<html>

<head>

<title>Page Title</title>

</head>

<body>

<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>

</html>

**Explaination**

⮚ The **DOCTYPE** declaration defines the document type to be HTML

⮚ The text between **<html>** and **</html>** describes an HTML document

⮚ The text between **<head>** and **</head>** provides information about the document ⮚ The text between **<title>** and **</title>** provides a title for the document

⮚ The text between **<body>** and **</body>** describes the visible page content

⮚ The text between **<h1>** and **</h1>** describes a heading

⮚ The text between **<p>** and **</p>** describes a paragraph

**HTML Tags**

⮚ HTML tags are **keywords** (tag names) surrounded by **angle brackets**:

<tagname>content</tagname>

⮚ HTML tags normally come **in pairs** like <p> and </p>

⮚ The first tag in a pair is the **start tag,** the second tag is the **end tag**

⮚ The end tag is written like the start tag, but with a **slash** before the tag name **HTML Editors**

⮚ HTML can be edited by using a professional HTML editor like:

∙ Adobe Dreamweaver

∙ Microsoft Expression Web

∙ CoffeeCup HTML Editor

∙ However, for learning HTML we recommend a text editor like Notepad (PC) or TextEdit (Mac).

∙ We believe using a simple text editor is a good way to learn HTML.

⮚ Follow the 4 steps below to create your first web page with Notepad.

**Step 1: Open Notepad**

⮚ To open Notepad in Windows 7 or earlier:

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⮚ Click **Start** (bottom left on your screen). Click **All Programs**. Click **Accessories**. Click **Notepad**.

**Step 2: Write Some HTML**

⮚ Write or copy some HTML into Notepad.

<!DOCTYPE html>

<html>

<body>

<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>

</html>

**Step 3: Save the HTML Page**

⮚ Save the file on your computer.

⮚ Select **File > Save as** in the Notepad menu.

⮚ Name the file "index.htm" or any other name ending with htm.

⮚ UTF-8 is the preferred encoding for HTML files.

⮚ ANSI encoding covers US and Western European characters only.

**Step 4: View HTML Page in Your Browser**

⮚ Open the saved HTML file in your favorite browser.

**HTML Elements**

⮚ HTML **documents** are made up by HTML **elements**.

⮚ HTML elements are written with a **start** tag, with an **end** tag, with the **content** in between: <tagname>content</tagname>

<p>My first HTML paragraph.</p>

| **Start tag**  | **Element content**  | **End tag** |
| --- | --- | --- |
| <h1>  | My First Heading </h1> |  |
| <p> | My first paragraph.  | </p> |

**Nested HTML Elements**

⮚ HTML elements can be nested (elements can contain elements).

⮚ All HTML documents consist of nested HTML elements.

⮚ This example contains 4 HTML elements:

<!DOCTYPE html>

<html>

<body>

<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>

</html>

⮚ The **<body>** element defines the **document body**.

⮚ It has a **start** tag <body> and an **end** tag </body>.

⮚ The element **content** is two other HTML elements (<h1> and <p>).

<body>

<h1>My First Heading</h1>

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<p>My first paragraph.</p>

</body>

⮚ The **<h1>** element defines a **heading**.

⮚ It has a **start** tag <h1> and an **end** tag </h1>.

⮚ The element **content** is: My First Heading.

<h1>My First Heading</h1>

⮚ The **<p>** element defines a **paragraph**.

⮚ It has a **start** tag <p> and an **end** tag </p>.

⮚ The element **content** is: My first paragraph.

**HTML Attributes**

⮚ Attributes provide additional information about HTML elements.

⮚ HTML elements can have **attributes**

⮚ Attributes provide **additional information** about an element

⮚ Attributes are always specified in **the start tag**

⮚ Attributes come in name/value pairs like: **name="value"**

**The lang Attribute**

⮚ The document language can be declared in the **<html>** tag.

⮚ The language is declared in the **lang** attribute.

⮚ Declaring a language is important for accessibility applications (screen readers) and search engines:

<!DOCTYPE html>

<html lang="en-US">

<body>

<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>

</html>

**The title Attribute**

⮚ HTML paragraphs are defined with the **<p>** tag.

⮚ In this example, the **<p>** element has a **title** attribute. The value of the attribute is "**About W3Schools**":

<p title="About W3Schools">

W3Schools is a web developer's site.

It provides tutorials and references covering many aspects of web programming, including HTML, CSS, JavaScript, XML, SQL, PHP, ASP, etc.

**The href Attribute**

⮚ HTML links are defined with the **<a>** tag. The link address is specified in the **href** attribute:

<a href="http://www.w3schools.com">This is a link</a>

**Size Attributes**

⮚ HTML images are defined with the **<img>** tag.

⮚ The filename of the source (**src**), and the size of the image (**width** and **height**) are all provided as **attributes**:

<img src="w3schools.jpg" width="104" height="142">

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**The alt Attribute**

⮚ The **alt** attribute specifies an alternative text to be used, when an HTML element cannot be displayed.

⮚ The value of the attribute can be read by "screen readers". This way, someone "listening" to the webpage, i.e. a blind person, can "hear" the element.

<img src="w3schools.jpg" alt="W3Schools.com" width="104" height="142"> **HTML Headings**

⮚ Headings are important in HTML documents.

⮚ Headings are defined with the <h1> to <h6> tags.

<h1> defines the most important heading. <h6> defines the least important heading. <h1>This is a heading</h1>

<h2>This is a heading</h2>

<h3>This is a heading</h3>

**The HTML <head> Element**

⮚ The HTML **<head>** element has nothing to do with HTML headings.

⮚ The HTML <head> element contains **meta data**. Meta data are not displayed. ⮚ The HTML <head> element is placed between the <html> tag and the <body> tag: <!DOCTYPE html>

<html>

<head>

<title>My First HTML</title>

<meta charset="UTF-8">

</head>

<body>

<p>The HTML head element contains meta data.</p>

<p>Meta data is data about the HTML document.</p>

</body>

</html>

**The HTML <title> Element**

⮚ The HTML **<title>** element is meta data. It defines the HTML document's title. ⮚ The title will not be displayed in the document, but might be displayed in the browser tab. **The HTML <meta> Element**

⮚ The HTML **<meta>** element is also meta data.

⮚ It can be used to define the character set, and other information about the HTML document.

**HTML Paragraphs**

⮚ HTML documents are divided into paragraphs.

⮚ The HTML **<p>** element defines a **paragraph**.

<p>This is a paragraph</p>

<p>This is another paragraph</p>

**HTML Display**

⮚ You cannot be sure how HTML will be displayed.

⮚ Large or small screens, and resized windows will create different results.

⮚ With HTML, you cannot change the output by adding extra spaces or extra lines in your HTML code.

⮚ The browser will remove extra spaces and extra lines when the page is displayed.

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⮚ Any number of spaces, and any number of new lines, count as **only one space**. <p>

This paragraph

contains a lot of lines

in the source code,

but the browser

ignores it.

</p>

<p>

This paragraph

contains a lot of spaces

in the source code,

but the browser

ignores it.

**HTML Line Breaks**

⮚ The HTML **<br>** element defines a **line break**.

⮚ Use <br> if you want a line break (a new line) without starting a new paragraph: <p>This is<br>a para<br>graph with line breaks</p>

**The HTML <pre> Element**

⮚ The HTML <pre> element defines preformatted text.

⮚ The text inside a <pre> element is displayed in a fixed-width font (usually Courier), and it preserves both spaces and line breaks:

**<** pre>

My Bonnie lies over the ocean.

My Bonnie lies over the sea.

Oh, bring back my Bonnie to me.

</pre>

**HTML Styling**

⮚ Every HTML element has a **default style** (background color is white and text color is black).

⮚ Changing the default style of an HTML element, can be done with the **style attribute**. ⮚ This example changes the default background color from white to lightgrey: <body style="background-color:lightgrey">

<h1>This is a heading</h1>

<p>This is a paragraph.</p>

</body>

**The HTML Style Attribute**

⮚ The HTML style attribute has the following **syntax**:

style="*property*:*value*"

**HTML Text Color**

⮚ The **color** property defines the text color to be used for an HTML element: <h1 style="color:blue">This is a heading</h1>

<p style="color:red">This is a paragraph.</p>

**HTML Fonts**

⮚ The **font-family** property defines the font to be used for an HTML element:

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<h1 style="font-family:verdana">This is a heading</h1>

<p style="font-family:courier">This is a paragraph.</p>

**HTML Text Size**

⮚ The **font-size** property defines the text size to be used for an HTML element: <h1 style="font-size:300%">This is a heading</h1>

<p style="font-size:160%">This is a paragraph.</p>

**HTML Text Alignment**

⮚ The **text-align** property defines the horizontal text alignment for an HTML element: <h1 style="text-align:center">Centered Heading</h1>

<p>This is a paragraph.</p>

**HTML Formatting Elements**

⮚ HTML uses elements like <b> and <i> for formatting output, like **bold** or *italic* text. ⮚ Formatting elements were designed to display special **types of text**:

∙ Bold text

∙ Important text

∙ Italic text

∙ Emphasized text

∙ Marked text

∙ Small text

∙ Deleted text

∙ Inserted text

∙ Subscripts

∙ Superscripts

**HTML Bold and Strong Formatting**

⮚ The HTML **<b>** element defines **bold** text, without any extra importance.

***Example***

<p>This text is normal.</p>

<p><b>This text is bold</b>.</p>

The HTML **<strong>** element defines **strong** text, with added semantic "strong" importance. ***Example***

<p>This text is normal.</p>

<p><strong>This text is strong</strong>.</p>

**HTML Italic and *Emphasized* Formatting**

⮚ The HTML **<i>** element defines *italic* text, without any extra importance.

***Example***

<p>This text is normal.</p>

<p><i>This text is italic</i>.</p>

⮚ The HTML **<em>** element defines *emphasized* text, with added semantic importance. ***Example***

<p>This text is normal.</p>

<p><em>This text is emphasized</em>.</p>

**HTML Small Formatting**

The HTML **<small>** element defines **small** text:

***Example***

<h2>HTML <small>Small</small> Formatting</h2>

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**HTML Marked Formatting**

The HTML **<mark>** element defines **marked** or highlighted text:

***Example***

<h2>HTML <mark>Marked</mark> Formatting</h2>

***HTML DeletedFormatting***

The HTML **<del>** element defines **deleted** (removed) of text.

***Example***

<p>My favorite color is <del>blue</del> red.</p>

***HTML Inserted Formatting***

The HTML **<ins>** element defines **inserted** (added) text.

***Example***

<p>My favorite <ins>color</ins> is red.</p>

***HTML subscript Formatting***

The HTML **<sub>** element defines **subscripted** text.

***Example***

<p>This is <sub>subscripted</sub> text.</p>

***HTML Superscript Formatting***

The HTML **<sup>** element defines **superscripted** text.

***Example***

<p>This is <sup>superscripted</sup> text.</p>

***HTML Comment Tags***

You can add comments to your HTML source by using the following syntax:

***Example***

<!-- Write your comments here -->

Comments are not displayed by the browser, but they can help document your HTML. With comments you can place notifications and reminders in your HTML:

***Example***

<!-- This is a comment -->

<p>This is a paragraph.</p>

<!-- Remember to add more information here -->

***Conditional Comments***

You might stumble upon conditional comments in HTML:

<!--[if IE 8]>

.... some HTML here ....

<![endif]-->

**HTML Links**

⮚ Links are found in nearly all web pages. Links allow users to click their way from page to page.

***HTML Links - Hyperlinks***

⮚ HTML links are hyperlinks.

⮚ A hyperlink is a text or an image you can click on, and jump to another document. ***HTML Links - Syntax***

⮚ In HTML, links are defined with the **<a>** tag:

<a href="*url*">*link text*</a>

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***Local Links***

⮚ The example above used an absolute URL (A full web address).

⮚ A local link (link to the same web site) is specified with a relative URL (without http://www ...).

***Example:***

<a href="html\_images.asp">HTML Images</a>

***HTML Links - Colors and Icons***

⮚ When you move the mouse cursor over a link, two things will normally happen: ∙ The mouse arrow will turn into a little hand

∙ The color of the link element will change

⮚ By default, links will appear as this in all browsers:

∙ An unvisited link is underlined and blue

∙ A visited link is underlined and purple

∙ An active link is underlined and red

⮚ You can change the defaults, using styles:

<style>

a:link {color:#000000; background-color:transparent; text-decoration:none} a:visited {color:#000000; background-color:transparent; text-decoration:none} a:hover {color:#ff0000; background-color:transparent; text-decoration:underline} a:active {color:#ff0000; background-color:transparent; text-decoration:underline} </style>

***HTML Links - The target Attribute***

⮚ The **target** attribute specifies where to open the linked document.

⮚ This example will open the linked document in a new browser window or in a new tab: ***Example***

<a href="http://www.w3schools.com/" target="\_blank">Visit W3Schools!</a> ***HTML Links - Image as Link***

⮚ It is common to use images as links:

***Example***

<a href="default.asp">

<img src="smiley.gif" alt="HTML tutorial" style="width:42px;height:42px;border:0"> </a>

***HTML Links - The id Attribute***

⮚ The **id** attribute can be used to create bookmarks inside HTML documents. ⮚ Bookmarks are not displayed in any special way. They are invisible to the reader. ***Example***

Add an id attribute to any <a> element:

<a id="tips">Useful Tips Section</a>

**HTML Images**

***Syntax***

⮚ In HTML, images are defined with the **<img>** tag.

⮚ The <img> tag is empty, it contains attributes only, and does not have a closing tag. ⮚ The src attribute specifies the URL (web address) of the image:

<img src="*url*" alt="*some\_text*"

***Image Size - Width and Height***

⮚ You can use the **style** attribute to specify the width and height of an image.

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⮚ The values are specified in pixels (use px after the value):

***Example***

<img src="html5.gif" alt="HTML5 Icon" style="width:128px;height:128px;"> ***Animated Images***

⮚ The GIF standard allows animated images:

***Example***

<img src="programming.gif" alt="Computer Man" style="width:48px;height:48px;"> ***Image Floating***

⮚ Use the CSS float property to let the image float.

⮚ The image can float to the right or to the left of a text:

***Example***

<p>

<img src="smiley.gif" alt="Smiley face" style="float:right;width:42px;height:42px;"> The image will float to the right of the text.

</p>

<p>

<img src="smiley.gif" alt="Smiley face" style="float:left;width:42px;height:42px;"> The image will float to the left of the text.

</p>

***Image Maps***

⮚ Use the <map> tag to define an image-map. An image-map is an image with clickable areas.

⮚ The name attribute of the <map> tag is associated with the <img>'s usemap attribute and creates a relationship between the image and the map.

⮚ The <map> tag contains a number of <area> tags, that defines the clickable areas in the image-map:

***Example***

<img src="planets.gif" alt="Planets" usemap="#planetmap" style="width:145px;height:126px;"> <map name="planetmap">

<area shape="rect" coords="0,0,82,126" alt="Sun" href="sun.htm">

<area shape="circle" coords="90,58,3" alt="Mercury" href="mercur.htm">

<area shape="circle" coords="124,58,8" alt="Venus" href="venus.htm">

</map>

**HTML Tables**

<table style="width:100%">

<tr>

<td>Jill</td>

<td>Smith</td>

<td>50</td>

</tr>

<tr>

<td>Eve</td>

<td>Jackson</td>

<td>94</td>

</tr>

</table>

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⮚ Tables are defined with the **<table>** tag.

⮚ Tables are divided into **table rows** with the **<tr>** tag.

⮚ Table rows are divided into **table data** with the **<td>** tag.

⮚ A table row can also be divided into **table headings** with the **<th>** tag.

***Table with a Border Attribute***

⮚ If you do not specify a border for the table, it will be displayed without borders. ⮚ A border can be added using the border attribute:

<table border="1" style="width:100%">

<tr>

<td>Jill</td>

<td>Smith</td>

<td>50</td>

</tr>

<tr>

<td>Eve</td>

<td>Jackson</td>

<td>94</td>

</tr>

</table>

***Table with Collapsed Borders***

⮚ If you want the borders to collapse into one border, add **CSS border-collapse**: ***Example***

table, th, td {

border: 1px solid black;

border-collapse: collapse;

}

***Table with Cell Padding***

⮚ Cell padding specifies the space between the cell content and its borders.

⮚ If you do not specify a padding, the table cells will be displayed without padding. ⮚ To set the padding, use the **CSS padding** property:

***Example***

table, th, td {

border: 1px solid black;

border-collapse: collapse;

}

th, td {

padding: 15px;

}

***Table Headings***

⮚ Table headings are defined with the **<th>** tag.

⮚ By default, all major browsers display table headings as bold and centered: ***Example***

<table style="width:100%">

<tr>

<th>Firstname</th>

<th>Lastname</th>

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<th>Points</th>

</tr>

<tr>

<td>Eve</td>

<td>Jackson</td>

<td>94</td>

</tr>

</table>

***Table with Border Spacing***

⮚ Border spacing specifies the space between the cells.

⮚ To set the border spacing for a table, use the **CSS border-spacing** property: ***Example***

table {

border-spacing: 5px;

}

***T able Cells that Span Many Columns***

⮚ To make a cell span more than one column, use the **colspan** attribute:

***Example***

<table style="width:100%">

<tr>

<th>Name</th>

<th colspan="2">Telephone</th>

</tr>

<tr>

<td>Bill Gates</td>

<td>555 77 854</td>

<td>555 77 855</td>

</tr>

</table>

**HTML Lists**

⮚ HTML can have Unordered lists, Ordered lists, or Description lists:

***Unordered HTML Lists***

⮚ An unordered list starts with the **<ul>** tag. Each list item starts with the **<li>** tag. ⮚ The list items will be marked with bullets (small black circles).

***Unordered List:***

<ul>

<li>Coffee</li>

<li>Tea</li>

<li>Milk</li>

</ul>

***Ordered HTML Lists***

⮚ An ordered list starts with the **<ol>** tag. Each list item starts with the **<li>** tag. ⮚ The list items will be marked with numbers.

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**Ordered List:**

<ol>

<li>Coffee</li>

<li>Tea</li>

<li>Milk</li>

</ol>

**HTML Classes**

<!DOCTYPE html>

<html>

<head>

<style>

.cities {

background-color:black;

color:white;

margin:20px;

padding:20px;

}

</style>

</head>

<body>

<div class="cities">

<h2>London</h2>

<p>

London is the capital city of England. It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.

</p>

</div>

</body>

</html>

***Classing Block Elements***

∙ The HTML <div> element is a **block level** element. It can be used as a container for other HTML elements.

∙ Classing <div> elements, makes it possible to define equal styles for equal<div> elements:

<!DOCTYPE html>

<html>

<head>

<style>

.cities {

background-color:black;

color:white;

margin:20px;

padding:20px;

}

</style>

</head>

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<body>

<div class="cities">

<h2>London</h2>

<p>London is the capital city of England. It is the most populous city in the United Kingdom, with a metropolitan area of over 13 million inhabitants.</p>

</div>

<div class="cities">

<h2>Paris</h2>

<p>Paris is the capital and most populous city of France.</p>

</div>

<div class="cities">

<h2>Tokyo</h2>

<p>Tokyo is the capital of Japan, the center of the Greater Tokyo Area,

and the most populous metropolitan area in the world.</p>

</div>

</body>

</html>

***Classing Inline Elements***

∙ The HTML <span> element is an inline element that can be used as a container for text. ∙ Classing <span> elements makes it possible to design equal styles for equal<span> elements.

***Example***

<!DOCTYPE html>

<html>

<head>

<style>

span.red {color:red;}

</style> </head>

<body><h1>My <span class="red">Important</span> Heading</h1>

</body>

</html>

**2. Briefly explain in detail about Java Script with suitable example.**

**HTML Scripts**

⮚ JavaScripts make HTML pages more dynamic and interactive.

**The HTML <script> Tag**

⮚ The <script> tag is used to define a client-side script, such as a JavaScript. ⮚ The <script> element either contains scripting statements or it points to an external script file through the src attribute.

⮚ Common uses for JavaScript are image manipulation, form validation, and dynamic changes of content.

⮚ The script below writes Hello JavaScript! into an HTML element with id="demo":

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**Example**

<script>

document.getElementById("demo").innerHTML = "Hello JavaScript!";

</script>

**The HTML <noscript> Tag**

⮚ The <noscript> tag is used to provide an alternate content for users that have disabled scripts in their browser or have a browser that doesn't support client-side scripting. ⮚ The <noscript> element can contain all the elements that you can find inside the <body> element of a normal HTML page.

⮚ The content inside the <noscript> element will only be displayed if scripts are not supported, or are disabled in the user's browser:

***Example***

<script>

document.getElementById("demo").innerHTML = "Hello JavaScript!";

</script>

<noscript>Sorry, your browser does not support JavaScript!</noscript>

**JavaScript Objects**

⮚ You have already learned that JavaScript variables are containers for data values. ⮚ This code assigns a **simple value** (Fiat) to a **variable** named car:

var car = "Fiat";

⮚ Objects are variables too. But objects can contain many values.

⮚ This code assigns **many values** (Fiat, 500, white) to a **variable** named car: var car = {type:"Fiat", model:500, color:"white"};

**Object Properties**

⮚ The name:values pairs (in JavaScript objects) are called **properties**.

var person = {firstName:"John", lastName:"Doe", age:50, eyeColor:"blue"};

**Property Property Value**

firstName John

lastName Doe

age 50

eyeColor blue

**Object Methods**

⮚ Methods are **actions** that can be performed on objects.

⮚ Methods are stored in properties as **function definitions**.

**Property Property Value**

firstName John

lastName Doe

age 50

eyeColor blue

fullName function() {return

this.firstName + " " + this.lastName;}

***Object Definition***

⮚ You define (and create) a JavaScript object with an object literal:

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***Example***

var person = {firstName:"John", lastName:"Doe", age:50, eyeColor:"blue"};

⮚ Spaces and line breaks are not important. An object definition can span multiple lines: ***Example***

var person = {

firstName:"John",

lastName:"Doe",

age:50,

eyeColor:"blue"

};

**Accessing Object Properties**

⮚ You can access object properties in two ways:

*objectName.propertyName*

***Accessing Object Methods***

⮚ You access an object method with the following syntax:

*objectName.methodName()*

**3. Write shorts on datatype in Java Script**

⮚ String, Number, Boolean, Array, Object.

⮚ JavaScript variables can hold many **data types**: numbers, strings, arrays, objects and more:

var length = 16; // Number

var lastName = "Johnson"; // String

var cars = ["Saab", "Volvo", "BMW"]; // Array

var x = {firstName:"John", lastName:"Doe"}; // Object

**The Concept of Data Types**

⮚ In programming, data types is an important concept.

⮚ To be able to operate on variables, it is important to know something about the type. ⮚ Without data types, a computer cannot safely solve this:

var x = 16 + "Volvo";

**JavaScript Has Dynamic Types**

⮚ JavaScript has dynamic types. This means that the same variable can be used as different types:

**Example**

var x; // Now x is undefined

var x = 5; // Now x is a Number

var x = "John"; // Now x is a String

**JavaScript Numbers**

⮚ JavaScript has only one type of numbers.

⮚ Numbers can be written with, or without decimals:

***Example***

var x1 = 34.00; // Written with decimals

var x2 = 34; // Written without decimals

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**JavaScript Booleans**

⮚ Booleans can only have two values: true or false.

***Example***

var x = true;

var y = false;

**4. Explain in detail about control statement in JavaScript with example program**

⮚ Very often when you write code, you want to perform different actions for different decisions.

⮚ You can use conditional statements in your code to do this.

⮚ In JavaScript we have the following conditional statements:

❖ Use **if** to specify a block of code to be executed, if a specified condition is true ❖ Use **else** to specify a block of code to be executed, if the same condition is false ❖ Use **else if** to specify a new condition to test, if the first condition is false

❖ Use **switch** to specify many alternative blocks of code to be executed

**The if Statement**

⮚ Use the **if** statement to specify a block of JavaScript code to be executed if a condition is true.

**Syntax**

if (*condition*) {

*block of code to be executed if the condition is true*

}

**Example**

Make a "Good day" greeting if the hour is less than 18:00:

if (hour < 18) {

greeting = "Good day";

}

**The result of greeting will be:**

Good day

**The else Statement**

⮚ Use the **else** statement to specify a block of code to be executed if the condition is false. Syntax

if (*condition*) {

*block of code to be executed if the condition is true*

} else {

*block of code to be executed if the condition is false*

}

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***Example***

If the hour is less than 18, create a "Good day" greeting, otherwise "Good evening": if (hour < 18) {

greeting = "Good day";

} else {

greeting = "Good evening";

}

**The else if Statement**

⮚ Use the **else if** statement to specify a new condition if the first condition is false.

**Syntax**

if (*condition1*) {

*block of code to be executed if condition1 is true*

} else if (*condition2*) {

*block of code to be executed if the condition1 is false and condition2 is true*

} else {

*block of code to be executed if the condition1 is false and condition2 is false*

}

***Example***

⮚ If time is less than 10:00, create a "Good morning" greeting, if not, but time is less than 20:00, create a "Good day" greeting, otherwise a "Good evening":

if (time < 10) {

greeting = "Good morning";

} else if (time < 20) {

greeting = "Good day";

} else {

greeting = "Good evening";

}

**The result of greeting will be:**

Good day

**JavaScript Switch Statement**

⮚ Use the switch statement to select one of many blocks of code to be executed.

**Syntax**

switch(*expression*) {

case *n*:

*code block*

break;

case *n*:

*code block*

break;

default:

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*default code block*

}

❖ The switch expression is evaluated once.

❖ The value of the expression is compared with the values of each case.

❖ If there is a match, the associated block of code is executed.

***Example***

❖ The getDay() method returns the weekday as a number between 0 and 6. (Sunday=0, Monday=1, Tuesday=2 ..)

❖ Use the weekday number to calculate weekday name:

switch (new Date().getDay()) {

case 0:

day = "Sunday";

break;

case 1:

day = "Monday";

break;

case 2:

day = "Tuesday";

break;

case 3:

day = "Wednesday";

break;

case 4:

day = "Thursday";

break;

case 5:

day = "Friday";

break;

case 6:

day = "Saturday";

break;

}

The result of day will be:

Tuesday

**The break Keyword**

⮚ When the JavaScript code interpreter reaches a **break** keyword, it breaks out of the switch block.

⮚ This will stop the execution of more code and case testing inside the block.

**The default Keyword**

⮚ The **default** keyword specifies the code to run if there is no case match:

***Example***

⮚ The getDay() method returns the weekday as a number between 0 and 6.

⮚ If today is neither Saturday (6) nor Sunday (0), write a default message:

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switch (new Date().getDay()) {

case 6:

text = "Today is Saturday";

break;

case 0:

text = "Today is Sunday";

break;

default:

text = "Looking forward to the Weekend";

}

**5. Explain in detail about HTML Forms with example.**

**The <form> Element**

⮚ HTML forms are used to collect user input.

The **<form>** element defines an HTML form:

***Example***

<form>

.*form elements*

.</form>

⮚ HTML forms contain **form elements**.

⮚ Form elements are different types of input elements, checkboxes, radio buttons, submit buttons, and more.

**The <input> Element**

⮚ The **<input>** element is the most important **form element**.

⮚ The <input> element has many variations, depending on the **type** attribute. ⮚ Here are the types used in this chapter:

**Text Input**

⮚ **<input type="text">** defines a one-line input field for **text input**:

***Example***

<form>

First name:<br>

<input type="text" name="firstname">

<br>

Last name:<br>

<input type="text" name="lastname">

</form>

***Radio Button Input***

⮚ **<input type="radio">** defines a **radio button**.

⮚ Radio buttons let a user select ONE of a limited number of choices:

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***Example***

<form>

<input type="radio" name="sex" value="male" checked>Male

<br>

<input type="radio" name="sex" value="female">Female

</form>

**The Submit Button**

⮚ **<input type="submit">** defines a button for **submitting** a form to a **form-handler**. ⮚ The form-handler is typically a server page with a script for processing input data. ⮚ The form-handler is specified in the form's **action** attribute:

***Example***

<form action="action\_page.php">

First name:<br>

<input type="text" name="firstname" value="Mickey">

<br>

Last name:<br>

<input type="text" name="lastname" value="Mouse">

<br><br>

<input type="submit" value="Submit">

</form>

***The Action Attribute***

⮚ The **action attribute** defines the action to be performed when the form is submitted. ⮚ The common way to submit a form to a server, is by using a submit button. ⮚ Normally, the form is submitted to a web page on a web server.

⮚ In the example above, a server-side script is specified to handle the submitted form: <form **action="action\_page.php**">

**The Method Attribute**

⮚ The **method attribute** specifies the HTTP method (**GET** or **POST**) to be used when submitting the forms:

<form action="action\_page.php" **method="GET"**>

**HTML Form Attributes**

⮚ An HTML <form> element, with all possible attributes set, will look like this: ***Example***

<form action="action\_page.php" method="GET" target="\_blank" accept-charset="UTF-8" enctype="application/x-www-form-urlencoded" autocomplete="off" novalidate> .*form elements*

.</form>

**HTML Form Elements**

⮚ This chapter describes all HTML form elements.

***The <input> Element***

⮚ The most important form element is the **<input>** element.

⮚ The <input> element can vary in many ways, depending on the **type** attribute.

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**The <select> Element (Drop-Down List)**

⮚ The **<select>** element defines a **drop-down** list:

***Example***

<select name="cars">

<option value="volvo">Volvo</option>

<option value="saab">Saab</option>

<option value="fiat">Fiat</option>

<option value="audi">Audi</option>

</select>

⮚ The **<option>** elements defines the options to select.

⮚ The list will normally show the first item as selected.

⮚ You can add a selected attribute to define a predefined option.

***Example***

<option value="fiat" selected>Fiat</option>

***The <textarea> Element***

The **<textarea>** element defines a multi-line input field (**a text area**):

***Example***

<textarea name="message" rows="10" cols="30">

The cat was playing in the garden.

</textarea>

***The <button> Element***

⮚ The **<button>** element defines a clickable **button**:

***Example***

<button type="button" onclick="alert('Hello World!')">Click Me!</button>

***HTML5 <output> Element***

⮚ The <output> element represents the result of a calculation (like one performed by a script).

***Example***

Perform a calculation and show the result in an <output> element:

<form action="action\_page.asp" oninput="x.value=parseInt(a.value)+parseInt(b.value)"> 0

<input type="range" id="a" name="a" value="50">

100 +

<input type="number" id="b" name="b" value="50">

=

<output name="x" for="a b"></output>

<br><br>

<input type="submit">

</form>

**6. Discuss in detail about HTML5 Canvas.**

⮚ The HTML <canvas> element is used to draw graphics, on the fly, via scripting (usually JavaScript).

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⮚ The <canvas> element is only a container for graphics. You must use a script to actually draw the graphics.

⮚ Canvas has several methods for drawing paths, boxes, circles, text, and adding images.

**Canvas Examples**

⮚ A canvas is a rectangular area on an HTML page. By default, a canvas has no border and no content.

⮚ The markup looks like this:

<canvas id="myCanvas" width="200" height="100"></canvas>

⮚ Always specify an id attribute (to be referred to in a script), and a width and height attribute to define the size of the canvas.

⮚ To add a border, use the style attribute:

**Basic Canvas Example**

<canvas id="myCanvas" width="200" height="100" style="border:1px solid #000000;"> </canvas>

***Drawing with JavaScript***

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

ctx.fillStyle = "#FF0000";

ctx.fillRect(0,0,150,75);

***Draw a Line***

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

ctx.moveTo(0,0);

ctx.lineTo(200,100);

ctx.stroke();

**Draw a Circle**

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

ctx.beginPath();

ctx.arc(95,50,40,0,2\*Math.PI);

ctx.stroke();

**Draw a Text**

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

ctx.font = "30px Arial";

ctx.fillText("Hello World",10,50);

**Stroke Text**

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

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ctx.font = "30px Arial";

ctx.strokeText("Hello World",10,50);

***Draw Linear Gradient***

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

// Create gradient

var grd = ctx.createLinearGradient(0,0,200,0);

grd.addColorStop(0,"red");

grd.addColorStop(1,"white");

// Fill with gradient

ctx.fillStyle = grd;

ctx.fillRect(10,10,150,80);

***Draw Circular Gradient***

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

// Create gradient

var grd = ctx.createRadialGradient(75,50,5,90,60,100);

grd.addColorStop(0,"red");

grd.addColorStop(1,"white");

// Fill with gradient

ctx.fillStyle = grd;

ctx.fillRect(10,10,150,80);

***Draw Image***

var c = document.getElementById("myCanvas");

var ctx = c.getContext("2d");

var img = document.getElementById("scream");

ctx.drawImage(img,10,10);

**7. How do you create frames? Why do we need them? Develop an application to explain the same. (MAY/JUNE 2014)**

**Frames**

∙ To use frames on a page we use <frameset> tag instead of <body> tag.

∙ The <frameset> tag defines how to divide the window into frames.

∙ The rows attribute of <frameset> tag defines horizontal frames and cols attribute defines vertical frames.

∙ Each frame is indicated by <frame> tag and it defines which HTML document shall open into the frame.

***Format***

**<frameset rows="pixels|%|\*">**

***Attribute Values***

| Value  | Description |
| --- | --- |
| Pixels  | The row height in pixels (like "100px" or just "100") |

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| %  | The row height in percent of the available space (like "50%") |
| --- | --- |
| \*  | The rest of the available space should be assigned this row |

**Need for Frame**

∙ Frames are a way of organizing your website. They allow you to divide up your window into various segments for different purposes.

∙ Another reason might be to have your entire site's links visible on the page, while the actual 'content' - i.e. text scrolls as much as it needs.

**Example**

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN"

"http://www.w3.org/TR/html4/frameset.dtd">

<html>

<head>

<title>Web Technology</title>

</head>

<frameset cols="200,\*" frameborder="0" border="0" framespacing="0">

<frame name="menu" src="menu\_1.html" marginheight="0" marginwidth="0"

scrolling="auto" noresize>

<frame name="content" src="content.html" marginheight="0" marginwidth="0"

scrolling="auto" noresize>

<noframes>

<p> Frame Example

</frameset>

</html>

**8. Explain in detail about Client side scripting and server side scripting**

**Client-side scripting**

⮚ **Client-side scripting** generally refers to the class of computer programs on the web that are executed *client-side*, by the user's web browser, instead of *server-side* (on the web server).

⮚ This type of computer programming is an important part of the Dynamic HTML (DHTML) concept, enabling web pages to be scripted; that is, to have different and changing content depending on user input, environmental conditions (such as the time of day), or other variables.

⮚ Client-side scripts are often embedded within an HTML or XHTML document(hence known as an "embedded script"),

⮚ but they may also be contained in a separate file, to which the document (or documents) that use it make reference (hence known as an "externalscript").

⮚ Upon request, the necessary files are sent to the user's computer by the web server (or servers) on which they reside.

⮚ The user's web browser executes the script, then displays the document, including any visible output from the script.

⮚ Client-side scripts may also contain instructions for the browser to follow in response to certain user actions, (e.g., clicking a button).

⮚ Often, these instructions can be followed without further communication with the server. ⮚ By viewing the file that contains the script, users may be able to see its source code.

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⮚ Many web authors learn how to write client-side scripts partly by examining the source code for other authors' scripts.

⮚ In contrast, server-side scripts, written in languages such as PHP, ASP.NET, Java, ColdFusion, Perl, Ruby, Go, Python, and server-side JavaScript, are executed by the web server when the user requests a document.

⮚ They produce output in a format understandable by web browsers (usually HTML), which is then sent to the user's computer.

⮚ The user cannot see the script's source code (unless the author publishes the code separately), and may not even be aware that a script was executed.

⮚ Documents produced by server-side scripts may, in turn, contain client-side scripts. ⮚ Server-side scripts require that their language's interpreter be installed on the server, and produce the same output regardless of the client's browser, operating system, or other system details.

⮚ Client-side scripts do not require additional software on the server (making thempopular with authors who lack administrative access to their servers); however, they do require that the user's web browser understands the scripting language in which they are written.

⮚ It is therefore impractical for an author to write scripts in a language that is not supported by popular web browsers.

⮚ Due to security restrictions, client-side scripts may not be allowed to access the user's computer beyond the web browser application.

⮚ Techniques like ActiveX controls can be used to sidestep this restriction.

⮚ Client-side scripting is not inherently unsafe. Users, though, are encouraged to always keep their web browsers up-to-date to avoid exposing their computer and data to new vulnerabilities.

⮚ The latest group of web browsers and web pages tend to employ a heavy amount of client-side scripting, accounting for an improved user interface in which the user does not experience the unfriendly "refreshing" of the web page,

⮚ but instead sees perhaps an animated GIF file indicating that the request occurred and the page will be updated shortly.

⮚ Ajax is an important addition to the JavaScript language, allowing web developers to communicate with the web server in the background without requiring a completely new version of the page to be requested and rendered.

⮚ This leads to a much improved user experience in general.

⮚ Unfortunately, even languages that are supported by a wide variety of browsers may not be implemented in precisely the same way across all browsers and operating systems. ⮚ Authors are well-advised to review the behaviour of their client-side scripts on a variety of platforms before they put them into use.

**Server-side scripting**

⮚ **Server-side scripting** is a technique used in web development which involves employing scripts on a web server which produce a response customized for each user's (client's) request to the website.

⮚ The alternative is for the web server itself to deliver a static web page. Scripts can be written in any of a number of server-side scripting languages that are available (see below).

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⮚ Server-side scripting is distinguished from client-side scripting where embedded scripts, such as JavaScript, are run client-side in a web browser, but both techniques are often used together.

⮚ Server-side scripting is often used to provide a customized interface for the user. ⮚ These scripts may assemble client characteristics for use in customizing the response based on those characteristics, the user's requirements, access rights, etc.

⮚ Server-side scripting also enables the website owner to hide the source code that generates the interface, whereas with client-side scripting, the user has access to allthe code received by the client.

⮚ A down-side to the use of server-side scripting is that the client needs to make further requests over the network to the server in order to show new information to the user via the web browser.

⮚ These requests can slow down the experience for the user, place more load on the server, and prevent use of the application when the user is disconnected from the server. ⮚ When the server serves data in a commonly used manner, for example according to the HTTP or FTP protocols, users may have their choice of a number of client programs (most modern web browsers can request and receive data using both of those protocols).

⮚ In the case of more specialized applications, programmers may write their own server, client, and communications protocol, that can only be used with one another.

⮚ Programs that run on a user's local computer without ever sending or receiving data over a network are not considered clients, and so the operations of such programs would not be considered client-side operations.

**9. Differentiate the client side scripting and server side scripting.**

**Client-side Environment**

⮚ The client-side environment used to run scripts is usually a browser. The processing takes place on the end users computer.

⮚ The source code is transferred from the web server to the users computer over the internet and run directly in the browser.

⮚ The scripting language needs to be **enabled** on the client computer. Sometimes if a user is conscious of **security risks** they may switch the scripting facility off.

⮚ When this is the case a message usually pops up to alert the user when script is attempting to run.

**Server-side Environment**

⮚ The **server-side environment** that runs a scripting language is a web server. A user's request is fulfilled by running a script directly on the web server to generate dynamic HTML pages.

⮚ This HTML is then sent to the client browser. It is usually used to provide interactive web sites that interface to databases or other data stores on the server.

⮚ This is different from client-side scripting where scripts are run by the viewing web browser, usually in JavaScript.

⮚ The primary advantage to server-side scripting is the ability to highly customize the response based on the user's requirements, access rights, or queries into data stores.

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**10.Explain in detail about CSS3 with example program**

**CSS3**

⮚ CSS3 is the latest standard for CSS.

⮚ CSS3 is completely backwards-compatible with earlier versions of CSS.

⮚ This section teaches you about the new features in CSS3!

**CSS3 Modules**

⮚ CSS3 has been split into "modules". It contains the "old CSS specification" (which has been split into smaller pieces). In addition, new modules are added.

Some of the most important CSS3 modules are:

∙ Selectors

∙ Box Model

∙ Backgrounds and Borders

∙ Image Values and Replaced Content

∙ Text Effects

∙ 2D/3D Transformations

∙ Animations

∙ Multiple Column Layout

∙ User Interface

**CSS3 Rounded Corners**

⮚ With the CSS3 border-radius property, you can give any element "rounded corners". ***CSS3 border-radius Property***

⮚ With CSS3, you can give any element "rounded corners", by using the border-radius property.

⮚ Here are three examples:

⮚ Rounded corners for an element with a specified background color:

❖ Rounded corners!

⮚ Rounded corners for an element with a border:

❖ Rounded corners!

⮚ Rounded corners for an element with a background image:

❖ Rounded corners!

Here is the code:

***Example***

#rcorners1 {

border-radius: 25px;

background: #8AC007;

padding: 20px;

width: 200px;

height: 150px;

}

#rcorners2 {

border-radius: 25px;

border: 2px solid #8AC007;

padding: 20px;

width: 200px;

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height: 150px;

}

#rcorners3 {

border-radius: 25px;

background: url(paper.gif);

background-position: left top;

background-repeat: repeat;

padding: 20px;

width: 200px;

height: 150px;

}

**CSS3 Border Images**

⮚ With the CSS3 border-image property, you can set an image to be used as the border around an element.

**CSS3 border-image Property**

⮚ The CSS3 border-image property allows you to specify an image to be used instead of the normal border around an element.

⮚ The border-image property has three parts:

❖ The image to use as the border

❖ Where to slice the image

⮚ We will use the following image (called "border.png"):



⮚ The border-image property takes the image and slices it into nine sections, like a tic-tac toe board. It then places the corners at the corners, and the middle sections are repeated or stretched as you specify.

⮚ Here, the middle sections of the image are repeated to create the border:

⮚ An image as a border!

Here is the code:

***Example***

#borderimg {

border: 10px solid transparent;

padding: 15px;

-webkit-border-image: url(border.png) 30 round; /\* Safari 3.1-5 \*/

order-image: url(border.png) 30 round; /\* Opera 11-12.1

\*/ border-image: url(border.png) 30 round;

}

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**CSS3 Backgrounds**

⮚ CSS3 contains a few new background properties, which allow greater control of the background element.

⮚ how to add multiple background images to one element.

⮚ You will also learn about the following new CSS3 properties:

∙ background-size

∙ background-origin

∙ background-clip

**CSS3 Multiple Backgrounds**

⮚ CSS3 allows you to add multiple background images for an element, throughthe background-image property.

⮚ The different background images are separated by commas, and the images are stacked on top of each other, where the first image is closest to the viewer.

⮚ The following example has two background images, the first image is a flower (aligned to the bottom and right) and the second image is a paper background (aligned to the top left corner):

***Example***

#example1 {

background-image: url(img\_flwr.gif), url(paper.gif);

background-position: right bottom, left top;

background-repeat: no-repeat, repeat;

}

**CSS3 Background Size**

⮚ The CSS3 background-size property allows you to specify the size of background images.

⮚ Before CSS3, the size of a background image was the actual size of the image. CSS3 allows us to re-use background images in different contexts.

⮚ The size can be specified in lengths, percentages, or by using one of the two keywords: contain or cover.

⮚ The following example resizes a background image to much smaller than the original image (using pixels):

⮚ Original background image:

***#div1 {***

***background: url(img\_flower.jpg);***

***background-size: 100px 80px;***

***background-repeat: no-repeat;***

***} Full Size Background Image***

⮚ Now we want to have a background image on a website that covers the entire browser window at all times.

⮚ The requirements are as follows:

∙ Fill the entire page with the image (no white space)

∙ Scale image as needed

∙ Center image on page

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∙ Do not cause scrollbars

⮚ The following example shows how to do it; Use the html element (the html element is always at least the height of the browser window).

⮚ Then set a fixed and centered background on it. Then adjust its size with the background size property:

***Example***

html {

background: url(img\_flower.jpg) no-repeat center center fixed;

background-size: cover;

**CSS3 background-origin Property**

⮚ The CSS3 background-origin property specifies where the background image is positioned.

⮚ The background-origin property takes three different values:

∙ border-box - the background image starts from the upper left corner of the border ∙ padding-box - (default) the background image starts from the upper left corner of the padding edge

∙ content-box - the background image starts from the upper left corner of the content

⮚ The following example illustrates the background-origin property:

***Example***

#example1 {

border: 10px solid black;

padding:35px;

background:url(img\_flwr.gif);

background-repeat: no-repeat;

background-origin: content-box; }

**CSS3 background-clip Property**

⮚ The CSS3 background-clip property specifies the painting area of the background. ⮚ The background-clip property takes three different values:

∙ border-box - (default) the background is painted to the outside edge of the border ∙ padding-box - the background is painted to the outside edge of the padding ∙ content-box - the background is painted within the content box

**Example1** {

border: 10px dotted black;

padding:35px;

background: yellow;

background-clip: content-box;

}

**CSS3 Colors**

⮚ CSS supports color names, hexadecimal and RGB colors.

⮚ In addition, CSS3 also introduces:

∙ RGBA colors

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∙ HSL colors

∙ HSLA colors

∙ opacity

⮚ ***RGBA Colors***

∙ RGBA color values are an extension of RGB color values with an alpha channel which specifies the opacity for a color.

∙ An RGBA color value is specified with: rgba(red, green, blue, alpha). The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (fully opaque)

***Example***

#p1 {background-color: rgba(255, 0, 0, 0.3);} /\* red with opacity \*/

#p2 {background-color: rgba(0, 255, 0, 0.3);} /\* green with opacity \*/

#p3 {background-color: rgba(0, 0, 255, 0.3);} /\* blue with opacity \*/

⮚ **HSL Colors**

∙ HSL stands for Hue, Saturation and Lightness.

∙ An HSL color value is specified with: hsl(hue, saturation, lightness).

✔ Hue is a degree on the color wheel (from 0 to 360):

❖ 0 (or 360) is red

❖ 120 is green

❖ 240 is blue

∙ Saturation is a percentage value: 100% is the full color.

∙ Lightness is also a percentage; 0% is dark (black) and 100% is white.

***Example***

#p1 {background-color: hsl(120, 100%, 50%);} /\* green \*/

#p2 {background-color: hsl(120, 100%, 75%);} /\* light green \*/

#p3 {background-color: hsl(120, 100%, 25%);} /\* dark green \*/

#p4 {background-color: hsl(120, 60%, 70%);} /\* pastel green \*/

⮚ **HSLA Colors**

∙ HSLA color values are an extension of HSL color values with an alpha channel - which specifies the opacity for a color.

∙ An HSLA color value is specified with: hsla(hue, saturation, lightness, alpha), where the alpha parameter defines the opacity.

∙ The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (fully opaque).

***Example***

#p1 {background-color: hsla(120, 100%, 50%, 0.3);} /\* green with opacity \*/

#p2 {background-color: hsla(120, 100%, 75%, 0.3);} /\* light green with opacity \*/ #p3 {background-color: hsla(120, 100%, 25%, 0.3);} /\* dark green with opacity \*/ #p4 {background-color: hsla(120, 60%, 70%, 0.3);} /\* pastel green with opacity \*/ ***Opacity***

∙ The CSS3 opacity property sets the opacity for a specified RGB value.

∙ The opacity property value must be a number between 0.0 (fully transparent) and 1.0 #p1 {background-color:rgb(255,0,0);opacity:0.6;} /\* red with opacity \*/

#p2 {background-color:rgb(0,255,0);opacity:0.6;} /\* green with opacity \*/

#p3 {background-color:rgb(0,0,255);opacity:0.6;} /\* blue with opacity \*/

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**CSS3 Gradients**

∙ CSS3 gradients let you display smooth transitions between two or more specified colors. ∙ Earlier, you had to use images for these effects.

∙ However, by using CSS3 gradients you can reduce download time and bandwidth usage. ∙ In addition, elements with gradients look better when zoomed, because the gradient is generated by the browser.

**CSS3 defines two types of gradients**:

∙ Linear Gradients (goes down/up/left/right/diagonally)

∙ Radial Gradients (defined by their center)

**CSS3 Linear Gradients**

∙ To create a linear gradient you must define at least two color stops. Color stops are the colors you want to render smooth transitions among.

∙ You can also set a starting point and a direction (or an angle) along with the gradient effect.

**Syntax**

background: linear-gradient(*direction*, *color-stop1*, *color-stop2, ...*);

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**UNIT-II JAVA**

**PART A**

**1. When super keyword is used?**

If the method overrides one of its superclass's methods, overridden method can be invoked through the use of the keyword super. It can be also used to refer to a hidden field. **2. Explain Runtime Exceptions?**

It is an exception that occurs that probably could have been avoided by the programmer. As opposed to checked exceptions, runtime exceptions are ignored at the time of compliation. **3. What do you mean by Checked Exceptions?**

It is an exception that is typically a user error or a problem that cannot be foreseen by the programmer. For example, if a file is to be opened, but the file cannot be found, an exception occurs. These exceptions cannot simply be ignored at the time of compilation. **4. What is the difference between StringBuffer and StringBuilder class?**

Use StringBuilder whenever possible because it is faster than StringBuffer. But, if thread safety is necessary then use StringBuffer objects.

**5. What is Abstract class?**

These classes cannot be instantiated and are either partially implemented or not at all implemented. This class contains one or more abstract methods which are simply method declarations without a body.

**6. What is an Interface?**

An interface is a collection of abstract methods. A class implements an interface, thereby inheriting the abstract methods of the interface.

**7. What are the two ways in which Thread can be created?**

Thread can be created by:

**1.** implementing Runnable interface

**2.** extending the Thread class

**8. Difference between throw and throws?**

It includes:

Throw is used to trigger an exception where as throws is used in declaration of exception. Without throws, Checked exception cannot be handled where as checked exception can be propagated with throws.

**9. What is the difference between yielding and sleeping?**

When a task invokes its yield() method, it returns to the ready state. When a task invokes its sleep() method, it returns to the waiting state.

**10. What is the difference between the Reader/Writer class hierarchy and the InputStream/OutputStream class hierarchy?**

The Reader/Writer class hierarchy is character-oriented, and theInputStream/OutputStream class hierarchy is byte-oriented.

**11. What's the difference between the methods sleep() and wait()?**

The code sleep(2000); puts thread aside for exactly two seconds. The code wait(2000), causes a wait of up to two second. A thread could stop waiting earlier if it receives the notify() or notifyAll() call. The method wait() is defined in the class Object and the method sleep() is defined in the class Thread.

**12. What is the difference between error and an exception?**

An error is an irrecoverable condition occurring at runtime. Such as OutOfMemory error. Exceptions are conditions that occur because of bad input etc. e.g. FileNotFoundException will be thrown if the specified file does not exist.

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**13. What is daemon thread?**

Daemon thread is a low priority thread, which runs intermittently in the back ground doing the garbage collection operation for the java runtime system.

**14. Difference between the super and this keyword.**

In the constructor, this() calls a constructor defined in the current class. super() calls a constructor defined in the parent class.

**15. Does java support multiple inheritance? Justify.**

Java does not support multiple inheritance using class, but it provides the facility by interface in order to avoid multiple instances parent class for child classes.

**16. What is the need for Buffered Reader and BufferedInputStream class? What isthe difference between Reader/writer and InputStream/outputStream?**

Buffered reader-character oriented, used o read text data and faster.

BufferedInputStream-byte oriented, used to read image, binary and sequential data , slower.

**17. What is the importance of == and equals () methods with respect to string object?** Both equals() method and == operator is used to compare two objects in Java. == is an operator and equals() is method. But == operator compare reference or memory location of objects in the heap, whether they point to the same location or not .

equals() method the main purpose is to compare the state of two objects or contents of the object are equal or not.

**18. What is Inheritance?**

Inheritance is a mechanism in which one object acquires all the properties and behaviour of another object of another class. It represents IS-A relationship. It is used for Code Resusability and Method Overriding.

**19. What is cloning?**

The **object cloning** is a way to create exact copy of an object. For this purpose, clone() method of Object class is used to clone an object. Less processing task.

**20. Mention the purpose of the Keyword 'final'.**

It is used with variables to make its values not to be changed.

The **final keyword** can be applied with the variables, a **final** variable that have no value it is called blank **final** variable or uninitialized **final** variable. It can be initialized in the constructor only. The blank**final** variable can be static also which will be initialized in the static block only.

**21. Write down the fundamentals of exception handling?**

o Exception is an event that occurs at the time of execution of a program.

o It disrupts the normal flow of the program.

o It is an object that describes the exceptional condition that occurs at the runtime of the program.

o Exception will happen due to improper input, resource not found and so on.. **Exception Handling:** Java exception handling is done using five keywords: try, catch, throw, throws, finally.

**Try:** This block helps program to monitor whether an exception arises or not.

**catch:** The exception is catched and handled here.

**throw:**Manually throws an exception out of the method.

**throws:**Any exception that is thrown out is specified here.

**finally:** Any code that has to be executed before a method returns is placed here.

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**Exception handling block:**

***Try***

***{ //code to monitor whether an exception arises or not }***

***catch (ExceptionType\_1 exobject)***

***{ //Exception handler }***

***Finally***

***{ // code to be executed before try block ends }***

**22. What are Java Packages? What’s the significance of packages?**

In Java, package is a collection of classes and interfaces which are bundled together as they are related to each other. Use of packages helps developers to modularize the code and group the code for proper re-use. Once code has been packaged in Packages, it can be imported in other classes and used.

**23. How an object is serialized in java?**

In java, to convert an object into byte stream by serialization, an interface with the name Serializable is implemented by the class. All objects of a class implementing serializable interface get serialized and their state is saved in byte stream.

**24. When we should use serialization?**

Serialization is used when data needs to be transmitted over the network. Using serialization, object’s state is saved and converted into byte stream .The byte stream is transferred over the network and the object is re-created at destination.

**25. Why Strings in Java are called as Immutable?**

In java, string objects are called immutable as once value has been assigned to a string, it can’t be changed and if changed, a new object is created.

**26. What is multi-threading?**

Multi threading is a programming concept to run multiple tasks in a concurrent manner within a single program. Threads share same process stack and running in parallel. It helps in performance improvement of any program.

**27. How garbage collection is done in Java?**

In java, when an object is not referenced any more, garbage collection takes place and the object is destroyed automatically. For automatic garbage collection java calls either System.gc() method or Runtime.gc() method.

**28. How destructors are defined in Java?**

In Java, there are no destructors defined in the class as there is no need to do so. Java has its own garbage collection mechanism which does the job automatically by destroying the objects when no longer referenced.

**29. What’s meant by anonymous class?**

An anonymous class is a class defined without any name in a single line of code using new keyword.

**30. Can we override static methods of a class?**

We cannot override static methods. Static methods belong to a class and not to individual objects and are resolved at the time of compilation (not at runtime).Even if we try to override static method,we will not get an complitaion error, nor the impact of overriding when running the code.

**PART-B**

**1. Explain briefly the following object oriented concepts.**

**(i) Abstraction and Encapsulation.**

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**(ii) Methods and messages.**

**(iii) Inheritance.**

**(iv) Polymorphism.**

**(v) Object and Class**

**OBJECT:**

⮚ Objects are key to understanding object-oriented technology.

⮚ Examples of real-world objects: dog,desk, television set, your bicycle.

⮚ Real-world objects share two characteristics: They all have **state** and **behavior.** ⮚ Dogs have state (name, color, breed, hungry) and behavior (barking, fetching, wagging tail).



A software object.

⮚ Software objects are conceptually similar to real-world objects: they too consist of state and related behavior.

⮚ An object stores its state in fields (variables in some programming languages) and exposes its behavior through methods (functions in some programming languages). ⮚ Methods operate on an object's internal state and serve as the primary mechanism for object-to-object communication. Hiding internal state and requiring all interaction to be performed through an object's methods is known as data encapsulation — a fundamental principle of object-oriented programming.

Consider a bicycle, for example:



**A bicycle modeled as a software object.**

⮚ Bundling code into individual software objects provides a number of benefits, including: ❖ **Modularity**: The source code for an object can be written and maintained independently of the source code for other objects. Once created, an object can be easily passed around inside the system.

❖ **Information-hiding**: By interacting only with an object's methods, the details of its internal implementation remain hidden from the outside world.

❖ **Code re-use:** If an object already exists (perhaps written by another software developer), you can use that object in your program. This allows specialists to

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implement/test/debug complex, task-specific objects, which you can then trust to run in your own code.

❖ **Pluggability and debugging ease**: If a particular object turns out to be problematic, you can simply remove it from your application and plug in a different object as its replacement. This is analogous to fixing mechanical problems in the real world. If a bolt breaks, you replace it, not the entire machine.

**CLASS:**

⮚ It is the central point of OOP and that contains data and codes with behavior. ⮚ In Java everything happens within class and it describes a set of objects with common behavior.

⮚ The class definition describes all the properties, behavior, and identity ofobjects present within that class.

⮚ As far as types of classes are concerned, there are predefined classes in languages like C++ and Pascal.

⮚ But in Java one can define his/her own types with data and code.

⮚ Example: In object-oriented terms, we say that your bicycle is an instance of the class of objects known as bicycles.

⮚ A class is the blueprint from which individual objects are created.

⮚ The following Bicycle class is one possible implementation of a bicycle:

**class Bicycle {**

**int cadence = 0;**

**int speed = 0;**

**int gear = 1;**

**void changeCadence(int newValue) {**

**cadence = newValue;**

**}**

**void changeGear(int newValue) {**

**gear = newValue;**

**}**

**void speedUp(int increment) {**

**speed = speed + increment;**

**}**

**void applyBrakes(int decrement) {**

**speed = speed - decrement;**

**}**

**void printStates() {**

**System.out.println("cadence:"+cadence+" speed:"+speed+" gear:"+gear); }}**

⮚ The syntax of the Java programming language: The fields cadence, speed, and gear represent the object's state, and the methods (changeCadence, changeGear, speedUp etc.) define its interaction with the outside world.

⮚ You may have noticed that the Bicycle class does not contain a main method. That's because it's not a complete application; it's just the blueprint for bicycles that might be used in an application. The responsibility of creating and using new Bicycle objects belongs to some other class in your application.

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⮚ Here's a BicycleDemo class that creates two separate Bicycle objects and invokes their methods:

**class BicycleDemo {**

**public static void main(String[] args) {**

**// Create two different Bicycle objects**

**Bicycle bike1 = new Bicycle();**

**Bicycle bike2 = new Bicycle();**

**// Invoke methods on those objects**

**bike1.changeCadence(50);**

**bike1.speedUp(10);**

**bike1.changeGear(2);**

**bike1.printStates();**

**bike2.changeCadence(50);**

**bike2.speedUp(10);**

**bike2.changeGear(2);**

**bike2.changeCadence(40);**

**bike2.speedUp(10);**

**bike2.changeGear(3);**

**bike2.printStates();**

**}}**

**METHOD**

⮚ We know that a class can define both attributes and behaviors. Again attributes are defined by variables and behaviors are represented by methods.

⮚ In other words, methods define the abilities of an object.

⮚ A method is a group of instructions that is given a name and can be called up at any point in a program simply by quoting that name.

⮚ Creating a method in a Java program

**import java.awt.\*;**

**import java.applet.\*;**

**public class calculation extends Applet**

**{ int first, answer;**

**public void paint (Graphics g)**

**{ first = 34;**

**calculation();**

**g.d rawString("Twice 34 is " + answer, 10, 25);**

**}**

**public void calculation ()**

**{ answer = first \* 2;**

**} }**

**MESSAGES**

⮚ A single object alone is generally not very useful and usually appears as a component of a larger program or application that contains many other objects.

⮚ Through the interaction of these objects, programmers achieve higher order functionality and more complex behavior.

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⮚ Software objects interact and communicate with each other by sending messages to each other. When object A wants object B to perform one of B's methods, object A sends a message to object B.



⮚ Sometimes the receiving object needs more information so that it knows exactly what to do—

⮚ For example, when you want to change gears on your bicycle, you have to indicate which gear you want. This information is passed along with the message as parameters. ⮚ Three components comprise a message:

❖ The object to whom the message is addressed (Your Bicycle)

❖ The name of the method to perform (changeGears)

❖ Any parameters needed by the method (lower gear)



⮚ The Benefits of Messages

❖ An object's behavior is expressed through its methods, so (aside from direct variable access) message passing supports all possible interactions

between objects.

❖ Objects don't need to be in the same process or even on the same machine to send and receive messages back and forth to each other.

**ABSTACTION AND ENCAPSULATION**

⮚ The process of abstraction in Java is used to hide certain details and only show the essential features of the object. In other words, it deals with the outside view of an object (interface).

⮚ Abstraction is simplifying complex reality by modeling classes appropriate to the problem, and working at the most appropriate level of inheritance for a given aspect of the problem.

⮚ This is an important programming concept that assists in separating an object's state from its behavior.

⮚ This helps in hiding an object's data describing its state from any further modification by external component.

⮚ In Java there are four different terms used for hiding data constructs and these are public, private, protected and package.

⮚ object can associated with data with predefined classes and in any application an object can know about the data it needs to know about.

⮚ So any unnecessary data are not required by an object can be hidden by this process.

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⮚ It can also be termed as information hiding that prohibits outsiders in seeing the inside of an object in which abstraction is implemented.

**INHERITANCE**

⮚ This is the mechanism of organizing and structuring software program. Thoughobjects are distinguished from each other by some additional features but there are objects that share certain things common

⮚ . In object oriented programming classes can inherit some common behavior and state from others.

⮚ Inheritance in OOP allows to define a general class and later to organize some other classes simply adding some details with the old class definition

⮚ . This saves work as the special class inherits all the properties of the old general class and as a programmer you only require the new features.

⮚ This helps in a better data analysis, accurate coding and reduces development time. ⮚ Object-oriented programming allows classes to inherit commonly used state and behavior from other classes.

⮚ In this example, Bicycle now becomes the superclass of MountainBike, RoadBike, and TandemBike.

⮚ In the Java programming language, each class is allowed to have one direct superclass, and each superclass has the potential for an unlimited number of subclasses:



**A hierarchy of bicycle classes.**

⮚ The syntax for creating a subclass is simple. At the beginning of your class declaration, use the extends keyword, followed by the name of the class to inherit from the super class.

**POLYMORPHISM**

⮚ It describes the ability ofthe object in belonging to different types with specific behavior of each type

⮚ By using this, one object can be treated like another and in this way it can create and define multiple level of interface.

⮚ Here the programmers need not have to know the exact type of object in advance and this is being implemented at runtime.

⮚ For example, given a base class shape, polymorphism enables the programmer to define different area methods for any number of derived classes, such as circles, rectangles and triangles.

⮚ No matter what shape an object is, applying the area method to it will return the correct results.

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⮚ Polymorphism is considered to be a requirement of any true object-oriented programming language (OOPL).

⮚ A variable with a given name may be allowed to have different forms and the program can determine which form of the variable to use at the time of execution.

⮚ A method with a given name may be allowed to have different form of variable declaration known as overloading.

**2. List out the features of java**

⮚ There is given many features of java. They are also known as java buzzwords. The Java Features given below are simple and easy to understand.

❖ Simple

❖ Object-Oriented

❖ Platform independent

❖ Secured

❖ Robust

❖ Portable

❖ Dynamic

❖ Interpreted

❖ High Performance

❖ Multithreaded

❖ Distributed

**Simple**

⮚ Java is Easy to write and more readable and eye catching.

⮚ Looks familiar to existing programmers: related to C and C++:

⮚ Omits many rarely used, poorly understood, confusing features of C++, like operator overloading, multiple inheritance, automatic coercions, etc.

⮚ Contains no *goto* statement, but *break* and *continue*

⮚ Has no header files and eliminated C preprocessor

⮚ Eliminates much redundancy (e.g. no structs, unions)

⮚ It has no pointers

❖ Added features to simplify:

∙ Garbage collection, so the programmer won't have to worry about storage management, which leads to fewer bugs.

∙ A rich predefined class library

**Object-oriented**

⮚ Java programming is object-oriented programming language.

⮚ Like C++ java provides most of the object oriented features.

⮚ Java is pure OOP. Language. (while C++ is semi object oriented)

⮚ Java is an object-oriented language, which means that you focus on the *data* in your application and *methods* that manipulate that data, rather than thinking strictly in terms of procedures.

⮚ In an object-oriented system, a *class* is a collection of data and methods that operate on that data. Taken together, the data and methods describe the state and behavior of an *object*. Classes are arranged in a hierarchy, so that a subclass can inherit behavior fromits superclass.

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⮚ Java comes with an extensive set of classes, arranged in *packages*, that you can use in your programs.

**Platform Independent**

⮚ Java code is compiled by the compiler and converted into bytecode.This bytecode is a platform independent code because it can be run on multiple platforms i.e. Write Once and Run Anywhere(WORA).

**Secured**

⮚ Java is secured because

∙ No explicit pointer

∙ Programs run inside virtual machine sandbox.

⮚ **Classloader-** adds security by separating the package for the classes of the localfile system from those that are imported from network sources.

⮚ **Bytecode Verifier-** checks the code fragments for illegal code that can violate access right to objects.

⮚ **Security Manager-** determines what resources a class can access such as reading and writing to the local disk.

⮚ These security are provided by java language. Some security can also be provided by application developer through SSL,JAAS,cryptography etc.

⮚ Java provides secure way to access web applications.

**Robust**

⮚ Java has been designed for writing highly reliable or robust software:

⮚ language restrictions (e.g. no pointer arithmetic and real arrays) to make it impossible for applications to smash memory (e.g overwriting memory and corrupting data)

⮚ Java does **automatic garbage collection**, which prevents memory leaks

⮚ Extensive compile-time checking so bugs can be found early; this is repeated at runtime for flexibilty and to check consistency

**Portable**

⮚ Java programs can execute in any environment for which there is a Java run-time system.(JVM)

⮚ Java programs can be run on any platform (Linux,Window,Mac)

⮚ Java programs can be transferred over world wide web (e.g applets)

⮚ We may carry the java bytecode to any platform

**High-performance**

⮚ Bytecodes are highly optimized.

⮚ JVM can executed them much faster.

**Distributed**

⮚ Java was designed with the distributed environment.

⮚ RMI and EJB are used for creating distributed applications.

⮚ We may access files by calling the methods from any machine on the internet. ⮚ Java supports various levels of network connectivity through classes in the java.net package

**Multi-threaded**

⮚ We can write Java programs that deal with many tasks at once by defining multiple threads.

⮚ The main advantage of multi-threading is that it shares the same memory.

⮚ Threads are important for multi-media, Web applications etc.

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**Dynamic**

⮚ Java was designed to adapt to an evolving environment:

⮚ Even after binaries have been released, they can adapt to a changing environment ⮚ Java loads in classes as they are needed, even from across the network

⮚ It defers many decisions (like object layout) to runtime, which solves many of the version problems that C++ has

**Interpreted**

⮚ The Java compiler generates *byte-codes*, rather than native machine code.

⮚ To actually run a Java program, you use the Java interpreter to execute the compiled byte-codes. Java byte-codes provide an architecture-neutral object file format. ⮚ \The code is designed to transport programs efficiently to multiple platforms. ∙ rapid turn-around development

∙ Software author is protected, since binary byte streams are downloaded and not the source code

**3. Write short on variable and datatype in java**

⮚ Variable is a name of memory location.

⮚ There are three types of variables: local, instance and static.

⮚ There are two types of datatypes in java, primitive and non-primitive.

**Variable**

⮚ Variable is name of reserved area allocated in memory.

**Types of Variable**

⮚ There are three types of variables in java

∙ local variable

∙ instance variable

∙ static variable



**Local Variable**

⮚ A variable that is declared inside the method is called local variable.

**Instance Variable**

⮚ A variable that is declared inside the class but outside the method is called instance variable . It is not declared as static.

**Static variable**

⮚ A variable that is declared as static is called static variable. It cannot be local.

**Example**

**class A{**

int data=50;//instance variable

static int m=100;//static variable

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void method(){

int n=90;//local variable

}

}//end of class

**Data Types**

⮚ In java, there are two types of data types

∙ primitive data types

∙ non-primitive data types

**4. Explain in detail about array with example program**

⮚ Java provides a data structure, the **array**, which stores a fixed-size sequentialcollection of elements of the same type.

⮚ An array is used to store a collection of data, but it is often more useful to think of an array as a collection of variables of the same type.

⮚ Instead of declaring individual variables, such as number0, number1, ..., and number99, you declare one array variable such as numbers and use numbers[0], numbers[1], and ..., numbers[99] to represent individual variables.

**Declaring Array Variables:**

⮚ To use an array in a program, you must declare a variable to reference the array, and you must specify the type of array the variable can reference.

⮚ Here is the syntax for declaring an array variable:

dataType[] arrayRefVar; // preferred way.

or

**dataType arrayRefVar[];** // works but not preferred way.

**Example:**

The following code snippets are examples of this syntax:

double[] myList; // preferred way.

or

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double myList[]; // works but not preferred way.

**Creating Arrays:**

⮚ You can create an array by using the new operator with the following syntax: arrayRefVar = new dataType[arraySize];

⮚ The above statement does two things:

∙ It creates an array using new dataType[arraySize];

∙ It assigns the reference of the newly created array to the variable arrayRefVar. ⮚ Declaring an array variable, creating an array, and assigning the reference of the arrayto the variable can be combined in one statement, as shown below:

dataType[] arrayRefVar = new dataType[arraySize];

⮚ Alternatively you can create arrays as follows:

dataType[] arrayRefVar = {value0, value1, ..., valuek};

⮚ The array elements are accessed through the **index**. Array indices are 0-based; that is, they start from 0 to **arrayRefVar.length-1**.

**Example:**

⮚ Following statement declares an array variable, myList, creates an array of10 elements of double type, and assigns its reference to myList.:

double[] myList = new double[10];

⮚ Following picture represents array myList. Here myList holds ten double values and the indices are from 0 to 9.



**Processing Arrays:**

⮚ When processing array elements, we often use either for loop or foreach loop because all of the elements in an array are of the same type and the size of the array is known. **Example:**

⮚ Here is a complete example of showing how to create, initialize and process arrays: public class TestArray {

public static void main(String[] args) {

double[] myList = {1.9, 2.9, 3.4, 3.5};

// Print all the array elements

for (int i = 0; i < myList.length; i++) {

System.out.println(myList[i] + " ");

}

// Summing all elements

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double total = 0;

for (int i = 0; i < myList.length; i++) {

total += myList[i];

}

System.out.println("Total is " + total);

// Finding the largest element

double max = myList[0];

for (int i = 1; i < myList.length; i++) {

if (myList[i] > max) max = myList[i];

}

System.out.println("Max is " + max);

}}

**Passing Arrays to Methods:**

⮚ Just as you can pass primitive type values to methods, you can also pass arraysto methods.

⮚ For example, the following method displays the elements in an int array:

public static void printArray(int[] array) {

for (int i = 0; i < array.length; i++) {

System.out.print(array[i] + " "); }}

⮚ You can invoke it by passing an array. For example, the following statement invokes the printArray method to display 3, 1, 2, 6, 4, and 2:

printArray(new int[]{3, 1, 2, 6, 4, 2});

**Returning an Array from a Method:**

⮚ A method may also return an array. For example, the method shown below returns an array that is the reversal of another array:

⮚ Example

public static int[] reverse(int[] list) {

int[] result = new int[list.length];

for (int i = 0, j = result.length - 1; i < list.length; i++, j--) {

result[j] = list[i];

} return result; }

**THE ARRAYS CLASS:**

⮚ The java.util.Arrays class contains various static methods for sorting and searching arrays, comparing arrays, and filling array elements.

⮚ These methods are overloaded for all primitive types.

**public static int binarySearch(Object[] a, Object key)**

**5. Briefly explain the various operator in java**

⮚ Java provides a rich set of operators to manipulate variables. We can divide all the Java operators into the following groups:

▪ Arithmetic Operators

▪ Relational Operators

▪ Bitwise Operators

▪ Logical Operators

▪ Assignment Operators

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**The Arithmetic Operators:**

⮚ Arithmetic operators are used in mathematical expressions in the same way that they are used in algebra. The following table lists the arithmetic operators:

⮚ Assume integer variable A holds 10 and variable B holds 20, then:

| **Operator**  | **Description**  | **Example** |
| --- | --- | --- |
| +  | Addition - Adds values on either side of the operator  | A + B will give 30 |
| -  | Subtraction - Subtracts right hand operand from left hand operand A - B will give -10 |  |
| \*  | Multiplication - Multiplies values on either side of the operator  | A \* B will give 200 |
| /  | Division - Divides left hand operand by right hand operand  | B / A will give 2 |
| % | Modulus - Divides left hand operand by right hand operand and returns remainder  | B % A will give 0 |
| ++ Increment - Increases the value of operand by 1  | B++ gives 21 |
| --  | Decrement - Decreases the value of operand by 1  | B-- gives 19 |

**The Relational Operators:**

⮚ There are following relational operators supported by Java language

⮚ Assume variable A holds 10 and variable B holds 20, then:

| **Operator**  | **Description**  | **Example** |
| --- | --- | --- |
| == | Checks if the values of two operands are equal or not, if yes then condition becomes true. | (A == B) is not true. |
| !=  | Checks if the values of two operands are equal or not, if values are not equal then condition becomes true.  | (A != B) is true. |
| > | Checks if the value of left operand is greater than the value of right operand, if yes then condition becomes true. | (A > B) is not true. |
| < | Checks if the value of left operand is less than the value of right operand, if yes then condition becomes true.  | (A < B) is true. |
| >= | Checks if the value of left operand is greater than or equal to the value of right operand, if yes then condition becomes true. | (A >= B) is not true. |
| <= | Checks if the value of left operand is less than or equal to the value of right operand, if yes then condition becomes true.  | (A <= B) is true. |

**The Bitwise Operators:**

⮚ Java defines several bitwise operators, which can be applied to the integer types, long, int, short, char, and byte.

⮚ Bitwise operator works on bits and performs bit-by-bit operation. Assume if a = 60; and b = 13; now in binary format they will be as follows:

⮚ The following table lists the bitwise operators:

| **Operator**  | **Description**  | **Example** |
| --- | --- | --- |
| & | Binary AND Operator copies a bit to the result if it exists in both operands. | (A & B) will give 12 which is 0000 1100 |

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| |  | Binary OR Operator copies a bit if it exists in either operand. | (A | B) will give 61 which is 0011 1101 |
| --- | --- | --- |
| ^ | Binary XOR Operator copies the bit if it is set in one operand but not both. | (A ^ B) will give 49 which is 0011 0001 |
| ~ | Binary Ones Complement Operator is unary and has the effect of 'flipping' bits. | (~A ) will give - 61 which is 1100 0011 in 2's complement form due to a signed binary number. |
| << | Binary Left Shift Operator. The left operands value is moved left by the number of bits specified by the right operan | A << 2 will give 240 which is 1111 0000 |
| >> | Binary Right Shift Operator. The left operands value is moved right by the number of bits specified by the right operand. | A >> 2 will give 15 which is 1111 |
| >>> | Shift right zero fill operator. The left operands value is moved right by the number of bits specified by the right operand and shifted values are filled up with zeros. | A >>>2 will give 15 which is 0000 1111 |

**The Logical Operators:**

⮚ The following table lists the logical operators:

⮚ Assume Boolean variables A holds true and variable B holds false, then:

| **Operator**  | **Description**  | **Example** |
| --- | --- | --- |
| &&  | Called Logical AND operator. If both the operands are non-zero, then the condition becomes true. | (A && B) is false. |
| ||  | Called Logical OR Operator. If any of the two operands are non zero, then the condition becomes true.  | (A || B) is true. |
| ! | Called Logical NOT Operator. Use to reverses the logical state of its operand. If a condition is true then Logical NOT operator will make false. | !(A && B) is true. |

**The Assignment Operators:**

⮚ There are following assignment operators supported by Java language:

| **Operator**  | **Description**  | **Example** |
| --- | --- | --- |
| = | Simple assignment operator, Assigns values from right side operands to left side operand | C = A + B will assign value of A + B into C |
| += | Add AND assignment operator, It adds right operand to the left operand and assign the result to left operand | C += A is equivalent to C = C + A |

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| -= | Subtract AND assignment operator, It subtracts right operand from the left operand and assign the result to left operand | C -= A is equivalent to C = C - A |
| --- | --- | --- |
| \*=  | Multiply AND assignment operator, It multiplies right operand with the left operand and assign the result to left operand | C \*= A is equivalent to C = C \* A |
| /=  | Divide AND assignment operator, It divides left operand with the right operand and assign the result to left operand | C /= A is equivalent to C = C / A |
| %=  | Modulus AND assignment operator, It takes modulus using two operands and assign the result to left operand | C %= A is equivalent to C = C % A |
| <<=  | Left shift AND assignment operator | C <<= 2 is same as C = C << 2 |
| >>=  | Right shift AND assignment operator  | C >>= 2 is same as C = C >> 2 |
| &=  | Bitwise AND assignment operator  | C &= 2 is same as C = C & 2 |
| ^=  | bitwise exclusive OR and assignment operator  | C ^= 2 is same as C = C ^ 2 |
| |=  | bitwise inclusive OR and assignment operator  | C |= 2 is same as C = C | 2 |

**6. Explain the various control statement in java**

⮚ **Java Control statements** control the order of execution in a java program, based on data values and conditional logic. There are three main categories of control flow statements; ⮚ Selection statements: if, if-else and switch.

⮚ · Loop statements: while, do-while and for.

⮚ · Transfer statements: break, continue, return, try-catch-finally and assert. **Selection Statements**

**The If Statement**

⮚ The if statement executes a block of code only if the specified expression is true. ⮚ If the value is false, then the if block is skipped and execution continues with the rest of the program.

⮚ You can either have a single statement or a block of code within an if statement. ⮚ Note that the conditional expression must be a Boolean expression.

⮚ The simple if statement has the following syntax:

**if (<conditional expression>)**

**<statement action>**

⮚ Example

public class IfStatementDemo {

public static void main(String[] args) {

int a = 10, b = 20;

if (a &gt; b)

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System.out.println("a &gt; b");

if (a &lt; b)

System.out.println("b &gt; a");

}}

**Output**

b > a

**The If-else Statement**

⮚ The if/else statement is an extension of the if statement. If the statements in the if statement fails, the statements in the else block are executed.

⮚ You can either have a single statement or a block of code within if-else blocks. ⮚ Note that the conditional expression must be a Boolean expression.

⮚ The if-else statement has the following syntax:

**if (<conditional expression>)**

**<statement action>**

**else**

**<statement action>**

⮚ Example

public class IfElseStatementDemo {

public static void main(String[] args) {

int a = 10, b = 20;

if (a &gt; b) {

System.out.println("a &gt; b");

} else {

System.out.println("b &gt; a");

} }}

**Output**

b > a

**Switch Case Statement**

⮚ The switch case statement, also called a case statement is a multi-way branch with several choices.

⮚ A switch is easier to implement than a series of if/else statements.

⮚ The switch statement begins with a keyword, followed by an expression that equates to a no long integral value.

⮚ Following the controlling expression is a code block that contains zero or more labeled cases. Each label must equate to an integer constant and each must be unique. ⮚ When the switch statement executes, it compares the value of the controlling expression to the values of each case label.

⮚ The program will select the value of the case label that equals the value of the controlling expression and branch down that path to the end of the code block. If none of the case label values match, then none of the codes within the switch statement code block will be executed.

⮚ Java includes a default label to use in cases where there are no matches. We can have a nested switch within a case block of an outer switch. Its general form is asfollows: **switch(<non-long integral expression>){**

**case label1: <statement1>**

**case label2: <statement2>**

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**…**

**case labeln: <statementn>**

**default: <statement>**

**} // end switch**

⮚ When executing a switch statement, the program falls through to the next case. ⮚ Therefore, if you want to exit in the middle of the switch statement code block, you must insert a break statement, which causes the program to continue executing after the current code block.

⮚ Example program to find the greatest of 3 numbers.

public class SwitchCaseStatementDemo {

public static void main(String[] args) {

int a = 10, b = 20, c = 30;

int status = -1;

if (a &gt; b &amp;&amp; a &gt; c) {

status = 1;

} else if (b &gt; c) {

status = 2;

} else {

status = 3;

}

switch (status) {

case 1:

System.out.println("a is the greatest");

break;

case 2:

System.out.println("b is the greatest");

break;

case 3:

System.out.println("c is the greatest");

break;

default:

System.out.println("Cannot be determined");

} } }

**Output**

c is the greatest

**Iteration Statements**

**While Statement**

⮚ The while statement is a looping construct control statement that executes a block of code while a condition is true.

⮚ You can either have a single statement or a block of code within the while loop. The loop will never be executed if the testing expression evaluates to false.

⮚ The loop condition must be a boolean expression.

⮚ The syntax of the while loop is

**while (<loop condition>)**

**<statements>**

⮚ Example program to print numbers from 1 to 10.

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public class WhileLoopDemo {

public static void main(String[] args) {

int count = 1;

System.out.println("Printing Numbers from 1 to 10");

while (count &lt;= 10) {

System.out.println(count++);

}

}

**Do-while Loop Statement**

⮚ The do-while loop is similar to the while loop, except that the test is performed at the end of the loop instead of at the beginning.

⮚ This ensures that the loop will be executed at least once.

⮚ A do-while loop begins with the keyword do, followed by the statements that make up the body of the loop.

⮚ Finally, the keyword while and the test expression completes the do-while loop. ⮚ When the loop condition becomes false, the loop is terminated and execution continues with the statement immediately following the loop.

⮚ You can either have a single statement or a block of code within the do-while loop. ⮚ The syntax of the do-while loop is

**do**

**<loop body>**

**while (<loop condition>);**

⮚ Example

public class DoWhileLoopDemo {

public static void main(String[] args) {

int count = 1;

System.out.println("Printing Numbers from 1 to 10");

do {

System.out.println(count++);

} while (count &lt;= 10);

}

**For Loops**

⮚ The for loop is a looping construct which can execute a set of instructions a specified number of times. It’s a counter controlled loop.

⮚ The syntax of the loop is as follows:

**for (<initialization>; <loop condition>; <increment expression>)**

**<loop body>**

⮚ The first part of a for statement is a starting initialization, which executes once before the loop begins.

⮚ The <initialization> section can also be a comma-separated list of expression statements. ⮚ The second part of a for statement is a test expression. As long as the expression is true, the loop will continue. If this expression is evaluated as false the first time, the loop will never be executed.

⮚ The third part of the for statement is the body of the loop. These are the instructionsthat are repeated each time the program executes the loop.

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⮚ The final part of the for statement is an increment expression that automatically executes after each repetition of the loop body.

⮚ Typically, this statement changes the value of the counter, which is then tested to see if the loop should continue.

⮚ All the sections in the for-header are optional. Any one of them can be left empty, but the two semicolons are mandatory.

⮚ In particular, leaving out the <loop condition> signifies that the loop condition istrue. The (;;) form of for loop is commonly used to construct an infinite loop.

⮚ Example

public class ForLoopDemo {

public static void main(String[] args) {

System.out.println("Printing Numbers from 1 to 10");

for (int count = 1; count &lt;= 10; count++) {

System.out.println(count); }

} }

**Transfer Statements**

**Continue Statement**

⮚ A continue statement stops the iteration of a loop (while, do or for) and causes execution to resume at the top of the nearest enclosing loop.

⮚ You use a continue statement when you do not want to execute the remaining statements in the loop, but you do not want to exit the loop itself.

⮚ The syntax of the continue statement is

**continue;** // the unlabeled form

**continue <label>;** // the labeled form

⮚ You can also provide a loop with a label and then use the label in your continue statement. The label name is optional, and is usually only used when you wish to return to the outermost loop in a series of nested loops.

⮚ Example program to demonstrate the use of continue statement to print Odd Numbers between 1 to 10.

public class ContinueExample {

public static void main(String[] args) {

System.out.println("Odd Numbers");

for (int i = 1; i &lt;= 10; ++i) {

if (i % 2 == 0)

continue;

// Rest of loop body skipped when i is even

System.out.println(i + "\t");

} } }

**Break Statement**

⮚ The break statement transfers control out of the enclosing loop ( for, while, do orswitch statement).

⮚ You use a break statement when you want to jump immediately to the statement following the enclosing control structure.

⮚ You can also provide a loop with a label, and then use the label in your break statement. ⮚ The label name is optional, and is usually only used when you wish to terminate the outermost loop in a series of nested loops.

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⮚ The Syntax for break statement is as shown below;

**break;** // the unlabeled form

**break <label>;** // the labeled form

⮚ Example program to demonstrate the use of break statement to print numbers Numbers 1 to 10.

public class BreakExample {

public static void main(String[] args) {

System.out.println("Numbers 1 - 10");

for (int i = 1;; ++i) {

if (i == 11)

break;

// Rest of loop body skipped when i is even

System.out.println(i + "\t");

} } }

**7. Give an elaborate discussion on inheritance**

⮚ It allows the extension and reuse of existing code without having to rewrite the codefrom scratch.

⮚ Inheritance involves the creation of new classes (derived classes) from the existing ones (base classes), thus enabling the creation of a hierarchy of classes that simulate the class and sub class concept of the real world.

⮚ Types of Inheritance

❖ Single Inheritance

❖ Multiple Inheritance // does support by java

❖ Multi level Inheritance

❖ Hierarchical Inheritance

❖ Hybrid Inheritance

**Single Inheritance**

**public class** Super {

**int** A=10;

**void** printA()

{

System.*out*.printf("A=%d",A); } }

**public class** Sub **extends** Super { **int** B=20;

**void** print()

{

printA();

System.*out*.printf("B=%d",B); }

**void** printsum()

{

**int** C;

C=A+B;

System.*out*.printf("sum=%d",C);

Super classSub class

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} }

**public class** Sample {

**public static void** main(String args[])

{

Sub a=**new** Sub();

a.print();

a.printsum();

} }

**Hierarchical Inheritance**

⮚ The process of creating more than one sub classes from one super class is knownas Hierarchical Inheritance.

**public class** Sample {

**public static void** main(String args[])

{

Sub1 a=**new** Sub1();

Sub2 b=**new** Sub2();

System.*out*.println("Subclass1");

a.print();

System.*out*.println("Subclass2");

b.print();

} }

**public class** Sub1 **extends** Super {

**int** B=2;

{

A=1;

}

**void** print()

{

printA();

System.*out*.println("B="+B);

} }

**public class** Sub2 **extends** Super {

**int** B=20;

{

A=10;}

**void** print()

{ printA();

System.*out*.println("B="+B);

}}

**public class** Super {

**int** A;

{

A=10;

}

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**void** printA()

{

System.*out*.println("A"+A); } }

**Multilevel inheritance**

⮚ The process of creating new subclass from an already inherited sub class is known as multilevel inheritance.

**publicclass** Sample {

**publicstaticvoid** main(String args[])

{

Sub a=**new**Sub();

a.print();

a.printsum();

} }

**package** multilevel;

**publicclass** Sub **extends**SubSuper {

**int**C=30;

**void** print()

{

printA();

printB();

System.*out*.println("C="+C);

}

**void**printsum()

{

System.*out*.println("Sum="+(A+B+C));

} }

**publicclass**SubSuper**extends** Super {

**int**B=20;

**void**printB()

{ System.*out*.println("B="+B); } }

**publicclass** Super {

**int**A=10;

**void**printA()

{ System.*out*.println("A="+A); } }

**Hybrid Inheritance:**

Super class

Sub-Super class Sub class

⮚ More than one type of inheritance is used. (Eg. Hierarchical and multilevel). **public class** Super {

**int** A;

**void** printA()

{

System.*out*.println("A="+A);

} }

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**public class** SubSuper **extends** Super {

**int** B=20;

{

A = 10;

}

**void** printB()

{

System.*out*.println("B="+B);

} }

**public class** Sub1 **extends** Super {

**int** B=2;

{

A=1;

}

**void** print()

{ printA();

System.*out*.println("B="+B);

} }

**public class** Sub2 **extends** SubSuper {

**int** C=30;

**void** print()

{ printA();

printB();

System.*out*.println("C="+C);

} }

**public class** Sample {

**public static void** main(String[] args) {

Sub1 a=**new** Sub1();

Sub2 b=**new** Sub2();

System.*out*.println("Subclass 1");

a.print();

System.*out*.println("Subclass 2");

b.print();

} }

**8. Give a brief overview on java packages. Write necessary code snippets PACKAGES**

⮚ Packages enable grouping of functionally related classes

⮚ Package names are dot separated, e.g., java.lang.

⮚ Package names have a correspondence with the directory structure

⮚ Packages Avoid name space collision. There cannot be two classes with same name in a same Package But two packages can have a class with same name.

⮚ Exact Name of the class is identified by its package structure.

<< Fully Qualified Name>>

java.lang.String ;

java.util.Arrays;

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java.io.BufferedReader ;

java.util.Date

⮚ Packages are mirrored through directory structure.

⮚ To create a package, first we have to create a directory /directory structure that match the package hierarchy.

⮚ Package structure should match the directory structure also.

⮚ To make a class belongs to a particular package include the package statement as the first statement of source file.

**Creation of Package:**

Package <Package Name>

**Importing classes**

**Method1:**

java.util.Date birthday=new java.util.Date();

⮚ util is the package within the package java. Date is the class name.

**Method 2:**

Import java.awt.Button; // imports Button class in that package

Import java.awt.\*; // \* imports all class in that package

**Method 3:**

Imort static MyPackage.A.display(); // Import static members(display() only) in that package Imort static MyPackage.A.\*; // Import All static members in that package

import java.applet.\*;

import java.awt.\*;

public class AnimApplet extends Applet implements Runnable

{ Image[] images = new Image[2];

int frame = 0;

volatile Thread thread;

public void init() {

images[0] = getImage(getDocumentBase(),

"http://hostname/image0.gif");

images[1] = getImage(getDocumentBase(),

"http://hostname/image1.gif");

}

public void start() {

(thread = new Thread(this)).start(); }

public void stop() {

thread = null; }

public void paint(Graphics g) {

g.drawImage(images[frame], 0, 0, this); }

public void run() {

int delay = 1000; // 1 second

try {

while (thread == Thread.currentThread()) {

frame = (frame+1)%images.length;

repaint();

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Thread.sleep(delay);

} } catch (Exception e) {

} } }

**9. Explain in detail about interface**

**INTERFACE**

⮚ An **interface** in the Java programming language is an abstract type that is used to specify an interface (in the generic sense of the term) that classes must implement.

⮚ Interfaces are declared using the **interface** keyword, and may only contain method signature and constant declarations (variable declarations that are declared to be both static and final).

⮚ An interface may never contain method definitions.

⮚ Interfaces cannot be instantiated

⮚ . A class that implements an interface must implement all of the methods described in the interface, or be an abstract class.

⮚ Object references in Java may be specified to be of an interface type; in which case, they must either be null, or be bound to an object that implements the interface.

**Syntax**

[*visibility*] interface ***InterfaceName*** [extends *other interfaces*]

{

*constant declarations*

*}*

public interface Comparable

{ boolean less(Object m);

boolean greater(Object m);

boolean lessEqual(Object m);

boolean greaterEqual(Object m);

}

⮚ All instance methods are implicitly public and abstract. You can mark them as such, but are discouraged from doing so as the marking is considered obsolete practice.

⮚ The interfaces themselves need not be public and several interfaces in the standard libraries are not public and thus used only internally.

⮚ An interface creates a protocol that classes may implement. Note that one can extend an interface (to get a new interface) just as you can extend a class.

⮚ One can actually extend several interfaces.

⮚ Interfaces thus enjoy the benefits of multiple inheritance. (Classes do not.) There are almost no disadvantages to multiple inheritance of interface.

⮚ There are large disadvantages to multiple inheritance of implementation as in C++. ⮚ These include efficiency considerations as well as the semantic difficulty of determining just what code will be executed in some circumstances.

⮚ The Polynomial class that implements Comparable will need to implement all of the functions declared in the interface.

public class Polynomial implements Comparable

{ . . .

boolean less(Object m){ . . . }

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boolean greater(Object m){ . . . }

boolean lessEqual(Object m){ . . . }

boolean greaterEqual(Object m){ . . . }

Polynomial multiply(Polynomial P){ . . . }

. . .

}

⮚ A class may choose to implement any number of interfaces. A class that implements an interface must provide bodies for all methods of that interface.

⮚ Also, I expect that an abstract class can choose to implement part of an interface leaving the rest for non-abstract subclasses.

⮚ I can't find this in the documentation, however. Anyone that needs to know can, of course, construct a simple example and try it to see if the compilers accept it.

⮚ I call this technique "probing" and use it often when I'm not sure about how something works. In Java, with its more complete definition than other languages, this should be an even more valuable technique, since compilers should differ very little (actually not at all).

⮚ The usefulness of interfaces goes far beyond simply publishing protocols for other programmers.

⮚ Any function can have parameters that are of interface type. Any object from a class that implements the interface may be passed as an argument.

class Foo

{ Vector bar(Vector v, Comparable c){...}

...

}

⮚ One can apply bar to a Vector and a Polynomial, since Polynomial implements Comparable.

Import java.io.\*;

Import java.util.\*;

**Interface** IntExample

{

**public void** sayHello();

}

**public class** JavaInterfaceExample **implements** IntExample

{

**public void** sayHello()

{

System.out.println("Hello Visitor !");

}

**public static void** main(String args[])

{

JavaInterfaceExample javaInterfaceExample = **new** JavaInterfaceExample();

javaInterfaceExample.sayHello();

} }

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**10. Briefly explain about string class and its methods**

**STRINGS**

⮚ Strings, which are widely used in Java programming, are a sequence of characters. In the Java programming language, strings are objects.

⮚ The Java platform provides the String class to create and manipulate strings. **Creating Strings:**

String greeting = "Hello world!";

⮚ Whenever it encounters a string literal in your code, the compiler creates a String object with its value in this case, "Hello world!'.

⮚ As with any other object, you can create String objects by using the new keyword and a constructor.

⮚ The String class has eleven constructors that allow you to provide the initial value of the string using different sources, such as an array of characters.

public class StringDemo{

public static void main(String args[]){

char[] helloArray = { 'h', 'e', 'l', 'l', 'o', '.'};

String helloString = new String(helloArray);

System.out.println( helloString ); }}

**String Methods:**

⮚ Here is the list of methods supported by String class:

| **SN**  | **Methods with Description** |
| --- | --- |
| 1 | **char charAt(int index)** Returns the character at the specified index. |
| 2 | **int compareTo(Object o)** Compares this String to another Object. |
| 3 | **int compareTo(String anotherString)** Compares two strings lexicographically. |
| 4 | **int compareToIgnoreCase(String str)** Compares two strings lexicographically, ignoring case differences. |
| 5 | **String concat(String str)** Concatenates the specified string to the end of this string. |
| 6 | **boolean contentEquals(StringBuffer sb)** Returns true if and only if this String represents the same sequence of characters as the specified StringBuffer. |
| 7 | **static String copyValueOf(char[] data)** Returns a String that represents the character sequence in the array specified. |
| 8 | **static String copyValueOf(char[] data, int offset, int count)** Returns a String that represents the character sequence in the array specified. |
| 9 | **boolean endsWith(String suffix)** Tests if this string ends with the specified suffix. |
| 10  | **boolean equals(Object anObject)** Compares this string to the specified object. |
| 11  | **boolean equalsIgnoreCase(String anotherString)** Compares this String to another String, ignoring case considerations. |

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| 12 | **byte getBytes()** Encodes this String into a sequence of bytes using the platform's default charset, storing the result into a new byte array. |
| --- | --- |
| 13 | **byte[] getBytes(String charsetName** Encodes this String into a sequence of bytes using the named charset, storing the result into a new byte array. |
| 14  | **void getChars(int srcBegin, int srcEnd, char[] dst, int dstBegin)** Copies characters from this string into the destination character array. |
| 15  | **int hashCode()** Returns a hash code for this string. |
| 16  | **int indexOf(int ch)** Returns the index within this string of the first occurrence of the specified character. |
| 17 | **int indexOf(int ch, int fromIndex)** Returns the index within this string of the first occurrence of the specified character, starting the search at the specified index. |
| 18  | **int indexOf(String str)** Returns the index within this string of the first occurrence of the specified substring. |
| 19 | **int indexOf(String str, int fromIndex)** Returns the index within this string of the first occurrence of the specified substring, starting at the specified index. |
| 20  | **String intern()** Returns a canonical representation for the string object. |
| 21  | **int lastIndexOf(int ch)** Returns the index within this string of the last occurrence of the specified character. |
| 22 | **int lastIndexOf(int ch, int fromIndex)** Returns the index within this string of the last occurrence of the specified character, searching backward starting at the specified index. |
| 23  | **int lastIndexOf(String str)** Returns the index within this string of the rightmost occurrence of the specified substring. |
| 24 | **int lastIndexOf(String str, int fromIndex)** Returns the index within this string of the last occurrence of the specified substring, searching backward starting at the specified index. |
| 25  | **int length()** Returns the length of this string. |
| 26  | **boolean matches(String regex)** Tells whether or not this string matches the given regular expression. |
| 27 | **boolean regionMatches(boolean ignoreCase, int toffset, String other, int ooffset, int len)** Tests if two string regions are equal. |
| 28  | **boolean regionMatches(int toffset, String other, int ooffset, int len)** Tests if two string regions are equal. |
| 29 | **String replace(char oldChar, char newChar)** Returns a new string resulting from replacing all occurrences of oldChar in this string with newChar. |
| 30  | **String replaceAll(String regex, String replacement** Replaces each substring of this string that matches the given regular expression with the |

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|  | given replacement. |
| --- | --- |
| 31 | **String replaceFirst(String regex, String replacement)** Replaces the first substring of this string that matches the given regular expression with the given replacement. |
| 32  | **String[] split(String regex)** Splits this string around matches of the given regular expression. |
| 33  | **String[] split(String regex, int limit)** Splits this string around matches of the given regular expression. |
| 34  | **boolean startsWith(String prefix)** Tests if this string starts with the specified prefix. |
| 35  | **boolean startsWith(String prefix, int toffset)** Tests if this string starts with the specified prefix beginning a specified index. |
| 36  | **CharSequence subSequence(int beginIndex, int endIndex)** Returns a new character sequence that is a subsequence of this sequence. |
| 37  | **String substring(int beginIndex)** Returns a new string that is a substring of this string. |
| 38  | **String substring(int beginIndex, int endIndex)** Returns a new string that is a substring of this string. |
| 39  | **char[] toCharArray()** Converts this string to a new character array. |
| 40 | **String toLowerCase()** Converts all of the characters in this String to lower case using the rules of the default locale. |
| 41 | **String toLowerCase(Locale locale)** Converts all of the characters in this String to lower case using the rules of the given Locale. |
| 42  | **String toString()** This object (which is already a string!) is itself returned. |
| 43 | **String toUpperCase()** Converts all of the characters in this String to upper case using the rules of the default locale. |
| 44 | **String toUpperCase(Locale locale)** Converts all of the characters in this String to upper case using the rules of the given Locale. |
| 45  | **String trim()** Returns a copy of the string, with leading and trailing whitespace omitted. |
| 46  | **static String valueOf(primitive data type x)** Returns the string representation of the passed data type argument. |

**11. Explain in detail about string buffer class with its method**

**STRING BUFFER CLASS**

⮚ The **StringBuffer** and **StringBuilder** classes are used when there is a necessity to make a lot of modifications to Strings of characters.

⮚ Unlike Strings objects of type StringBuffer and Stringbuilder can be modified over and over again without leaving behind a lot of new unused objects.

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⮚ The StringBuilder class was introduced as of Java 5 and the main difference between the StringBuffer and StringBuilder is that StringBuilders methods are not thread safe(not Synchronised).

⮚ It is recommended to use **StringBuilder** whenever possible because it is faster than StringBuffer. However if thread safety is necessary the best option is StringBuffer objects.

**Example:**

public class Test{

public static void main(String args[]){

StringBuffer sBuffer = new StringBuffer(" test");

sBuffer.append(" String Buffer");

System.ou.println(sBuffer);

}

}

**String Buffer Methods:**

⮚ Here is the list of important methods supported by StringBuffer class:

| **SN**  | **Methods with Description** |
| --- | --- |
| 1 | **public StringBuffer append(String s)** Updates the value of the object that invoked the method. The method takes boolean, char, **int, long, Strings etc.** |
| 2 | **public StringBuffer reverse()** The method reverses the value of the StringBuffer object that invoked the method. |
| 3 | **public delete(int start, int end)** Deletes the string starting from start index until end index. |
| 4 | **public insert(int offset, int i)** This method inserts an string s at the position mentioned by offset. |
| 5 | **replace(int start, int end, String str)** This method replaces the characters in a substring of this StringBuffer with characters in the specified String. |

⮚ Here is the list of other methods (Except set methods ) which are very similar to String class:

| **SN**  | **Methods with Description** |
| --- | --- |
| 1 | **int capacity()** Returns the current capacity of the String buffer. |
| 2 | **char charAt(int index)** The specified character of the sequence currently represented by the string buffer, as indicated by the index argument, is returned. |
| 3 | **void ensureCapacity(int minimumCapacity)** Ensures that the capacity of the buffer is at least equal to the specified minimum. |
| 4 | **void getChars(int srcBegin, int srcEnd, char[] dst, int dstBegin)** Characters are copied from this string buffer into the destination character array dst. |
| 5 | **int indexOf(String str)** Returns the index within this string of the first occurrence of the specified substring. |
| 6 | **int indexOf(String str, int fromIndex)** Returns the index within this string of the first occurrence of the specified substring, starting at the specified index. |

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| 7 | **int lastIndexOf(String str)** Returns the index within this string of the rightmost occurrence of the specified substring. |
| --- | --- |
| 8 | **int lastIndexOf(String str, int fromIndex)** Returns the index within this string of the last occurrence of the specified substring. |
| 9 | **int length()** Returns the length (character count) of this string buffer. |
| 10  | **void setCharAt(int index, char ch)** The character at the specified index of this string buffer is set to ch. |
| 11  | **void setLength(int newLength)** Sets the length of this String buffer. |
| 12  | **CharSequence subSequence(int start, int end)** Returns a new character sequence that is a subsequence of this sequence. |
| 13 | **String substring(int start)** Returns a new String that contains a subsequence of characters currently contained in this StringBuffer.The substring begins at the specified index and extends to the end of the StringBuffer. |
| 14 | **String substring(int start, int end)** Returns a new String that contains a subsequence of characters currently contained in this StringBuffer. |
| 15  | **String toString()** Converts to a string representing the data in this string buffer. |

**12. What is an Exception? Explain in detail about Exceptions hierarchy.**

❖ Error occurred in execution time

❖ Abnormal termination of program

❖ Wrong execution result

❖ Provide an exception handling mechanism in language system

❖ Improve the reliability of application program

❖ Allow simple program code for exception check and handling into source

❖ Treat exception as an object

⮚ All exceptions are instances of a class extended from **Throwable** class or **its subclass.** Generally, a programmer makes new exception class to extend the Exception class which is subclass of Throwable class.

**EXCEPTION HIERARCHY**:



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**TYPES OF ECEPTION HANDLIG:**

⮚ **Checked exceptions – inability to acquire system resources (such as insufficient memory, file does not exist)**

❖ Java checks at compile time that some mechanism is explicitly in place to receive and process an exception object that may be created during runtime due to one of these exceptions occurring.

⮚ **Unchecked exceptions – exceptions that occur because of the user entering bad data, or failing to enter data at all.**

❖ Unchecked exceptions can be avoided by writing more robust code that protects against bad input values. Java does not check at compile time to ensure that there is a mechanism in place to handle such errors.

**GENERAL SYNTAX:**

**try** {

**//statements – one of which is capable of throwing an exception**

}

**catch** (ExceptionTypeName objName)

{

**//one or more statements to execute if this exception occurs**

}

**finally**

{

**//statements to be executed whether or not exception occurs**

}

**EXAMPLE:**

package Exception;

public class MainClass {

public static void main(String args[]) {

int d, a;

try {

d = 0;

a = 42 / d;

System.out.println("This will not be printed.");

}

catch (ArithmeticException e) {

System.out.println("Division by zero."); }

System.out.println("After catch statement.");

} }

**FINALLY BLOCK**

⮚ An optional finally block can be added at the end of the catch blocks to provide a set of statements that are always executed whether or not an exception occurs. Finally block is executed independent of exception and catch. It is executed before return statement. **Example:**

package Exception;

class FinallyDemo {

static void procA() {

try {

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System.out.println("inside procA");

throw new RuntimeException("demo");

} finally

{ System.out.println("procA's finally");

} }

static void procB() {

try {

System.out.println("inside procB");

return;

} finally

{ System.out.println("procB's finally");

} }

static void procC() {

try { System.out.println("inside procC");

} finally {

System.out.println("procC's finally"); } }

public static void main(String args[]) {

try {

procA();

} catch (Exception e) {

System.out.println("Exception caught");

}

procB();

procC();

} }

**NESTED TRY – CATCH AND MULTIPLE CATCH BLOCK**

⮚ Each catch block works like a method definition. If the catch parameter matches with the type of exception object thrown, then exception is caught and statements in the catch block will be executed.

⮚ The try and catch block within outer try block behaves like independent try and catch block

**Example**

public class NestedTry

{

public static void main (String args[])throws IOException

{

int num=2,res=0;

try

{ FileInputStream fis=null;

fis = new FileInputStream (new File (args[0]));

try

{ res=num/0;

System.out.println("The result is"+res);

}

catch(ArithmeticException e)

{ System.out.println("divided by Zero");

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} }

catch (FileNotFoundException e)

{ System.out.println("File not found!"); }

catch(ArrayIndexOutOfBoundsException e)

{ System.out.println("Array index is Out of bound! Argument required"); }}} **13. Explain the multithreaded programming with suitable examples.**

⮚ A multithreaded program contains two or more parts that can run concurrently and each part can handle different task at the same time making optimal use of the available resources specially when your computer has multiple CPUs.

⮚ By definition multitasking is when multiple processes share common processing resources such as a CPU. Multithreading extends the idea of multitasking into applications where you can subdivide specific operations within a single application into individual threads. Each of the threads can run in parallel. The OS divides processing time not only among different applications, but also among each thread within an application.

⮚ Multithreading enables you to write in a way where multiple activities can proceed concurrently in the same program.

**Life Cycle of a Thread:**

****

⮚ **New:** A new thread begins its life cycle in the new state. It remains in this state until the program starts the thread. It is also referred to as a born thread.

⮚ **Runnable:** After a newly born thread is started, the thread becomes runnable. A thread in this state is considered to be executing its task.

⮚ **Waiting:** Sometimes, a thread transitions to the waiting state while the thread waits for another thread to perform a task.A thread transitions back to the runnable state onlywhen another thread signals the waiting thread to continue executing.

⮚ **Timed waiting:** A runnable thread can enter the timed waiting state for a specified interval of time. A thread in this state transitions back to the runnable state whenthat time interval expires or when the event it is waiting for occurs.

⮚ **Terminated:** A runnable thread enters the terminated state when it completes its task or otherwise terminates

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**Thread Priorities:**

⮚ Every Java thread has a priority that helps the operating system determine the order in which threads are scheduled.

⮚ Java thread priorities are in the range between MIN\_PRIORITY (a constant of 1) and MAX\_PRIORITY (a constant of 10). By default, every thread is given priority NORM\_PRIORITY (a constant of 5).

**Create Thread by Implementing Runnable Interface:**

⮚ If your class is intended to be executed as a thread then you can achieve this by implementing **Runnable** interface. You will need to follow three basic steps:

**Step 1:**

⮚ As a first step you need to implement a run() method provided by **Runnable** interface. This method provides entry point for the thread and you will put you complete business logic inside this method. Following is simple syntax of run() method:

public void run( )

**Step 2:**

⮚ At second step you will instantiate a **Thread** object using the following constructor: Thread(Runnable threadObj, String threadName);

⮚ Where, *threadObj* is an instance of a class that implements the **Runnable** interface and **threadName** is the name given to the new thread.

**Step 3**

⮚ Once Thread object is created, you can start it by calling **start( )** method, which executes a call to run( ) method. Following is simple syntax of start() method:

void start( );

**Example**

class RunnableDemo implements Runnable {

private Thread t;

private String threadName;

RunnableDemo( String name){

threadName = name;

System.out.println("Creating " + threadName );

}

public void run() {

System.out.println("Running " + threadName );

try {

for(int i = 4; i > 0; i--) {

System.out.println("Thread: " + threadName + ", " + i);

// Let the thread sleep for a while.

Thread.sleep(50);

}

} catch (InterruptedException e) {

System.out.println("Thread " + threadName + " interrupted.");

} System.out.println("Thread " + threadName + " exiting.");

}

public void start ()

{

System.out.println("Starting " + threadName );

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if (t == null)

{

t = new Thread (this, threadName);

t.start (); } }}

public class TestThread {

public static void main(String args[]) {

RunnableDemo R1 = new RunnableDemo( "Thread-1");

R1.start();

RunnableDemo R2 = new RunnableDemo( "Thread-2");

R2.start(); } }

**Create Thread by Extending Thread Class:**

⮚ The second way to create a thread is to create a new class that extends **Thread** class using the following two simple steps.

⮚ This approach provides more flexibility in handling multiple threads created using available methods in Thread class.

**Step 1**

⮚ You will need to override **run( )** method available in Thread class.

⮚ This method provides entry point for the thread and you will put you complete business logic inside this method. Following is simple syntax of run() method:

public void run( )

**Step 2**

⮚ Once Thread object is created, you can start it by calling **start( )** method, which executes a call to run( ) method. Following is simple syntax of start() method:

void start( )

**Example**

class ThreadDemo extends Thread {

private Thread t;

private String threadName;

ThreadDemo( String name){

threadName = name;

System.out.println("Creating " + threadName );

}

public void run() {

System.out.println("Running " + threadName );

try {

for(int i = 4; i > 0; i--) {

System.out.println("Thread: " + threadName + ", " + i);

// Let the thread sleep for a while.

Thread.sleep(50);

} } catch (InterruptedException e) {

System.out.println("Thread " + threadName + " interrupted.");

} System.out.println("Thread " + threadName + " exiting.");

}

public void start ()

{

System.out.println("Starting " + threadName );

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if (t == null)

{ t = new Thread (this, threadName);

t.start ();

} } }

public class TestThread {

public static void main(String args[]) {

ThreadDemo T1 = new ThreadDemo( "Thread-1");

T1.start();

ThreadDemo T2 = new ThreadDemo( "Thread-2");

T2.start();

} }

**Thread Methods:**

**public void start()**

⮚ Starts the thread in a separate path of execution, then invokes the run() method on this Thread object.

**public void run()**

⮚ If this Thread object was instantiated using a separate Runnable target, the run() method is invoked on that Runnable object.

**public final void setName(String name)**

⮚ Changes the name of the Thread object. There is also a getName() method forretrieving the name.

**public final void setPriority(int priority)**

⮚ Sets the priority of this Thread object. The possible values are between 1 and 10. **public final void setDaemon(boolean on)**

⮚ A parameter of true denotes this Thread as a daemon thread.

**public final void join(long millisec)**

⮚ The current thread invokes this method on a second thread, causing the current thread to block until the second thread terminates or the specified number of milliseconds passes. **public void interrupt()**

⮚ Interrupts this thread, causing it to continue execution if it was blocked for any reason. **public final boolean isAlive()**

⮚ Returns true if the thread is alive, which is any time after the thread has been started but before it runs to completion.

**public static void yield()**

⮚ Causes the currently running thread to yield to any other threads of the same priority that are waiting to be scheduled.

**public static void sleep(long millisec)**

⮚ Causes the currently running thread to block for at least the specified number of milliseconds.

**public static boolean holdsLock(Object x)**

⮚ Returns true if the current thread holds the lock on the given Object.

**public static Thread currentThread()**

⮚ Returns a reference to the currently running thread, which is the thread that invokesthis method.

**public static void dumpStack()** Prints the stack trace for the currently running thread, which is useful when debugging a multithreaded application.

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**UNIT – III JDBC**

**PART A**

**1. What is JDBC?**

JDBC is java database connectivity as name implies it’s a java API for communicating to relational database, API has java classes and interfaces using that developer can easily interact with database.

**2. Difference between type 2 and type 4 JDBC drivers.**

Type 1 JDBC Driver is called JDBC-ODBC Bridge driver (bridge driver)

Type 2 JDBC Driver is referred as Native-API/partly Java driver (native driver) Type 3 JDBC Driver is called AllJava/Net-protocol driver (middleware driver) Type 4 JDBC Driver is called All Java/Native-protocol driver (Pure java driver) **3. What are the main steps in java to make JDBC connectivity?**

Main steps to connect to database.

⮚ **Load the Driver**: First step is to load the database specific driver which communicates with database.

⮚ **Make Connection**: Next step is get connection from the database using connection object, which is used to send SQL statement also and get result back from the database. ⮚ **Get Statement object**: From connection object we can get statement object which is used to query the database

⮚ **Execute the Query**: Using statement object we execute the SQL or database query and get result set from the query.

⮚ **Close the connection**: After getting resultset and all required operation performed the last step should be closing the database connection.

**4. What are different types of Statement?**

Statement object is used to send SQL query to database and get result from database, and we get statement object from connection object.

There are three types of statement:

**Statement**: it’s a commonly used for getting data from database useful when we are using static SQL statement at runtime. it will not accept any parameter. 

Statement stmt = conn.createStatement( );

ResultSet rs = stmt.executeQuery();

**PreparedStatement**: when we are using same SQL statement multiple time its is useful and it will accept parameter at runtime. 

String SQL = "Update stock SET limit = ? WHERE stockType = ?";

PreparedStatement pstmt = conn.prepareStatement(SQL);

ResultSet rs = pstmt.executeQuery();

**Callable Statement**: when we want to access stored procedures then callable statement are useful and they also accept runtime parameter. It is called like this 

CallableStatement cs = con.prepareCall("{call SHOW\_SUPPLIERS}");

ResultSet rs = cs.executeQuery();

**5. How cursor works in scrollable result set?**

There are three constant define in result set by which we can move cursor. **TYPE\_FORWARD\_ONLY**: creates a nonscrollable result set, that is, one in which the cursor moves only forward

**TYPE\_SCROLL\_INSENSITIVE** : a scrollable result set does not reflects changes that are made to it while it is open

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**TYPE\_SCROLL\_SENSITIVE**: a scrollable result set reflects changes that are made to it while it is open

**6. What is connection pooling?**

Connection pooling is the mechanism by which we reuse the recourse like connection objects which are needed to make connection with database .In this mechanism client are not required every time make new connection and then interact with database instead of that connection objects are stored in connection pool and client will get it from there.

**7. Does the JDBC-ODBC Bridge support multiple concurrent open statements per connection?**

No, we can open only one statement object when using JDBC-ODBC Bridge.

**8. Is it possible to send an object using Sockets, if so, how it can be?**

Yes it is Poosible to send an Object using Sockets. Objects that implement Serializable may be sent across a socket connection using an ObjectInputStream and ObjectOutputStream combination.

**9. How does server know that a client is connected to it or not?**

When a task invokes its yield() method, it returns to the ready state. When a task invokes its sleep() method, it returns to the waiting state.

**10. What is Domain Naming Service (DNS)?**

DNS stands for Domain Name System, an Internet service that translates domain names into IP addressess.

**11. What is Inet address?**

InetAddress is a class used to find the ip address of a host in a network. This InetAddress is divided into two types,

1)Inet4address for the ip version 4(ipv4)=Which has 32bit ip address

2)Inet6address for the ip version 6(ipv6)=Which has 128bit ip address

There are subclasses & abstract in the InetAddress.

**12. What is URL?**

URL stands for Uniform Resource Locator and it points to resource files on the Internet. URL has four components. http://www.allinterview.com:80/index.html http - protocol name, allinterview - IP address or host name, 80 - port number, index.html - file

**13. What is meant by TCP, IP, UDP?**

**TCP**:its a protocal for transfering data that is reliable and commonly used. IP: It's Internet Protocol, every computer available on the network has a unique IP. TCP and IP both works together and this is called TCP/IP.

**UDP**:its unreliable but fast mode of transfering data.

**14. What is the difference between TCP and UDP ?**

∙ TCP is guaranteed delivery, UDP is not guaranteed.

∙ TCP guarantees order of messages, UDP doesn’t.

∙ Data boundary is not preserved in TCP, but UDP preserves it.

∙ TCP is slower compared to UDP.

**15. What is the difference between TCP/IP and TCP?**

The difference is that TCP is responsible for the data delivery of a packet and IP is responsible for the logical addressing. In other words, IP obtains the address and TCP guarantees delivery of data to that address.

**16. What is meant by time-slicing?**

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Preemptive multitasking also called "time slicing". Interrupting the execution of a process and passing control to another waiting process and performing a context switch after which the context for the next pending process is restored, and the next process is executed for the duration of its time slice or "quantum".

**17. What is the difference between IO and NIO?**

The main difference between NIO and IO is that NIO provides asynchronous, non blocking IO, which is critical to write faster and scalable networking systems. On the other hand, most of the utilities from the IO classes are blocking and slow. NIO takes advantage of asynchronous system calls in UNIX systems such as the select() system call for network sockets. Using select(), an application can monitor several resources at the same time and can also poll for network activity without blocking. The select() system call identifies if data is pending or not, then read() or write() may be used knowing that they will complete immediately.

**18. What is javabean?**

**JavaBeans** are classes that encapsulate many objects into a single object (the **bean**). They are serializable, have a zero-argument constructor, and allow access to properties using getter and setter methods.

**19. What are advantage and disadvantage of java sockets?**

**Advantages:**

a. Flexible and powerful.

b. Cause low network traffic if efficiently used.

c. Only updated information can be sent.

**Disadvantages:**

a. The Java applets can establish communication only with the machine requested and not with any other machine on the network.

b. Sockets allow only raw data to be sent. This means that both client and server need to have mechanisms to interpret the data.

**20. What is Socket?**

∙ A **socket** is an endpoint for communication between two machines.

∙ Java Socket programming can be connection-oriented or connection-less.

∙ Socket and ServerSocket classes are used for connection-oriented socket programming and DatagramSocket and DatagramPacket classes are used for connection-less socket programming.

∙ The client in socket programming must know two information:

1. IP Address of Server, and

2. Port number.

**PART-B**

**1. Explain in detail about JDBC Architecture.**

**JDBC**

∙ JDBC stands for **J**ava **D**ata**b**ase **C**onnectivity, which is a standard Java API for database independent connectivity between the Java programming language and a wide range of databases.

❖ The JDBC library includes APIs for each of the tasks mentioned below that are commonly associated with database usage.

❖ Making a connection to a database.

❖ Creating SQL or MySQL statements.

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❖ Executing SQL or MySQL queries in the database.

❖ Viewing & Modifying the resulting records.

⮚ Fundamentally, JDBC is a specification that provides a complete set of interfacesthat allows for portable access to an underlying database.

⮚ Java can be used to write different types of executables, such as −

❖ Java Applications

❖ Java Applets

❖ Java Servlets

❖ Java ServerPages (JSPs)

❖ Enterprise JavaBeans (EJBs).

⮚ All ofthese different executables are able to use a JDBC driver to access a database, and take advantage of the stored data.

⮚ JDBC provides the same capabilities as ODBC, allowing Java programs to contain database-independent code.

**Pre-Requisite**

⮚ Before moving further, you need to have a good understanding of the following two subjects −

❖ Core JAVA Programming

❖ SQL or MySQL Database

**JDBC Architecture**

⮚ The JDBC API supports both two-tier and three-tier processing models for database access but in general, JDBC Architecture consists of two layers −

⮚ **JDBC API:** This provides the application-to-JDBC Manager connection.

⮚ **JDBC Driver API:** This supports the JDBC Manager-to-Driver Connection. ⮚ The JDBC API uses a driver manager and database-specific drivers to provide transparent connectivity to heterogeneous databases.

⮚ The JDBC driver manager ensures that the correct driver is used to access each data source.

⮚ The driver manager is capable of supporting multiple concurrent drivers connected to multiple heterogeneous databases.

⮚ Following is the architectural diagram, which shows the location of the driver manager with respect to the JDBC drivers and the Java application −



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**Common JDBC Components**

⮚ The JDBC API provides the following interfaces and classes −

⮚ **DriverManager:**

❖ This class manages a list of database drivers. Matches connection requests from the java application with the proper database driver using communication sub protocol.

❖ The first driver that recognizes a certain subprotocol under JDBC will be used to establish a database Connection.

⮚ **Driver:**

❖ This interface handles the communications with the database server. You will interact directly with Driver objects very rarely.

❖ Instead, you use DriverManager objects, which manages objects of this type. It also abstracts the details associated with working with Driver objects.

⮚ **Connection:**

❖ This interface with all methods for contacting a database. The connection object represents communication context, i.e., all communication with database is

through connection object only.

⮚ **Statement:**

❖ You use objects created from this interface to submit the SQL statements to the database.

❖ Some derived interfaces accept parameters in addition to executing stored procedures.

⮚ **ResultSet:**

❖ These objects hold data retrieved from a database after you execute an SQL query using Statement objects.

❖ It acts as an iterator to allow you to move through its data.

⮚ **SQLException:**

❖ This class handles any errors that occur in a database application.

**The JDBC 4.0 Packages**

⮚ The java.sql and javax.sql are the primary packages for JDBC 4.0. This is the latest JDBC version at the time of writing this tutorial.

⮚ It offers the main classes for interacting with your data sources.

⮚ The new features in these packages include changes in the following areas − ❖ Automatic database driver loading.

❖ Exception handling improvements.

❖ Enhanced BLOB/CLOB functionality.

❖ Connection and statement interface enhancements.

❖ National character set support.

❖ SQL ROWID access.

❖ SQL 2003 XML data type support.

❖ Annotations.

**2. Briefly Explain the step to create a JDBC application.**

**Creating JDBC Application**

⮚ There are following six steps involved in building a JDBC application −