



**Strathmore**  
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES  
BACHELOR OF SCIENCE IN: TELECOMMUNICATIONS (BTC)/ INFORMATICS AND  
COMPUTER SCIENCE (BICS)  
END OF SEMESTER EXAMINATION  
WEB APPLICATION DEVELOPMENT/ INTERNET PROGRAMMING  
ICS2102 /BTC3101

DATE: 14<sup>th</sup> September 2021

Time: [15:30] 2 Hours

**Instructions**

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

**Question ONE (30 marks)**

- A. A protocol suite is a set of communication protocols used in the Internet. Consider a client interacting with a web server to send and receive data.
- i. With the aid of a well labelled diagram of the TCP/IP protocol suite, identify the layers and protocols that will be used in each layer during communication between web client and web server. Explain the purpose of each protocol.  
**( 5 marks)**
  - ii. With the aid of a well labelled diagram, describe the steps that take place during communication from client to the webserver, describing how the protocols identified in (i) above are used in every step  
**(5 marks)**

B. Consider the following output

## Bill Gates



William Henry Gates III (born October 28, 1955) is an American business magnate, software developer, investor, author, and philanthropist. He is a co-founder of Microsoft Corporation, along with his late childhood friend Paul Allen.

### Early Life

Bill Gates was born in Seattle, Washington, on October 28, 1955. His father was a prominent lawyer, and his mother served on the board of directors for First Interstate BancSystem and the United Way of America.

### Microsoft

When Bill and Paul Allen started Microsoft, their vision of "a computer on every desktop and in every home" seemed farfetched to most people. Today, thanks to Microsoft and many other companies, that vision is a reality in many parts of the world.

- i. Write CSS code necessary to recreate the output. You are provided with the **HTML code**.  
(10 marks)

- Paragraphs on the page have an *indent* of "20px" and letters have a *spacing* of "2 px"
- The *first letter* of every paragraph has a size of "30px" and is "red" in colour
- *Before every paragraph* that comes *directly after* a h1, there is a *background image* "gates.jpg" which *does not repeat*. The space before the paragraph has a height of 200px and width of 500px .
- The div element with *id of main* has a left margin of 200px and height is 100% of the viewport height and width of 800px
- The div element with *id of side* has a background colour of #D7EAA3 with a *dashed* border that has a thickness of 2px and is coloured #471C47
- The div element with *id of side* floats to the *left* with a width of 30em. There is 1em space between the content and the edges.
- All h3 are *underlined*

- The paragraph that comes *directly after the div element* with id main is coloured red with font named monospace, and font weight of 200. It is also displayed as inline block.

#### HTML CODE

```
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8">
    <title>Gates</title>
<link rel="stylesheet" href="gates.css">
</head>
<body>
    <div id="main">
        <h1>Bill Gates</h1>
        <p>William Henry Gates III (born October 28, 1955) is an American business magnate, software developer, investor, author, and philanthropist. He is a co-founder of Microsoft Corporation, along with his late childhood friend Paul Allen</p>

        <div id="side" class="aside">
            <div id="content-A">
                <h3>Early Life</h3>
                <p>Bill Gates was born in Seattle, Washington, on October 28, 1955. His father was a prominent lawyer, and his mother served on the board of directors for First Interstate BancSystem and the United Way of America.</p>
            </div>

            <div id="content-B" class="a">
                <h3>Microsoft</h3>
                <p>When Bill and Paul Allen started Microsoft, their vision of "a computer on every desktop and in every home" seemed farfetched to most people. Today, thanks to Microsoft and many other companies, that vision is a reality in many parts of
```

```
the world</p>
    </div>

</div>
</div>
</body>
</html>
```

C. Consider the following PHP codes and write down their outputs

i) What will be the output of the following code?

(2 marks)

```
<?php
    $op2 = "be";
    function foo($op1)
    {
        global $op2;
        echo $op2;
        echo $op1;
    }
    foo(" awesome");
?>
```

ii) What will be the output of the following code?

(2 marks)

```
<?php
    function foo($msg)
    {
        echo "$msg";
    }
    $var1 = "foo";
    $var1("This works!!");
?>
```

iii) What is the output of the following code

(2 marks)

```
<?php  
$country = array("Mauritius" => array  
    ("population" => "1,265,985", "capital" => "Port Luis"),  
    "Maldives" => array("population" => "133,412",  
    "capital" => "Male"));  
echo $country["Mauritius"]["population"];  
?>
```

D. Consider the following PHP short questions:

- i) Name two conditional statement types in PHP (2 marks)
- ii) How can you incorporate one PHP file within another? (2 marks)

#### Question TWO (15 marks)

A. Write HTML tags that will be used to display the following text as a comment (1 mark)

This is a comment

B. Consider the following CSS Rule.

```
p.b {  
    font-family: Arial, Helvetica, sans-serif;  
}
```

- i. Write the HTML code that is referenced by the CSS Rule. (2 marks)

C. Consider the following HTML document. This HTML document will not validate, and would generate errors and warnings in the W3C Validator. However, it is possible to make 5 modifications to the HTML to make it pass validation

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <h1>Validate</h1>
</head>
<body>
    <div>
        <style>
            p{border: dashed;}
        </style>
        <a href="home.html"></a>
    </span>
    <p> This is the best page ever </p>
</body>
</html>

```

- i. Identify the modifications that should be made to pass the validation. **(5 marks)**

D. Consider the following HTML and CSS and answer the questions that follow

#### HTML CODE

```

<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8">
    <title>Wall</title>
    <link rel="stylesheet" href="wall.css">
</head>
<body>
    <div id="all">
        <h1>WALL E</h1>
        <p>WALT DISNEY motion pictures</p>
        <div id="menu">
            <p>Summary</p>
            <p>Critic Views</p>
            <p>User Views</p>
            <p>Details and Credits</p>
            <p>Trailers and videos</p>
        </div>
        <div style="clear: both;"></div>
        <div id="score">
            <h2>&lt Metascore &gt</h2>
            <p>Universal Claim <br/> Based on 39 critics</p>
            <ul>
                <li>Starring: Ben Burtt, Elissa Knight, Jeff Garlin</li>
                <li>Summary: After hundreds of
                    lonely years of doing what he
                    was built for, Wall E
                    discovers a new purpose in
                    life when he meets a sleek
                    search robot named EVE. [Walt
                    Disney Pictures]</li>
            </ul>
        </div>
    </div></div>

```

```
</div>  
</body>  
</html>
```

### CSS CODE

```
#all{  
    border: solid;  
  
#menu > p{  
    border: 1px solid;  
    background-color: yellow;  
    width: 200px;  
    float: left;  
    margin: 10px;  
    padding: 10px;  
}  
h1{  
    text-align: center;  
}
```

- i. Draw a picture of how the HTML/CSS code will look when the browser renders it on-screen. Indicate a non-white background by drawing diagonal lines like

this

*. Assume that the screen is the size of your answer booklet*

(7 marks)

### Question THREE (15 marks)

- A. Consider the following CSS Rule

```
p.a {  
    font-family: "Times New Roman", Times, serif;  
}
```

- i. Describe what the selector selects (2 marks)  
ii. The font-family property has three values. What is the advantage of that ? (2 marks)

- B. Consider the following CSS Rules. The rule is written in an external stylesheet and the second rule is written in an internal stylesheet

From external CSS file:

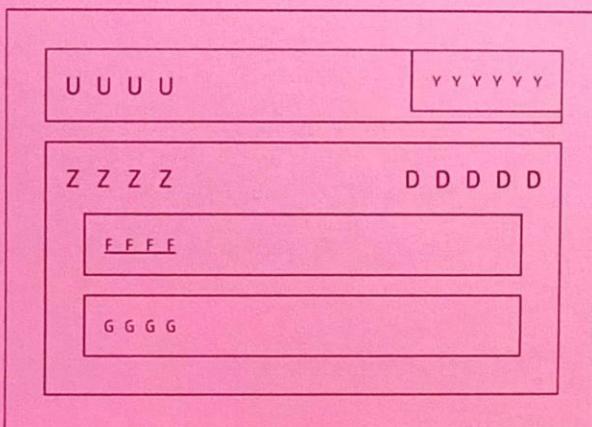
```
#content h1 {background-color: red;}
```

In HTML file:

```
<style>
#content h1 {
    background-color: yellow;
}
</style>
```

i. Which rule will apply and why? (3 marks)

C. Consider the following output of HTML code



HTML CODE	
<pre>&lt;div&gt;     &lt;div class="id"&gt;Y Y Y Y Y Y &lt;/div&gt;         &lt;div&gt;             &lt;span class="one"&gt;                 U U U U             &lt;/span&gt;         &lt;/div&gt;     &lt;div class="class"&gt;         &lt;span id="Z" class="one"&gt;Z Z Z Z &lt;/span&gt;         &lt;span class="id one"&gt;D D D D D &lt;/span&gt;         &lt;div id="class"&gt;F F F F &lt;/div&gt;         &lt;div id="G"&gt;G G G G &lt;/div&gt;     &lt;/div&gt; &lt;/div&gt;</pre>	<ul style="list-style-type: none"><li>Text uses monospace font</li><li>All borders shown are 2px thick and blue in color</li><li>Elements “U”, “Z”, “D”, have yellow background and a font size of 30px</li><li>Element “Y” and “D” appears to the right of the element</li><li>Element “F” is underlined</li><li>All div elements have a blank space of 20px around the content</li></ul>

i. Write a CSS code that will be used to replicate the appearance. You are not allowed to change the HTML code (6 marks)

D. Consider the following margin properties.

```
*{  
    margin-top: 10px;  
    margin-bottom: 15px;  
    margin-left: 20px;  
    margin-right: 5px;  
}
```

- i. Use the shorthand property to set the margin properties in one declaration **(2 marks)**

**Question FOUR (15 marks)**

A. What are JavaScript events? List four events and explain briefly what they do **(4 marks)**

B. Consider the following code. What is the output when you run the following programs.

Indicate true or false

**(4 marks)**

```
var i = 25;  
var j = "25";  
var k = 2 + "5"  
var l = "2" + "5";
```

- i) document.write (i == j);
- ii) document.write (i === j);
- iii) document.write (j == k);
- iv) document.write (j === k);
- v) document.write (i == k);
- vi) document.write (i === k);
- vii) document.write (k == l);
- viii) document.write (k === l);

C. Consider the following HTML code. Fill in the body of the Javascript function **changeColor** so that the **color** of the text changes in response to the selection made in the menu. **(3 marks)**

```
<style type="text/css">  
.a {color:red;}  
.b {color:green;}
```

```

.c {color:blue; }

</style>

...

<div id="colorText">Select below to change the color of this
text</div>

<select onchange="changeColor(this.value)">
    <option value="a">Red</option>
    <option value="b">Green</option>
    <option value="c">Blue</option>
</select>

<script type="text/javascript">
//<![CDATA[
function changeColor(value) { ---- }

```

- D. Explain three ways JavaScript can be applied in software development **(3 marks)**  
E. Give two examples of JavaScript frameworks **(1 mark)**

#### Question FIVE(15 marks)

- A. Consider the following HTML code that allows a user to order for a drug by selecting the drug and specifying the quantity.

HTML CODE
<pre> &lt;body&gt;     &lt;form action="drugs.php" method="post"&gt;         &lt;label for="drug_name"&gt;Drugname&lt;/label&gt;         &lt;select name="drug_names" id="drug_name"&gt;             &lt;option value="Abacavir"&gt;Abacavir&lt;/option&gt;             &lt;option value="Stavudine"&gt;Stavudine&lt;/option&gt;             &lt;option value="chloroquine"&gt;chloroquine&lt;/option&gt;             &lt;option value="mefloquine"&gt;mefloquine&lt;/option&gt;         &lt;/select&gt;          &lt;label for="qty"&gt;Quantity&lt;/label&gt;         &lt;input type="number" name="quantity" id="qty"&gt;          &lt;input type="submit" value="Order"&gt;     &lt;/form&gt; </pre>

- i. Create a php function that will get the drug name and quantity as arguments and output the total price of the items ordered. Assume the drug prices are as follows:

*Abacavir - Ksh 200, Stavudine-Ksh 100, Chloroquine- Ksh 400, Mefloquine - Ksh 300* (6 marks)

- ii. Suppose the drugs were stored in a database table as shown below:

Drugs table		
Drug ID	Drug Name	Price
1	Abacavir	200
2	Stavudine	100
3	Chloroquine	400
4	Mefloquine	300

- Write code to connect PHP to a MYSQL database named “*Medicine*” (2 marks)
- Write an SQL statement that will be used to fetch *drug\_name* and *price* from the database table. (2 marks)
- Rewrite the HTML code to display options using data fetched from the database (5 marks)