<table>
<thead>
<tr>
<th>Tick the Relevant</th>
<th>Computer Science B.Sc. Program ABET Student Outcomes</th>
<th>Question No. Relevant Is Hyperlinked</th>
<th>Covering %</th>
</tr>
</thead>
<tbody>
<tr>
<td>√</td>
<td>a) Apply knowledge of computing and mathematics appropriate to the discipline;</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>b) Analyze a problem, and identify and define the computing requirements appropriate to its solution</td>
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<tr>
<td>√</td>
<td>c) Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;</td>
<td>2, 3</td>
<td>67</td>
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<tr>
<td></td>
<td>d) Function effectively on teams to accomplish a common goal;</td>
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<td></td>
<td>e) Understanding of professional, ethical, legal, security, and social issues and responsibilities;</td>
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<td></td>
<td>f) Communicate effectively with a range of audiences;</td>
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<td></td>
<td>g) Analyze the local and global impact of computing on individuals, organizations and society;</td>
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<tr>
<td></td>
<td>h) Recognition of the need for, and an ability to engage in, continuing professional development;</td>
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<tr>
<td>√</td>
<td>i) Use current techniques, skills, and tools necessary for computing practices.</td>
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<tr>
<td></td>
<td>j) Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;</td>
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<td></td>
<td>k) Apply design and development principles in the construction of software systems of varying complexity;</td>
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</tbody>
</table>
Question 1 (10 Marks):

1. What is the value of b after executing the following code? (2 Marks)

\[
i = 8; \ j = 3; \ k = 1; \\
b = (j == 6 && i <= k) || (j < 8); \\
i = 8; \ j = 10; \ k = 1; \\
b = (j == 6 && i <= k) || (j < 8); \\
\]

answer:

true.................2.00 ..............false

2. What is the display of the following code? (3 Marks)

```java
int result = 0, operator = 2, 
    firstNumber=3,secondNumber=4; 
    firstNumber=4,secondNumber=3;

switch (operator) {
    case 1: result = firstNumber / secondNumber ;
    case 2: result = firstNumber * secondNumber ;
    case 3: result = firstNumber + secondNumber ;
    case 4: result = result+(firstNumber - secondNumber) ;
        break;
    default: result = 0;
}
System.out.println("result = " + result );
```

answer:

result = 6 .............3.00 .............result = 8
1. what is the display of the following code? (2 Marks)

```java
int i = 0;
while (i < 5) {
    if ((i + 3) % 2 == 0) {
        System.out.println("i= "+i);
        i+=3;
    }
    else i+=4;
    i++;
}
System.out.println("I am out of the loop");
```

**Answer:**

I am out of the loop ........................ 2.00

---

2. what is the display of the following code? (3 Marks)

```java
int i = 1;
int x = 0;
while (x <= 15) {
    x = x * 3+i;
    i+=2 ;
    System.out.println(x + "##");
}
```

**Answer:**

1 ## ................................. 1.00
6 ## ................................. 1.00
23 ## ................................. 1.00
Question 2 (12 Marks):

Consider the class \textit{Point} that defines a point with its coordinates (x,y) and its color. The class \textit{Point} has the following attributes:

- \textit{x} : represents the value of the first coordinate
- \textit{y} : represents the value of the second coordinate
- \textit{color} : represents the color of the point

The class \textit{Point} has the following methods:

A constructor \textit{Point}(): initializes \textit{x}, \textit{y} with the value 0 (zero) and the attribute \textit{color} with the value “black”.

A constructor \textit{Point}(int a, int b): initializes \textit{x}, \textit{y} with the value \textit{a} and \textit{b} and the attribute \textit{color} with the value “black”.

\textit{setPoint}(int a, int b): stores the values of the input parameters in the attributes \textit{x} and \textit{y}.

\textit{movePoint}(int dx, int dy): move the point from its actual position to a new position where \textit{dx} and \textit{dy} represent the shift from the actual position to the new one.

\textit{changeColor}(): a private method that changes the color of the point according to its coordinates(int, int). changes the color of the point according to the following rules.

<table>
<thead>
<tr>
<th>\textit{x}</th>
<th>\textit{y}</th>
<th>\textit{color}</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0</td>
<td>&lt;0</td>
<td>red</td>
</tr>
<tr>
<td>&gt;=0</td>
<td>&lt;0</td>
<td>green</td>
</tr>
<tr>
<td>&lt;0</td>
<td>&gt;=0</td>
<td>blue</td>
</tr>
<tr>
<td>&gt;=0</td>
<td>&gt;=0</td>
<td>yellow</td>
</tr>
</tbody>
</table>

\textbf{Note}: \textit{setPoint} and \textit{movePoint} changes the coordinates of the point. Any \textbf{changes} of the coordinates of the point changes the color of the point according to the defined table.
Implement the class \textit{Point}.

Answer:

class Point {
    private int x;                        \hfill 0.25
    private int y;                        \hfill 0.25
    private String color;                \hfill 0.25

    public Point() {
        x = y = 0;                        \hfill 0.50
        color = "black";                \hfill 0.50
    }

    public Point(int a, int b) {
        x = a;                           \hfill 0.25
        y = b;                           \hfill 0.25
        color = "black";                \hfill 0.50
    }

    public void setPoint(int a, int b) {
        x = a;                           \hfill 0.50
        y = b;                           \hfill 0.50
        changeColor();                  \hfill 1.00
    }

    public int getX() {
        return x;                       \hfill 1.00
    }

    public int getY() {
        return y;                       \hfill 1.00
    }

    public String getColor() {
        return color;                   \hfill 1.00
    }

    public void movePoint(int dx, int dy) {
        x += dx;                        \hfill 0.50
        y += dy;                        \hfill 0.50
        changeColor();                  \hfill 1.00
    }

    public void changeColor() {
        if (x < 0 && y < 0) color = "red"; \hfill 0.50
        if (x >= 0 && y < 0) color = "green"; \hfill 0.50
        if (x < 0 && y >= 0) color = "blue"; \hfill 0.50
        if (x >= 0 && y >= 0) color = "yellow"; \hfill 0.50
    }
}

Question 3 (8 Marks):

Write a Java program that:
- creates 2 points. The first one at the position (-5, 6) and the second one in the origin.
- moves the first point with 2 in the x axis and with 1 in the y axis;
- sets new coordinates to the second point, entered by the user from the keyboard.
- displays the color of the point that has the biggest y.

Answer:

```java
import java.util.Scanner;

class TestPoint {
    public static void main(String[] args) {
        Scanner S = new Scanner(System.in);

        Point p1 = new Point(-5, 6);
        Point p2 = new Point(0, 0);

        p1.movePoint(2, 1);

        int x = S.nextInt();
        int y = S.nextInt();
        p2.setPoint(x, y);

        if (p1.getY() > p2.getY())
            System.out.println(p1.getColor());
        else
            System.out.println(p2.getColor());
    }
}
```
## Result

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Relevant Student Outcome</th>
<th>SO is Covered by %</th>
<th>Full Mark</th>
<th>Student Mark</th>
<th>Assessor’s Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a</td>
<td>33</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>c</td>
<td>40</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>c</td>
<td>27</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals**  
100%  
30

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I certify that the work contained within this assignment is all my own work and referenced where required.

Student Signature:  
Date:  
Feedback Received:  
Student Signature:  
Date: