



**COMSATS UNIVERSITY ISLAMABAD, ISLAMABAD CAMPUS**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**Mid-Term Examination, SPRING 2023**

|              |                                                                                                  |        |              |
|--------------|--------------------------------------------------------------------------------------------------|--------|--------------|
| Class:       | BSCS, BSSE, BDS, BAL, BCT                                                                        | Marks: | 25           |
| Subject:     | CSC103-Programming Fundamentals                                                                  | Time:  | 90 min       |
| Instructors: | Dr. Manzoor Iqbal Tummey, Mr. Muzaffar Iqbal, Mr. Sanecha Amir, Mr. Umar Iqbal, Mr. Riwaz Rashid | Dated: | May 08, 2023 |

**Instructions:**

1. Attempt all questions.
2. Mobile phones or digital devices are not allowed.
3. Return question paper along with answer sheet.

**Question-1: Write the output of the following code snippets. [CLO-1]****(5 Marks)**

|                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>a. <code>int x = 0, a = 20;</code><br/> <code>a = a - -a + a++;</code><br/> <code>x = -a + -a + ++x;</code><br/> <code>System.out.println(a + " * x);</code></p>                                                                                                                                                                                   | <p>b. <code>int i, j;</code><br/> <code>for(i=1; i&lt;=2; i++);</code><br/> <code>for(j=2; j&gt;1; j--);</code><br/> <code>System.out.println(i + " * j + " * j);</code></p>                                                                                                                    |
| <p>c. <code>int a = 100, b = 123, c = 0;</code><br/> <code>c = a++ + b + c--;</code><br/> <code>System.out.printf("%2d %5d %5d", a+b+c);</code></p>                                                                                                                                                                                                   | <p>d. <code>int a = 2;</code><br/> <code>switch(a){</code><br/> <code>case 1: System.out.print("1 ");</code><br/> <code>case 2: System.out.print("2 ");</code><br/> <code>case 3: System.out.print("3 ");</code><br/> <code>default: System.out.print("Error ");</code><br/> <code>}</code></p> |
| <p>e. <code>for (int i = 1; i &lt;= 2; i++) {</code><br/> <code>for (int j = 1; j &lt;= 2; j++) {</code><br/> <code>for (int k = 1; k &lt;= 5; k++) {</code><br/> <code>System.out.print(++k);</code><br/> <code>System.out.println();</code><br/> <code>}</code><br/> <code>}</code><br/> <code>System.out.println();</code><br/> <code>}</code></p> | <p>Handwritten output for e: <code>1 2 3 4 5</code><br/> <code>1 2 3 4 5</code><br/> <code>1 2 3 4 5</code></p>                                                                                                                                                                                 |

**Question-2: Write code snippets for the following statements. [CLO-2]****(4 x 1 Mark)**

- Write a for statement to add all multiples of 3 between 1 and 100.
- Write an input statement validation loop that prompts the user to enter a number less than 20 or greater than 75.
- Write a Java while header, with an appropriate sentinel value, for a program that inputs the number of hours each employee worked during the week.
- Rewrite the following expressions using the conditional operator.

```
if (hours >= 40.0)
```

```
wages = 40 * 7.50 + 1.5 * 7.5 * (hours - 40);
```

```
else
```

```
wages = hours * 7.50;
```

while

Student name & reg. no.:

**Question - 3 [CLO-2]**

(3 Marks)

A sequence consists of integer numbers and ends with the number 0. Determine three highest numbers in the sequence. Do Not Use Arrays.

**Sample Run**

Input: 3 5 1 8 9 5 6 50 43 0

Output: Three highest Numbers: 50 > 43 > 9

**Question - 4 [CLO-2]**

(3 Marks)

A box of cookies can hold 24 cookies and a container can hold 75 boxes of cookies. Write a program that prompts the user to enter the total number of cookies. The program then outputs the number of boxes and the number of containers to ship the cookies. Note that each box must contain the specified number of cookies and each container must contain the specified number of boxes. If the last box of cookies contains less than the number of specified cookies, you can discard it, and output the number of leftover cookies. Similarly, if the last container contains less than the number of specified boxes, you can discard it, and output the number of leftover boxes.

**Question - 5 [CLO-2]**

(5 Marks)

Write a program to compute the following summation. Use Math.sqrt(n).

$$\frac{1}{1 + \sqrt{2}} + \frac{1}{\sqrt{2} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{4}} + \dots + \frac{1}{\sqrt{624} + \sqrt{625}}$$

**Question - 6 [CLO-2]**

(2 x 2.5 Marks)

- a) Twin primes are a pair of prime numbers that differ by 2. For example, 3 and 5 are twin primes, 5 and 7 are twin primes, and 11 and 13 are twin primes. Write a program to find all twin primes less than 100. Display the output as follows:

(3, 5)

(5, 7)

- b) Write an overloaded method `calculateArea()` that calculates the area of a rectangle. The method should take two `int` parameters representing the length and width of the rectangle, and return the area as an `int`. Then, overload the method to also calculate the area of a circle. The method should take a single `double` parameter representing the radius of the circle, and return the area as a `double`.

box = 24 cookies

container = 75 boxes of cookies

input: total cookies

output: no. of box & containers

dist get b2 =

int b = 800 / 24

int left = 800 - b \* box

trains = boxes / 75