

Section 2

Q1)

Observation:

- ❖ For $i = 1$:
 - Inner loop executes with $j = 1$, printing: 1 1
 - Inner loop executes with $j = 2$, printing: 1 2
 - After inner loop completes, a new line is printed.
- ❖ For $i = 2$:
 - Inner loop executes with $j = 1$, printing: 2 1
 - Inner loop executes with $j = 2$, printing: 2 2
 - After inner loop completes, a new line is printed.
- ❖ For $i = 3$:
 - Inner loop executes with $j = 1$, printing: 3 1
 - Inner loop executes with $j = 2$, printing: 3 2
 - After inner loop completes, a new line is printed.

Output: 1 1 1 2

 2 1 2 2

 3 1 3 2

Q2)

Observation:

- ❖ **When $i = 5$:**
 - $\text{total} += i; \rightarrow \text{total} = 0 + 5 = 5$

- if (i == 3) continue; → This condition is false, so continue is not executed.
- total -= 1; → total = 5 - 1 = 4

❖ **When i = 4:**

- total += i; → total = 4 + 4 = 8
- if (i == 3) continue; → This condition is false, so continue is not executed.
- total -= 1; → total = 8 - 1 = 7

❖ **When i = 3:**

- total += i; → total = 7 + 3 = 10
- if (i == 3) continue; → This condition is true, so continue is executed. This skips total -= 1;.
- The loop proceeds to the next iteration without executing total -= 1;.

❖ **When i = 2:**

- total += i; → total = 10 + 2 = 12
- if (i == 3) continue; → This condition is false, so continue is not executed.
- total -= 1; → total = 12 - 1 = 11

❖ **When i = 1:**

- total += i; → total = 11 + 1 = 12
- if (i == 3) continue; → This condition is false, so continue is not executed.
- total -= 1; → total = 12 - 1 = 11

Output: 11

Q3)

Observation:

❖ **First Iteration:**

- count is 0.
- `System.out.print(count + " ");` prints 0 .
- `count++` increments count to 1.
- `if (count == 3) break;` condition is false (since count is 1), so the loop continues.

❖ **Second Iteration:**

- count is 1.
- `System.out.print(count + " ");` prints 1 .
- `count++` increments count to 2.
- `if (count == 3) break;` condition is false (since count is 2), so the loop continues.

❖ **Third Iteration:**

- count is 2.
- `System.out.print(count + " ");` prints 2 .
- `count++` increments count to 3.
- `if (count == 3) break;` condition is true (since count is 3), so the break statement terminates the loop.

❖ **After Loop:**

- The loop is exited, and `System.out.println(count);` prints the final value of count, which is 3

Output: 0 1 2 3

Q4)

Observation:

❖ **First Iteration:**

- i is 1.

- `System.out.print(i + " ");` prints 1 .
- `i++` increments `i` to 2.

❖ **Second Iteration:**

- `i` is 2.
- `System.out.print(i + " ");` prints 2 .
- `i++` increments `i` to 3.

❖ **Third Iteration:**

- `i` is 3.
- `System.out.print(i + " ");` prints 3 .
- `i++` increments `i` to 4.

❖ **Fourth Iteration:**

- `i` is 4.
- `System.out.print(i + " ");` prints 4 .
- `i++` increments `i` to 5.

❖ **Loop Exit:**

- The condition `i < 5` is now false (since `i` is 5).
- The loop terminates.

❖ **After the Loop:**

- `System.out.println(i);` prints the final value of `i`, which is 5.

Output: 1 2 3 4 5

Q5)

Observation:

❖ **First Iteration (`i = 1`):**

- $i \% 2 == 0$ is false (since 1 is odd).
- $num -= i \rightarrow num = 1 - 1 = 0$.

❖ **Second Iteration (i = 2):**

- $i \% 2 == 0$ is true (since 2 is even).
- $num += i \rightarrow num = 0 + 2 = 2$.

❖ **Third Iteration (i = 3):**

- $i \% 2 == 0$ is false (since 3 is odd).
- $num -= i \rightarrow num = 2 - 3 = -1$.

❖ **Fourth Iteration (i = 4):**

- $i \% 2 == 0$ is true (since 4 is even).
- $num += i \rightarrow num = -1 + 4 = 3$.

Output: 3

Q6)

Observation:

❖ **Initial Value:**

- x starts at 5.

❖ **Expression Analysis:** $y = ++x - x-- + --x + x++;$

- **Pre-Increment (++x):**

- ++x increments x before using its value. So, x becomes 6 and the expression uses 6.

- **Post-Decrement (x--):**

- x-- uses the current value of x (which is 6) and then decrements it. After this operation, x becomes 5. The value used in the expression is 6.

- **Pre-Decrement (--x):**

- --x decrements x before using its value. x is now 5 (from the previous step), so --x makes it 4. The value used in the expression is 4.

- **Post-Increment (x++):**

- x++ uses the current value of x (which is 4) and then increments it. After this operation, x becomes 5. The value used in the expression is 4.

❖ **Expression Calculation:**

- Substitute the values into the expression:

- $y = 6 - 6 + 4 + 4$

- Perform the operations:

- $6 - 6$ results in 0

- $0 + 4$ results in 4

- $4 + 4$ results in 8

Output: 8

Q7)

Observation:

❖ **Initial Values:**

- $a = 10$
- $b = 5$

❖ **Expression Analysis:** $\text{result} = ++a * b-- - --a + b++;$

- **Pre-Increment (++a):**

- ++a increments a by 1 before using it.
- a becomes 11.

- The expression now uses 11.
- **Post-Decrement (b--):**
 - b-- uses the current value of b (which is 5) and then decrements it.
 - After this operation, b becomes 4.
 - The value used in the expression is 5.
- **Multiplication:**
 - ++a * b-- results in 11 * 5 which is 55.
- **Pre-Decrement (--a):**
 - --a decrements a by 1 before using it.
 - a becomes 10.
 - The value used in the expression is 10.
- **Post-Increment (b++):**
 - b++ uses the current value of b (which is 4) and then increments it.
 - After this operation, b becomes 5.
 - The value used in the expression is 4.
- **Subtraction and Addition:**
 - Subtracting --a from the previous result: 55 - 10 which is 45.
 - Adding b++ to the result: 45 + 4 which is 49.

Output: 49

Q8)

Observation:

❖ **Initial Values:**

- count = 0

- $i = 0$

❖ **First Iteration ($i = 0$):**

- **Expression:** $\text{count} += i++ - ++i$
 - $i++$ (post-increment): Uses the value of i before incrementing. So, $i++$ is 0 and then i is incremented to 1.
 - $++i$ (pre-increment): Increments i first (now i becomes 2), and then uses this new value.
 - So, $i++ - ++i$ evaluates to $0 - 2$, which is -2 .
- Update count: $\text{count} += -2 \rightarrow \text{count} = 0 - 2 = -2$.
- Increment i in the loop header: i is now 2.

❖ **Second Iteration ($i = 2$):**

- **Expression:** $\text{count} += i++ - ++i$
 - $i++$ (post-increment): Uses the value of i before incrementing. So, $i++$ is 2 and then i is incremented to 3.
 - $++i$ (pre-increment): Increments i first (now i becomes 4), and then uses this new value.
 - So, $i++ - ++i$ evaluates to $2 - 4$, which is -2 .
- Update count: $\text{count} += -2 \rightarrow \text{count} = -2 - 2 = -4$.
- Increment i in the loop header: i is now 4.

❖ **Loop Condition Check:**

- The loop condition $i < 4$ is now false (since i is 4), so the loop terminates.

Output: -4