Chapter – 4

4.1 Fill in the blanks in each of the following statements:

a) All programs can be written in terms of three types of control structures **sequence, selection** and **repetition**.

b) The statement **if-else** is used to execute one action when a condition is true and another when that condition is false.

c) Repeating a set of instructions a specific number of times is called **counter-controlled (or definite)** repetition.

d) When it's not known in advance how many times a set of statements will be repeated, a(n) **sentinel, signal, flag or dummy** value can be used to terminate the repetition.

e) The **sequence** structure is built into Java; by default, statements execute in the order they appear.

f) Instance variables of types char, byte, short, int, long, float and double are all given the value **0 (zero)** by default.

g) Java is a(n) **Strong typed** language; it requires all variables to have a type.

h) If the increment operator **prefixed** is to a variable, first the variable is incremented by 1, then its new value is used in the expression.

4.2 State whether each of the following is *true* or *false*. If *false*, explain why.

a) An algorithm is a procedure for solving a problem in terms of the actions to execute and the order in which they execute.

True.

b) A set of statements contained within a pair of parentheses is called a block.

False. A set of statements contained within a pair of braces ({ and }) is called a block.

c) A selection statement specifies that an action is to be repeated while some condition remains true.

False. A repetition statement specifies that an action is to be repeated while some condition remains true.

d) A nested control statement appears in the body of another control statement.

True.

e) Java provides the arithmetic compound assignment operators +=, -=, *=, /= and %= for abbreviating assignment expressions.

True

f) The primitive types (boolean, char, byte, short, int, long, float and double) are portable across only Windows platforms.

False. The primitive types (boolean, char, byte, short, int, long, float and double) are portable across all computer platforms that support Java.

g) Specifying the order in which statements execute in a program is called program control.

True.

h) The unary cast operator (double) creates a temporary integer copy of its operand.

False. The unary cast operator (double) creates a temporary floating-point copy of its operand.

i) Instance variables of type boolean are given the value true by default.

False. Instance variables of type boolean are given the value false by default.

j) Pseudocode helps you think out a program before attempting to write it in a programming language.

True

4.3 Write four different Java statements that each add 1 to integer variable x.

Ans :

```
x = x + 1;
x += 1;
++x;
x++;
```

4.4 Write Java statements to accomplish each of the following tasks:

a) Use one statement to assign the sum of x and y to z, then increment x by 1.

Ans : z = x++ + y;

b) Test whether variable count is greater than 10. If it is, print "Count is greater than 10".

Ans :
```
if ( count > 10 )
    System.out.println( "Count is greater than 10" );
```

c) Use one statement to decrement the variable x by 1, then subtract it from variable total and store the result in variable total.

Ans : total -= --x;

d) Calculate the remainder after q is divided by divisor, and assign the result to q. Write this statement in two different ways.

Ans :
```
q %= divisor;
q = q % divisor;
```

4.5 Write a Java statement to accomplish each of the following tasks:

a) Declare variables sum and x to be of type int.

```
int sum;
int x;
```

c) Assign 1 to variable x.

```
X=1;
```

d) Assign 0 to variable sum.

```
Sum = 0;
```

e) Add variable x to variable sum, and assign the result to variable sum.

```
Sum = sum+x  or  sum +=x;
```

f) Print "The sum is: ", followed by the value of variable sum.
System.out.printf("The sum is: %d\n", sum);

4.6 Combine the statements that you wrote in Exercise 4.5 into a Java application that calculates and prints the sum of the integers from 1 to 10. Use a while statement to loop through the calculation and increment statements. The loop should terminate when the value of x becomes 11.

Ans :

```
1
2
3 public class Calculate
4 {
5 public static void main( String[] args )
6 {
7 int sum;
8 int x;
9
10 x = 1;
11 sum = 0;
12
13 while ( x <= 10 )
14 {
15 sum += x;
16 ++x;
17 }
18
19 System.out.printf( "The sum is: %d\n", sum );
20 }
21 }
```

Output:

```
The sum is: 55
```

4.7 Determine the value of the variables in the statement product *= x++; after the calculation is performed. Assume that all variables are type int and initially have the value 5.

Ans: product = 25, x = 6

4.8 Identify and correct the errors in each of the following sets of code:

a) while (c <= 5)

{

product *= c;

++c;

Ans :

Error: The closing right brace of the while statement's body is missing.

Correction: Add a closing right brace after the statement ++c;.

b) if (gender == 1)

System.out.println("Woman");

else;

System.out.println("Man");

Ans :

Error: The semicolon after else results in a logic error. The second output statement will always be executed.

Correction: Remove the semicolon after else.

4.9 What is wrong with the following while statement?

while (z >= 0)

sum += z;

Ans:

The value of the variable z is never changed in the while statement. Therefore, if the loopcontinuation condition (z >= 0) is true, an infinite loop is created. To prevent an infinite loop from occurring, z must be decremented so that it eventually becomes less than 0..