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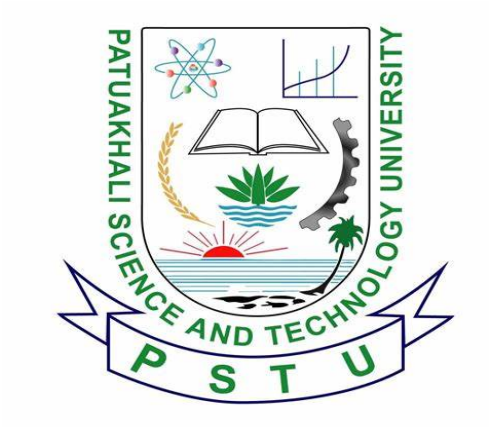

Course Code: CCE-121

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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 if … else statement 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 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 zero by default.

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

h) If the increment operator is prefixed 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.

Ans: True

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

Ans: False. A set of statements withing braces is called a block.

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

Ans: False. A repetition statement specify that an action is to be repeated

while some condition remain true.

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

Ans: True.

e) Java provides the arithmetic compound assignment operators +=, -=, *=, /=

and %= for abbreviating assignment expressions.

Ans: True.

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

Ans: False. As they are cross-platform, they can support almost all platforms.

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

program control.

Ans: True.

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

operand.

Ans: 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.

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

j) Pseudo-code helps you think out a program before attempting to write it in

a programming language.

Ans: True.

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

1 X = X + 1;

2 X++;

3 ++X;

4 X+=1;

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.

1 z = x++ + y;

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

1 if (count > 10)

2 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.

1 total = 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.

1 Q = Q % divisor;

2 Q %= divisor;

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

a) Declare variables sum of type int and initialize it to 0.

1 Int sum = 0;

b) Declare variables x of type int and initialize it to 1.

1 int x = 1;

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

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

d) Print "The sum is: ", followed by the value of variable sum.

```
1 System.out.println(“The sum is: ” + 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.

```
 1 public class Main {
 2 public static void main(String[] args) {
 3 int sum = 0;
 4 int x = 1;
 5 while ( x <= 10 )
 6 {
 7 sum += x++;
 8 }
 9 System.out.println(sum);
10 }
11 }
```

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: The value of x will be 25.

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

1 a) while (c <= 5)

2 {

3 product *= c;

4 ++c;

Ans: The closing bracket is missing.

1 b) if (gender == 1)

2 System.out.println("Woman");

3 else;

4 System.out.println("Man");

Ans: There's a semicolon after else, so it'll not work as expected.

4.9 What is wrong with the following while statement?

1 while (z >= 0)

2 sum += z;

Ans: It'll cause an infinity loop. Cause the value of z will remain unchanged.

4.10 Compare and contrast the if single-selection statement and the while repetition statement. How are these two statements similar? How are they different?

Ans: The if statement and while repetition statement both works on a certain condition. If the condition is true then both of these works, or they avoids a lenght of statements.

On the other hand, if selection statement can execute some statements once but the while repetition can execute certain statements until the condition is met.

4.11 Explain what happens when a Java program attempts to divide one integer by another. What happens to the fractional part of the calculation? How can you avoid that outcome?

Ans: When a Java program attempts to divide one integer by another using the division operator ("/"), the result will be an integer division. The fractional part of the calculation is truncated, meaning it is discarded, and we will get the integer quotient as the result. For example, if you divide 7 by 2, the result will be 3, and the fractional part (0.5) is discarded.

To avoid integer division and preserve the fractional part, we can use casting to convert one or both of the integers to floating-point numbers. For example: (double) a / b or a / (double) b.

4.12 Describe the two ways in which control statements can be combined.

Ans: Control statement can be combined in two ways. Those are,

1. Sequential Combination: Control statements are executed in sequence, one after the other. This is the default behavior in Java. For example, statements in a method are executed one after the other, from top to bottom.

2. Nested Combination: In this process one control statement appears inside another. If the outer condition one is true and executed then inner one works.

4.13 What type of repetition would be appropriate for obtaining an input from the user until the user indicates there is no more input to provide? What type would be appropriate for calculating the factorial of 5? Briefly describe how each of these tasks could be performed.

Ans: For such type of repetition, while loop will be much more effective. For instance, the following code will take input from the user and will create a list

until the user press 0.

```
 1 import java.util.LinkedList;
 2 import java.util.Scanner;
 3
 4 public class Main {
 5 public static void main(String[] args) {
 6 LinkedList<Integer> list = new LinkedList<Integer>();
 7 Scanner sc = new Scanner(System.in);
 8 while (true)
 9 {
10 int temp = sc.nextInt();
11 if (temp == 0) break;
12 list.add(temp);
13 }
14 sc.close();
15 System.out.println(list.toString());
16 }
17 }
```

For finding the factorial of five, while repetition will be much more effiecint and time saving. The code will be like,

```
1 public class Main {
2 public static void main(String[] args) {
3 int fact = 5, result = 1;
4 while (fact != 1)
```

```
5 result *= fact--;
6 System.out.println(result);
7 }
8 }
```

4.14 If integers x and y are set to 7 and 3, what is the value of x after x = y++ and x = ++y?

Ans: 3 and 4

4.15 Identify and correct the errors in each of the following pieces of code.

[Note: There may be more than one error in each piece of code.]

a)

```
1 if (age >= 65);
2 System.out.println("Age is greater than or equal to 65");
3 else
4 System.out.println("Age is less than 65)";
```

Ans: At line 1, there's a semicolon after the if condition. And in the fourth line, the semicolon will have to be put after the right parentheses.

b)

```
1 int x == 1, total == 0;
2 while (x <= 10)
3 {
4 total ++x;
5 System.out.println(x);
6 }
```

Ans: At line one, we have to assign a number to x and, so we have to use, x = 1; And on the fourth line, ++ is a unary operator, so we just have to use one

operand.

c)

```
1 while (x <= 100)
2 total += x;
3 ++x;
```

Ans: After while statement block statement or braces are missing. In this code only the total += x; will be executed, which will cause an infinity loop. So we have to use braces to define block statement.

d)

```
1 while (y =! 0)
2 {
3 System.out.println (y);
```

Ans: Here the control statement would be y != 0 and there will be a right brace at the very end.

4.16:What does the following program print?

```
1 // Exercise 4.16: Mystery.java
2 public class Mystery
3 {
4 public static void main(String[] args)
5 {
6 int x = -2;
7 int total = 0;
8 while (x <= 10)
9 {
```

```
10 int y = x + 2;
11 x++;
12 total += y;
13 System.out.printf("Y is: %d and total is %d\n", y, total);
14 }// end while
15 }// end main
16 } // end class Mystery
```

Ans: The output will be,

```
Y is: 0 and total is 0
Y is: 1 and total is 1
Y is: 2 and total is 3
Y is: 3 and total is 6
Y is: 4 and total is 10
Y is: 5 and total is 15
Y is: 6 and total is 21
Y is: 7 and total is 28
Y is: 8 and total is 36
Y is: 9 and total is 45
Y is: 10 and total is 55
Y is: 11 and total is 66
Y is: 12 and total is 78
```