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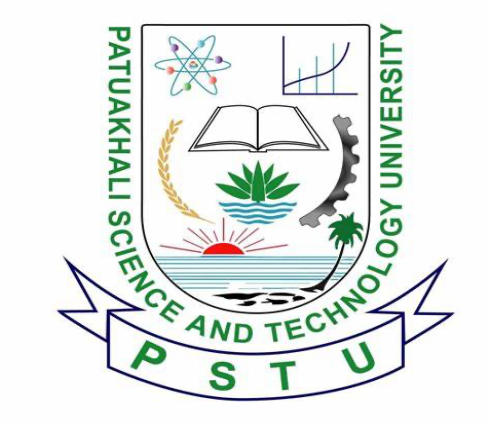

Course Code: CCE-121

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

Answers:

a. sequence, selection, repetition.

b. if…else.

c. counter-controlled (or definite).

d. sentinel, signal, flag or dummy.

e. sequence.

f. 0 (zero).

g. strongly typed.

h. prefixed.

4.2 True false

Answers:

a. True.

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

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

d. True.

e. True.

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

g. True.

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

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

j. True

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

Answers:

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.

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

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

Answers:

a. z = x++ + y;

b. if (count > 10)

```
   System.out.println("Count is greater than 10");
```

c. total -= --x;

d. q %= divisor; q = q % divisor;

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

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

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

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

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

Answers:

a. int sum = 0;

b. int x = 1;

c. sum += x; or sum = sum + x;

d. 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

Answers:

```
public class answer
 {
 public static void main(String[] args)
 {
 int sum = 0;
 int x = 1;
 while (x <= 10) // while x is less than or equal to 10
 {
 sum += x; // add x to sum
 ++x; // increment x
 }
  System.out.printf("The sum is: %d%n", sum);  }  }
```

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.

Answers:

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; b) if (gender == 1) System.out.println("Woman"); else; System.out.println("Man");

Answers:

a) Error: The closing right brace of the while statement’s body is missing. Correction: Add a closing right brace after the statement ++c;.

b) 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;

Answers:

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.

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?

Answers:

Similarities:

Control Structures: Both "if" and "while" are control structures used in programming to control the flow of a program.

Condition-based: Both statements rely on conditions to make decisions. In the case of "if," it makes a decision to execute a block of code based on whether a condition is true or false. In the case of "while," it continues to execute a block of code as long as a condition is true.

Differences:

Purpose:

"if" Statement: It is primarily used for single-selection decision-making. It allows you to execute a block of code when a condition is true and optionally execute another block of code when the condition is false.

"while" Statement: It is used for repetition or looping. It repeatedly executes a block of code as long as a condition is true. It is used for tasks that need to be performed multiple times.

Execution:

"if" Statement: It is typically executed once, and it can be followed by an "else" statement for an alternative code block to execute when the condition is false.

"while" Statement: It can execute its block of code multiple times, potentially an indefinite number of times, as long as the condition remains true.

Control Flow:

"if" Statement: It can affect the flow of the program by allowing it to take different paths depending on the condition's outcome.

"while" Statement: It can create a loop, which causes the program to repeatedly execute the same code until the condition becomes false. This can lead to iterative execution.

Termination:

"if" Statement: It doesn't inherently control how many times a block of code is executed. It's used for one-time decisions.

"while" Statement: It controls repetition and continues executing the block of code until the condition becomes false, at which point it terminates the loop.

Example Usage:

"if" Statement: Checking if a user is above a certain age to grant access to a website.

"while" Statement: Iterating through a list of items to process each item until the list is empty.

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?

Answers:

Integer Division:

If both the numerator and denominator are integers, Java performs integer division. This means that only the integer portion of the result is retained, and the fractional part is discarded. For example, if you divide 5 by 2 (5 / 2) in integer division, the result is 2. The fractional part (0.5) is truncated, and only the whole number part is kept.

Floating-Point Division: If either the numerator or the denominator is a floating-point number (float or double), the division operation is performed as floating-point division. In this case, the fractional part **of** the result is retained. For example, if you divide 5.0 by 2 (5.0 / 2), the result is 2.5, and the fractional part (0.5) is preserved.

Avoiding Integer Division: To avoid the truncation of the fractional part in division, you can ensure that at least one of the operands is a floating-point number. You can do this by:

Using a floating-point literal: Instead of 5 / 2, use 5.0 / 2 or 5 / 2.0.

Casting: You can explicitly cast one or both operands to floating-point types. For example, (double) 5 / 2 or 5 / (double) 2.

Using variables with floating-point types: If the operands are stored in variables, declare them as float or double, and perform the division with those variables.

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

Answers:

Control statements in programming can be combined in two ways:

Sequential Combination: This involves executing control statements one after another in a sequential order. The output of one control statement can serve as input to the next statement. Sequential combination is the default behavior in most programs, where statements are executed in the order they appear in the code.

Structured Combination: Structured combination involves using control structures such as loops, conditionals, and subroutines/functions to create more complex control flows. You can nest control structures or combine them in a structured manner to perform tasks that involve repeated execution, decision-making, and modularization of code. This approach allows for more complex and organized program behavior.

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.

Answers:

Obtaining User Input Until No More Input:

For obtaining input from the user until they indicate there's no more input to provide, an appropriate type of repetition is a "post-test loop," typically implemented with a do-while loop. In this loop, the program first executes the code, and then it checks a condition to determine if it should repeat.

Calculating the Factorial of 5:

Calculating the factorial of 5, which is a fixed number, is best achieved using a "for" loop. A "for" loop is suitable when you know the exact number of iterations required.

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?

Answers:

X=5,y=5;

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) if (age >= 65); System.out.println("Age is greater than or equal to 65");

else System.out.println("Age is less than 65)";

b) int x == 1, total == 0;

while (x <= 10)

{ total ++x; System.out.println(x); }

c) while (x <= 100) total += x; ++x;

d) while (y =! 0)

{ System.out.println (y);

Answers:

a. Errors: There should be no semicolon after the condition in the if statement.
   The semicolon terminates the statement prematurely.
   The closing parenthesis of the second System.out.println should be inside the double-quotes. The if statement should be followed by the else statement without a semicolon.
b. Errors: Variable declarations should use a single equal sign (=) for assignment, not a double equal sign (==). The increment operator should be x++, not ++x
c. Errors: The statements within the loop should be enclosed in curly braces.The increment of x should be inside the loop.

4.16 What does the following program print?

```
// Exercise 4.16: Mystery.java
public class Mystery
{
public static void main(String[] args)
{
int x = -2;
int total = 0;
```

```
while (x <= 10)
{
int y = x + 2;
x++;
total += y;
System.out.printf("Y is: %d and total is %d\n", y, total);
}// end while
}// end main
}
```

Answers:

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