Thursday 24th 2022

Attempt any 4

You will present your work on Tuesday of 29th- March 2022 during lecture time

Make sure all questions have at-least been attempted

Question 1

a) What is the purpose and use of the import statement in Java programming? Does a java program always have to include an import statement? Use an appropriate example to show the syntax for importing one class and all classes in a package

b) Explain the advantages/features of the Java programming language:
   i) Java is architecture-neutral
   ii) Java is Multithreaded
   iii) Java is Distributed

c) Using appropriate examples or illustrations, explain the following terminologies as used in Java programming:
   i) Class
   ii) Constructor
   iii) Object
   iv) Wrapper class
   v) Bytecode

d) Mulwana Insurance Company is having problems in calculating interest for its customers. Write a java program to help them find the Simple interest for any amount of principal and at whatever interest supplied by the user using the formula below:
   SI = PTR /100
   Where

   P: Principal

   T: Time (in)

   R: Interest rate per

Question 2

a) What is the work of the static keyword in Java programming? When do we declare a member of a class static? When should we not declare a member static? When should we not declare a member static?

b) Identify and correct all the errors in the following Java Program:

```
Private class three
}
Public static void main ( )
{
String input;
Input = Scanner.next( );
System.out.print(“Input has “ +input.length () + ” characters”);
{
}
```

c) By means of a java Program of your choice, show and explain what is meant by an infinite loop
d) What is polymorphism in OOP: How is it implemented in Java? Why would we use it?
e) Use all the three types of loops in one program to output all the even numbers from 2 to 60. Each loop should write the numbers again on a new line as shown below:
2, 4, 6, …….. 60
2,4,6,…….. 60
2,4,6,…….. 60

Question 3

a) What is an access modifier? Explain the basic class access modifiers that can be implemented in any java program.
b) A drug looses x% of its effectiveness every month it is in storage. When its effectiveness is below 50% it is considered expired and must be discarded.
Required:
Write a java program that determines how many years and months the drug can remain in storage when the user provides the value x.
Hint: use the modulo operator %
c) Create a program called Season using a switch construct that obtains a number representing a month (January = 1, December = 12) and outputs what season the month is in.
For the purpose of this program, December-March is considered winter, April - May is considered spring, June-August is considered summer, and September-November is considered autumn.

Question 4

a) Define the following terms
i) Methos overloading
ii) Local variable
iii) Instance Variable
b) Draw the flow chart that will generate 50 integer number between -13 and 63 and print them only if they are even columns of 10

Question 5

a) Java is a Simple high level, robust, secured and object- oriented programming language. Discuss in details these characteristics of java
b) Explain the concept of exceptions in Java
c) For this problem, you should write a very simple but complete class. The class represents a counter that counts 0,1,2,3,4,..... The name of the class should be counter. It has one private instance variable representing the value of the counter. It has two instance methods: increment ( ) adds a value of one to the counter value and get value ( ) which returns the current counter value. Write a complete definition for the class counter.

Question 6

a) What are access specifiers? Draw a table showing all the access specifiers and their accessibility in the class package, subclasses and other packages

b) The gad( ) function, defined in a class Euclid, takes two Non-negative integer arguments and return the greatest common divisor of the two integers.

```
Public class Euclid {
    Public Static int gcd(int P, int q) {
    If (q = = 0) return P;
            return gcd (q, p%q)
    }
}
```

i) Write an overloaded function gcd ( ) that takes three non-negative integer arguments and returns the greatest common divisor of the three integers. Assume that the function is in the same class Euclid as the two-argument version above.

Hint: Use the identity gcd(P; q; r) = gcd(gcd(p; q);r)

For example

gcd(504; 4116; 4410)
= gcd(gcd(504; 4116); 4410)
=Gcd(84; 4410) = 42

Question 7

Create a Java Class for the following class diagram

Circle
- X-coord - Y-coord - Radius
+findArea() +findCircumference() +Scale()

Hint: For the methods, don't implement their functionalities/body

Question 8

a) Write two different Java statements where each statement adds 1 to integer variable x
b) Write Java statements to accomplish each of the following tasks:
   i) Assign the sum of x and y to z and increment the value of x by 1 after the calculation
   ii) Use a **tenary** operator Test if the value of the variable count is greater than 10. If it is, print "Count is greater than 10"
   iii) Explain the primitive data types as used in Java

Question 9

Write a program that will evaluate simple expressions such as 2 + 3 and 1.19 * 4.27. Th expressions are to be typed in by the user. The input should always consist of a number, followed by an operator, followed by another number. The operators that are allowed are +,

-, * , and / for addition, subtraction, multiplication and division respectively. Your program should read an expression, print its value, read another expression, print its value, and so on. The program should end when the user enters 0 as the first number on the line.