TUTORIAL 2

1)
   a. Explain public static void main(String args[]) in Java.
   b. Mark the following statements as true or false.
      (i) An identifier can be any sequence of digits and letters.
      (ii) In Java, there is no difference between reserved word and predefined identifier.
      (iii) A Java identifier can start with a digit.
      (iv) The operands of the modules operator must be integers.
      (v) If the value of a is 4 and the value of b is 3, then after the statement a = b; the value of b still 3.
      (vi) In a mixed expression, all operands are converted to floating-point numbers.
      (vii) Suppose x = 5. After the statement y = x++, executes, y is 5 and x is 6.
      (viii) Suppose a = 5. After the statement ++a; executes, the value of a is still5 because the value of the expression is not saved in another variable.

2)
   a. How does a variable of a primitive type differ from a reference variables?

   b. Mark the following statements as true or false.

      (i) In Java, all variables ae initialized when they are declared.
      (ii) In Java, when a decimal number is assigned to an int variable without using the cast operator, the decimal part is dropped automatically.
      (iii) In an output statement, the newline character may be part of a string.
      (iv) The class String is included in the package java.io.

3)
   a. What is an object?

   b. Mark the following statements as true or false.

      (i) A value returning method returns only one value via the return statement.
      (ii) When a return statement executes in a user-defined method, the method exits immediately.
      (iii) If a Java method does not use parameters, parentheses around the empty parameter list still are needed.
      (iv) In Java, the names of the corresponding formal and actual parameters must be the same.
      (v) The instance variables of a class must be of the same type.

4)
   a. What does the operator new do?

   b. Mark the following statements as true or false.

      (i) The methods of a class must be public.
      (ii) A class can have more than one constructor.
      (iii) A constructor can return a value of any primitive type.
      (iv) The result of a logical expression cannot be assigned to an int variable.
      (v) Every if statement must have an associated else.

5) Suppose the object str2 is a String variable. Write a Java statement that uses the operator new to instantiate the object str2 and assign the string “Java is an Object Oriented Programming Language”.

6)

a. What is unary operator and give example.

b. Write a method that calculates the factorial of a given number.
Factorial is the product of all positive integers less than or equal to n. For example, factorial(4) = 4x3x2x1 = 24.
TIP: To make it more interesting, try to do it recursively.

7)

a) List 3 relational operators.

b) Mark the following statements as true or false.

(i) The method printf and format are used to format a decimal number to a specific number of decimal places.
(ii) The value of the expression Double.parseDouble(“-45.75”) = 45.75.
(iii) A variable declared using a class is called an object.
(iv) To use a predefined method of a class contained in the package java.lang in a program, you need to know only what the name of the method is and how to use it.

8) Identify whether the following identifiers legal or illegal, if illegal explain why they illegal.
a. RS6S6
b. MIX-UP
c. STOP!
d. Exam1
e. $amount
f. September1Lecture
g. 2May
h. First exam
i. J
j. Three

9) Which of the following is a reserved word in Java?
a. int
b. INT
c. Char
d. CHAR

10) Circle the best answer.
a. The value of 15 / 2 is:
(i) 7
(ii) 7.5
(iii) 0.75
(iv) none of these
b. The value of 18 / 3 is:
(i) 6
(ii) 0,6
(iii) 6.0

(iv) none of these

c. The value of 22 % 7 is:
   (i) 3
   (ii) 1
   (iii) 22/7
   (iv) 3.142

d. The value of 5 % 7 is:
   (i) 0
   (ii) 2
   (iii) 5
   (iv) undefined

e. The value of 5 – 3.0 + 2 is:
   (i) 0
   (ii) 0.0
   (iii) 4
   (iv) 4.0

f. The value of 7 – 5 * 2 + 1 is
   (i) -2
   (ii) 5
   (iii) 6
   (iv) none of these

g. The value of 15.0 / 3.0 + 2.0 is:
   (i) 3
   (ii) 3.0
   (iii) 5.0
   (iv) none of these

11) If x = 5, y = 6, z = 4, and w = 2.0, evaluate each of the following expressions, if possible. If it is not possible, state the reason.
   a. (x + z) % y
   b. (x + y) / w
   c. (y + x) % x
   d. (x + y) * w
   e. (x % y) % z
   f. (y % z) % x
   g. (x * z) % y
   h. ((x * y) * w) * z

12) Given:
```
int n, m, l;
double x, y;
```
   which of the following assignment are valid? If an assignment is not valid, state the reason.
   a. n = 5;
   b. m = 2 * n; l = m;
   c. n = 5; m = 2 + 6; n = 6/3;
   d. m + n = l;
   e. x = 2 * n + 5.3;
   f. l + l = n;
   g. x / y = x * y;
   h. m = n % l;
   i. n = x % 5;
   j. x = x + 5;
   k. n = 3 + 4.6;

13) Do a walk-through to find the value assigned to e. Assume that all variables are properly declared.

```
a = 3;

b = 4;

c = (a % b) * 6;

d = c / b;

e = (a + b + c + d) / 4;
```

14) Which of the following variable declarations are correct? If the variable declaration is not correct, give the reason(s) and provide the correct variable declaration.
    a. n = 12;
    b. char letter = ;
    c. char letter = B;
    d. int one = 5, two;
    e. double x, y, z;

15) Which of the following valid Java assignment statements? Assume that i, x and percent are double variables.
    a. I = I + 5;
    b. x + 2 = x;
    c. x = 2.5 + x;
    d. percent = 10%

16) Write a Java statements that accomplish the following:
    a. Declare int variables x and y.
    b. Initialize an int variable x to 10 and a char variable ch to ‘B’.
    c. Update the value of an int variable x by adding 5 to it.
    d. Set the value of a double variable z to 25.3.
    e. Copy the contents of an int variable y into an int variable z.
    f. Swap the contents of the variable x and y. (Declare an additional variable, if necessary.)
    g. Output the contents of variable x and expression 2 * x + 5 – y, where x and y are double variables.
    h. Declare a char variable grade and set the value of grade to ‘A’.
    i. Declare int variables to store four integers.
    j. Copy the value of a double variable z to the nearest integer into an int variable x.

17) Write each of the following as a Java expression.
    a. 10 times a
    b. The character that represents 8
    c. $(b^2 – 4ac) / 2a$
    d. $(-b + (b^2 – 4ac)) / 2a$

18) Suppose x, y, z, and w are int variables. What value is assigned to each variable after last statement executes?

```
x = 5;
z = 3;
y = x – z;
z = 2 * y + 3;
w = x – 2 * y + z;
z = w – x;
w++;
```

19) Suppose x, y, and z are int variables and w and t are double variables. What is the value of each variable after the last statement executes?

```
x = 17;
y = 15;
x = x + y / 4;
z = x % 3 + 4;
w = 17 / 3 + 6.5;
t = x / 4.0 + 15 % 4 – 3.5;
```

20) Suppose a, b, and c are int variable and a = 5 and b = 6. What value is assigned to each variable after each statement executes? If a variable s undefined at a particular statement, report UND (undefined).

	a	b	c
a = (b++) + 3;			
c = 2 * a + (++b);			
b = 2 * (++c) – (a++);			

21) What are the output of following Java Program:

a.
```
public class Exersice21
    {
    //My first Java program
    public static void main(String[] args){

    //print the string Hello World on screen
    System.out.println("Hello World");
    }
}
```

b.
```
public
class Exersice21{
//My first Java program
public static void main(String[]
args){
```

```
//print the string Hello World on screen
System.out.println("Hello World");
}
}
```

c.
```
public class Exersice21{
//My first Java program
    public static void main(String[] args){

//print the string Hello World on screen
System.out.println(

"Hello World");
}
}
```

d.
```
public class Exersice21{
    //My first Java program
    public static void main(String[] args)
    {
    //print the string Hello World on screen
    System.out.println("Hello World")

    ;
    }
}
```

22) What is the output of the following Java programs:

```
public class Exersice22
{
    public static void main(String[] args)
    {
        System.out.println("My fist Java program.");
```

```
            System.out.println("The sum of 2 and 3 = " +5);
            System.out.println("7 + 8 = " + 7 + 8);
            System.out.println("7 + 8 = " + (7 + 8));

        }
    }
```

23) Consider the following program segment:

```
public class Exersice23
{
    public static void main(String[] args)
    {
            //print the variable declaration;
            //executable statements
    }
}
```

Declare a proper variable for the following item. Write a comment at the end of variable declaration to state the question number:

a. Number of apple in the basket.
b. The price of burger.
c. Weight of tomato in a plastic.
d. Pack of sugar.
e. Identity card number.
f. Light switch on and off.

24) Consider the following program segment:

```
public class Exersice24
{
    public static void main(String[] args)
    {
            //print the variable declaration;
            //executable statements
    }
}
```

Write Java statements that accomplish the following:

a. Declare following variables num1, num2 and num3 and average of type int.
b. Store 125 into num1, 28 into num2 ans -25 into num3.
c. Store the average of num1, num2 and num3 into average.

d. Display the values of num1, num2, num3 and average.

25) Repeat Exercise 24 by declaring num1, num2, num3 and average of type double. Store 75.35 into num1, -35.56 into num2 and 15.76 into num3.

26) Consider the following program segment:

```
public class Exersice26
{
    public static void main(String[] args)
    {
            //print the variable declaration;
            //executable statements
    }
}
```

Write Java statements that accomplish the following:

a. Declare variable name of type String and studyHours of type double.
b. Assign the String "Elizabeth Arden" to name and store 4.5 into studyHours.
c. Output the values of name and studyHours with the appropriate text. A sample output is: Hello, Elizabeth Arden. On Saturday, you have to study 4.5 hours for the exam.

27) Consider the following program segment:

```
public class Exersice27
{
    public static void main(String[] args)
    {
            //print the variable declaration;
            //executable statements
    }
}
```

Write Java statements that accomplish the following:

a. Declare and initialize the following names constants: PRICE of type double initialized to 3.50.
b. Declare the variable quantity of type int and totalPrice of type double.
c. Store the multiplication of quantity and PRICE into totalPrice.
d. Output the values quantity and totalPrice with the appropriate text.
   A sample output is: 2 Chicken Burger X RM3.50 = RM7.00.

28) Suppose x and y are int variable and x = 25 and y = 35. What is the ouput of each of the following statements?
a. System.out.println (x + ‘ ‘ + y);
b. System.out.println (x + “ “ + y);

29) Suppose x, y, and z are int variables and x = 2, y = 5 and z = 6. What is the output of each of the following statements?
   a. System.out.println("x = " + x + ", y= " + y + ", z= " + z);
   b. System.out.println("x + y =" + (x + y);
   c. System.out.println("Sum of " + x + " and " + z + " is " +(x + z));
   d. System.out.println("z / x = is " +(x / z));
   e. System.out.println("2 times " + x + " = " + (2 * x));

30) Which of the following are correct Java statements?
   a. System.out.println("Hello There!");
   b. System.out.println("Hello");
      ("There");
   c. System.out.println('Hello There');
   d. System.out.println("Hello" +
      (" There");

31) What is the output of the following statements? Suppose a and b are int variables, c is double variable, and a = 13, b = 5, and c = 17.5.
   a. System.out.println(a + b – c);
   b. System.out.println(15 / 2 + c);
   c. System.out.println(a / double(b) + 2 + c);
   d. System.out.println(14 % 3 + 6.3 + b / a);
   e. System.out.println((int)c % 5 + a - b);
   f. System.out.println(13.5 / 2 + 4.0 * 3.5 + 18);

32) Consider the statements:
   int x, y;
   char ch;

   and the input 46 A 49
   Write a Java statements that would store 46 into x, 'A' into ch, and 49 into y when these values are entered in order.

33) Consider the statements:
   double x = 75.3987;
   double y = 982.89764;

   What is the output of the following statements?
   a. System.out.printf("%.2f %n", x);
   b. System.out.printf("%.2f %n", y);
   c. System.out.printf("%.3f %n", x);
   d. System.out.printf("%.3f %n", y);

34) What does the following statement do?(Assume the scoreStr is a String variable.)
   scoreStr = JOptionPane.showInputDialog("Enter the score : ");

35) Consider the following statements:
   String str3 = "Siti is reading a book";
   char ch;
   int len;
   int position;

   a. What value is stored in ch by the following statement?
      ch = str3.charAt(0);

b. What value is stored in ch by the following statement?
   ch = str3.charAt(13);
c. What value is stored in len by the following statement?
   len = str3.length();
d. What value is stored in position by the following statement?
   ch = str3.indexOf('b');
e. What value is stored in position by the following statement?
   ch = str3.indexOf("book");
f. What value is the output of the following statement?
   System.out.println(str2.substring(0, 4);
g. What value is the output of the following statement?
   System.out.println(str2.substring(8, 15);
h. What value is the output of the following statement?
   System.out.println(str2.toLowerCase());
i. What value is the output of the following statement?
   System.out.println(str2.replace('o','*');

36) Consider the following statements:

```
double num1, num2, num3;
int val1, val2;
double value;

num1 = 5.0; num2 = 6.0; num3 = 3.0;
val1 = 4; val2 = 7;
```

and the method heading:
public static double cube(double a, double b, double c)
Which of the following statements are valid? If they are invalid explain why/

a. value = cube(num1, num2, num3);
b. System.out.println(cube(num1, 15.0, num3));
c. System.out.println(cube(4.0, 7.0, 9.5));
d. System.out.println(cube(num1, num2));
e. System.out.println(cube(4, 7, 9));

37) What is the output of the following program segments?

a.
```
if (6 < 2 * 5)
    System.out.println("Hi");
    System.out.println(" There");
```
b.
```
if (7 <= 7)
   System.out.println(6 – 9 * 2 /6);
```
c.
```
if('a' < 'b' || 66 > (int)('A'))
System.out.pritnln("#*#");
```

38) What is the output of the following Java code?

```
int x = 100;
int y = 200;
```

```
if (x > 100 && y <= 200)
   System.out.println(x+ " " + y + " " + (x + y));
else
    System.out.println(x+ " " + y + " " + (2 * x - y));
```

39) State whether the following are valid or invalid switch statements. If not, explain why. Assume that digit is int variable.

a.
```
switch (digit / 4)
{
case 0:
case 1:
        System.out.println("low");
        break;
case 0:
case 1:
        System.out.println("middle");
        break;
case 3:
        System.out.println("high");
}
```

b.
```
switch (digit / 4)
{
case 0:
case 1:
        System.out.println("low");
        break;
case 2:
        System.out.println("middle");
        break;
case 3:
        System.out.println("high");
}
```

c.
```
switch (digit >= 4)
{
case 0:
case 1:
```

```
        System.out.println("low");
        break;
    case 2:
        System.out.println("middle");
        break;
    case 3:
        System.out.println("high");
    }
```

40) Write a value returning method that takes as parameters two double values and returns the sum of the values. Write a program to test your method.

41) Write a void method that takes as parameter one double value and returns the absolute value meaning negative number to positive number. Write a program to test your method. You can use Math.abs method in Math class.

42) Write a program that ask user to input there numbers. The program should then output the numbers in increasing order.

43) Write a program that ask user to input a number. The program should output then output the number and a message saying whether the number is negative, positive or zero.

44) Write a program that mimics a calculator. The program should take as input two integers and one arithmetic operation (+, -, * and /) to be performed. It should then output the numbers, the operator, and the result. Sample output:
3 + 6 = 9
10 * 4 = 40

45) A box of cookies can hold 24 cookies, and a container can old 75 boxes of cookies. Write a program that prompts the user to enter the total number of cookies. The program then outputs the number of boxes and the number of containers needed to ship the cookies. If the last box of cookies contains less than the number of specified cookies, you can discard it and output the number of leftover cookies. Similarly, if the last container contains less than the number of specified boxes, you can discard it and output the leftover boxes.

46) What's wrong with the following program?

```
public class SomethingIsWrong {
    public static void main(String[] args) {
        Rectangle myRect;
        myRect.width = 40;
        myRect.height = 50;
        System.out.println("myRect's area is " +
myRect.area());
    }
}
```

Fix the program called SomethingIsWrong

47) Consider the following class:

```
public class IdentifyMyParts {
   public static int x = 7;
   public int y = 3;
}
```

a. What are the class variables?
b. What are the instance variables?
c. What is the output from the following code:

```
IdentifyMyParts a = new IdentifyMyParts();
IdentifyMyParts b = new IdentifyMyParts();
a.y = 5;
b.y = 6;
a.x = 1;
b.x = 2;
System.out.println("a.y = " + a.y);
System.out.println("b.y = " + b.y);
System.out.println("a.x = " + a.x);
System.out.println("b.x = " + b.x);
System.out.println("IdentifyMyParts.x = " + IdentifyMyParts.x);
```

48) What is a *constructor?* What is the purpose of a constructor in a class?

a. Compile the following program, find any error and CORRECT it.

```
class StudentData
{
   private int stuID;
   private String stuName;
   private int stuAge;
   StudentData()
   {
       //Default constructor
       stuID = 100;
       stuName = "New Student";
       stuAge = 18;
   }
   StudentData(int num1, String str, int num2)
   {
       //Parameterized constructor
       stuID = num1;
       stuName = str;
       stuAge = num2;
   }
   //Getter and setter methods
   public int getStuID() {
       return stuID;
   }
   public void setStuID(int stuID) {
       this.stuID = stuID;
   }
   public String getStuName() {
       return stuName;
   }
   public void setStuName(String stuName) {
       this.stuName = stuName;
   }
   public int getStuAge() {
       return stuAge;
   }
   public void setStuAge(int stuAge) {
       this.stuAge = stuAge;
   }

   public static void main(String args[])
   {
       //This object creation would call the default constructor
       StudentData myobj;
       System.out.println("Student Name is: "+myobj.getStuName());
       System.out.println("Student Age is: "+myobj.getStuage());
       System.out.println("Student ID is: "+myobj.getStuId());

       /*This object creation would call the parameterized
        * constructor StudentData(int, String, int)*/
       StudentData myobj2 = new StudentData(555, "Chaitanya", 25);
       System.out.printl("Student Name is: "+myobj2.getStuName());
       System.out.println("Student Age is: "+myobj2.getStuAge())
       System.out.println("Student ID is: "+myobj2.getStuID());
  }
```

b) How many constructors on the above code and what is the name of this contractors.

.

49) Based on the following code, change' if..else' statement into 'switch' statement

```
public class ifToSwitchConversion {


   public static void main(String [] args) {

      // Declare a Scanner and a choice variable
      Scanner stdin = new Scanner(System.in);
      int choice = 0;

      System.out.println("Please enter your choice (1-4): ");
      choice = stdin.nextInt();

      if(choice == 1)
      {
         System.out.println("You selected 1.");
      }
      else if(choice == 2 || choice == 3)
      {
         System.out.println("You selected 2 or 3.");
      }
      else if(choice == 4)
      {
         System.out.println("You selected 4.");
      }
      else
      {
         System.out.println("Please enter a choice between 1-4.");
      }

   }
}
```

50) Write a program based on the following text:

Create a class named 'Rectangle' with two data members- length and breadth and a method to calculate the area which is 'length*breadth'. The class has three constructors which are:

1 - having no parameter - values of both length and breadth are assigned zero.

2 - having two numbers as parameters - the two numbers are assigned as length and breadth respectively.

3 - having one number as parameter - both length and breadth are assigned that number.

51) Write a program on the following text

> Suppose you have a Piggie Bank with an initial amount of $50 and you have to add some more amount to it. Create a class 'AddAmount' with a data member named 'amount' with an initial value of $50. Now make two constructors of this class as follows:
>
> 1 - without any parameter - no amount will be added to the Piggie Bank
> 2 - having a parameter which is the amount that will be added to Piggie Bank
>
> Create object of the 'AddAmount' class and display the final amount in Piggie Bank.

52) Write a program based on the following text:

> Create a class named 'Programming'. While creating an object of the class, if nothing is passed to it, then the message "I love programming languages" should be printed. If some String is passed to it, then in place of "programming languages" the name of that String variable should be printed.
> For example, while creating object if we pass "Java", then "I love Java" should be printed.

53) In the below Class X, is 'method' properly overloaded?

```
class X
{
    int method(int i, int d)
    {
        return i+d;
    }

    static int method(int i, double d)
    {
        return (int)(i+d);
    }

    double method(int i, int d)
    {
        return i+d;
    }

    static double method(double i, double d)
    {
        return i+d;
    }
}
```

If there any error in the code, please suggest how to correct it.

54) Suppose that the input is
38 45 71 4 -1
What is the output of the following code? Assume all variables are properly declared.

```
sum = console.nextInt();
num = console.nextInt();

while (num != -1)
{
     sum = sum + num;
     num = console.nextInt();
}

System.out.println("Sum = " + sum);
```

55) Correct the following code so that it finds the sum of 10 numbers. Assume all variables are properly declared.

```
sum = 0;

while (count < 10)
      num = console.nextInt();
      sum = sum + num;
      count++;
```

56) Given the following code:

```
for (int i = 12; i <= 25; i++)
     System.out.println("i = " + i);
System.out.println();
```

Answer the following questions:
(a) The seventh integer printed is ___.
(b) The for loop produces ___ line of output.
(c) If i++ were changed to i--, a compilation error would result. True of False?

57) Given the following program segment:

```
for (int number  = 1; number <= 10; number++)
     System.out.println("number = " + number);
System.out.println();
```

58) Consider the following method:

```
public static int secret(int one)
{
        int prod = 1;

        for(int i = 1; i <=3; i++)
            prod = prod * one;
        return prod;
}
```

What is the output of the following Java statements?

(a) System.out.println(secret(5));

(b) System.out.println(2 * secret(6));

59) What is the value of b variable at the time it is displayed inside the setValue() method in class Question9a? How would you justify your answer?

```
public class Question9a {

  private int a = 5;

  private int b;

  public Question9a() {

    setValue(a++);

  }

  public void setValue(int inputValue) {

    b = a + 5;

    System.out.println("b = " + b);

  }

}
```

60) What is the value of b variable at the time it is displayed inside the setValue() method in class Question60? How would you justify your answer?

```
public class Question60 {

  private int a = 5;

  private int b;

  public Question60() {
```

```
    setValue(a++);
  }
  public void setValue(int inputValue) {
    int a = 25;
    b = a + 5;
    System.out.println("b = " + b);
  }
}
```