Tutorial 1
SE 102 Abstract Data Type and Problem Solving

Tutorial # 1: Variables, Primitive Data Types and Operators

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1. What is the output of the following code?

Code	System.out.println("1");
	
	//System.out.println("2");
	
	System.out.println("3");
	
	//System.out.println("4");
		/* System.out.println("1");
		System.out.println("2");
		System.out.println("3");
		System.out.println("4");
		*/
			/**
			*System.out.println("1");
			*System.out.println("2");
			*System.out.println("3");
			*System.out.println("4");
			*/

Output	1 3		

We called it as comment. In Java are non-executable statements that are used to describe the code, making it more readable and maintainable. They are ignored by the Java compiler during execution.

2. Calculate the value of the given mathematical expression:

A + B * C / (D * E) – (F + G) – H

Assign the following values to the variables: A = 5, B = 11, C = 99, D = 29, E = 8, F = 1, G = 5.5, H = 3 Write the code and display the result.

Expected Output: 0.193965517241379

Main.java Output

```
1  // Online Java Compiler
2  // Use this editor to write, compile and run your Java code online
3
4  class Main {
5      public static void main(String[] args) {
6          double A, B, C, D, E, F, G, H;
7          A=5;
8          B=11;
9          C=99;
10         D=29;
11         E=8;
12         F=1;
13         G=5.5;
14         H=3;
15         System.out.println(A + B * C / (D * E) - (F + G) - H);
16     }
```

Main.java Output

```
0.193965517241379

=== Code Execution Successful ===
```

3. Math Class

Code (Using System.out.println(X))	Output	Data Type	Description
Math.PI	3.141592653589793	double	PI value
Math.E	2.718281828459045	double	Natural log value
Math.sqrt(36)	6.0	double	Square root of 36

Math.pow(10,2)	100.0	double	10 power by 2
Math.ceil (3.5)	4.0	double	Round 3.5 up return in double
Math.abs(-3)	3	integer	Absolute value of 3
Math.round(3.5)	4	integer	Round 3.5 up and return in int or long.
Math.floor(3.5)	3.0	double	Round 3.5 down and return in double
Math.max(3, 4)	4	integer	Return maximum of two numbers
Math.random( )	0.4441946202024849	double	Random number in 0 to 1
Math.min(3, 4)	3	integer	Return minimum of two numbers
Math.log(3)	1.0986122886681098	double	Return the natural logarithm of 3
Math.exp(10)	22026.465794806718	double	e to the power of 10

Hint: https://docs.oracle.com/javase/8/docs/api/java/lang/Math.html

4. Temperature Converter (Celsius to Fahrenheit)
    - declare celsius for example (now temp is 32)
    - convert to fahrenheit
    - display the output

(Celsius to Fahrenheit)

- Formula : C x 9/5 + 32 = °F
- °F = C x 9/5 + 32

Code:

```
class Main {
public static void main(String[] args) {
    double celsius = 32;
    double fahrenheit = celsius*9/5+32;
    System.out.println(celsius + " celsius in fahrenheit is " + fahrenheit + " fahrenheit.");
  }
}
```

5. Temperature Converter (Fahrenheit to Celsius)
   - declare fahrenheit
   - convert to celsius
   - display the output
   - Formula : (°F - 32) x 5/9 = °C

Code:

```
class Main {
  public static void main(String[] args) {
    double fahrenheit = 32;
    double celsius = (fahrenheit-32)*5/9;
    System.out.println(fahrenheit + " fahrenheit in celsius is " + celsius + " celsius.");
  }
}
```

6. With *a* = 1, *b* = 3, and *c* = –4 write Java code to evaluate Quadratic Equation. Expected outputs are -4 and 1

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Code:

```
class Main {
   public static void main(String[] args) {
      double a, b, c;
      a = 1;
      b = 3;
      c = -4;
      double x1 = ((-b)-(Math.sqrt((b*b)-(4*a*c))))/(2*a);
      double x2 = ((-b)+(Math.sqrt((b*b)-(4*a*c))))/(2*a);
      System.out.println("x = "_1 + ", " + x2);
   }
}
```

7. BMI Calculator

- declare variable weight and assign value (in KGs)
- declare variable height and assign value (in meters)
- Calculate BMI using BMI formula

$$\text{BMI} = \frac{\text{Weight in kilogram}}{\left(\text{Height in meter}\right)^2}$$

Display the result

Code:

```
class Main {
    public static void main(String[] args) {
        double weight, height, BMI;
        weight = 73; // in kilogram unit
        height = 175; // in meter unit
        BMI = weight/((height)*(height)); // from the given formular
        System.out.println("Your BMI is " + BMI);
    }
}
```