Tutorial # 2 Data and Expressions using Classes and Objects.

SOFE 2710U Object Oriented Programming and Design

Objective:

In this tutorial you will learn how to use built in classes and Objects to perform specific tasks.

Creating Classes and Objects:

In this tutorial, we will be using Scanner class which will provide convenient methods for reading input values and Scanner object will be set up for reading input values (Scanner scan = new Scanner (System.in)). As Scanner class is a part of java.util so, it must be imported in the program.

We will be using Math class which provides several methods to work on various mathematical functions.
Some of the functions and methods are mentioned below:

Functions	Methods
Largest number of two values	Math.max(x)
Square root	Math.sqrt()
Power of x and y	Math.pow()
Logarithm	Math.log()
Logarithm when base is 10	Math.log10()
Log of x+1	Math.log1p()
Power of 2	Math.exp()
Sine value	Math.sin()
Cosine value	Math.cos()
Tangent value	Math.tan()
Absolute value	Math.abs()
Cube root	Math.cbrt()

We will also be using Random class, many times we need to generate sequence of numbers. It is not a problem to generate sequence of numbers. But some of the times we need to generate random numbers. In java we can generate random numbers by using Random class. Random objects perform calculations to produce stream of random values (Random generator = new Random ()). Random class is also a part of java.util so, it should be imported in the program.

Problems:

1. What would be the output of each expression using following methods? (double x = 32; double y = 8;)
    - Square root of y (Math.sqrt(y)
    - 32 power of 8 (Math.pow(x,y))
    - Logarithm of x and y (Math.log(x))
    - Power of 2 (Math.exp(x)).

2. Write a program to find the surface area and volume of a sphere using given methods based on user input.

   (surface area = 4 * PI * (radius^3) /3, volume = 4 * PI * (radius^2).)

3. Write a program to generate 7 random integers with the limit of 25, so that the generated random number is always less than 25.