Lab-02
Java Programming Elements

Objectives:
Learning Input / Output handling on Java console. Understanding variables using primitive and non-primitive data types. Exploring Java's built in classes.

Theory:
Console input
System.in to the standard input device. Console input is not directly supported in Java, but Scanner class is used to create an object to read input from System.in, as follows:

```
Scanner input = new Scanner(System.in);
double radius = input.nextDouble();
```

Import the class by adding

```
import java.util.Scanner;
```

Console output
Java uses System.out to refer to the standard output device.To perform console output, println method is used to display a primitive value or a string to the console.

```
System.out.print("Hello ");
System.out.println("world");
```

You can use the System.out.printf method to display formatted output on the console.

```
System.out.printf("Your Total amount is %.2f", total);
System.out.printf("count is %d and amount is %f", count, amount);
```

Data Types in Java
A data type in a programming language is a set of data with values having predefined characteristics.
There are two basic types in Java.

1. **Primitive**
   A primitive type is predefined by the language and is named by a reserved keyword.
2. **Non-Primitive**
   It is a reference data type, which are references to objects.

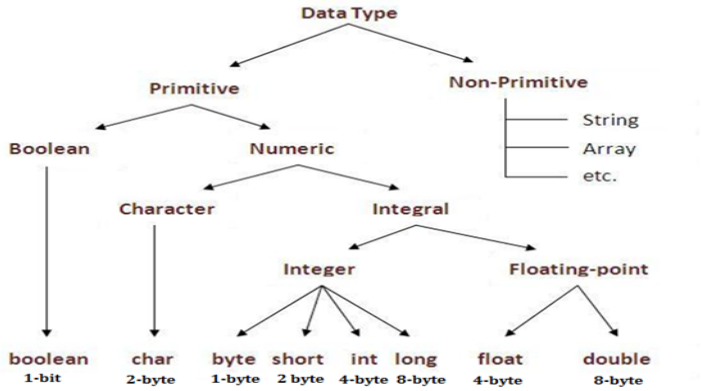

Figure 2.1: Data Types in Java

Variables

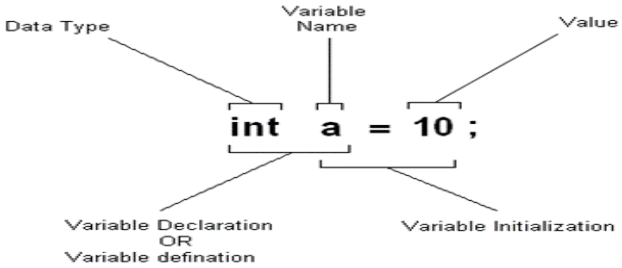

Figure 2.2: Variable Initialization

- Variable is a name of memory location.
- It is name of reserved area allocated in memory.
- In the given example; int is data type, a is variable name
- and 10 is the value that a variable holds, followed by a terminator;

Type Conversion

Casting is an operation that converts a value of one data type into a value of another data type. The syntax for casting a type is to specify the target type in parentheses, followed by the variable's name or the value to be cast. For example;

System.out.println((int)1.7);

The above statement displays 1. When a double value is cast into an int value, the fractional part is truncated.

Some Useful Java Classes

Math

Math class file is included for the definitions of math functions listed below. It is written as java.lang.Math.

Trignometic / Maths Functions

- sin(n)
- cos(n)
- tan(n)
- hosh(n)
- tanh(n)
- pow(nmb,pwr)

- sinh(n)
- sqrt(n)

Lab Task:

1 Design a Java program to take different input from user and store the input in variables with respective data type and then display the data on the console.

2 Design a Java program to explore Math class.

Lab Assignment:

Program the following.

Implement the following equation

$3x^4\sin(180x) + 4x^3\cos(90x) + x^2\sin(\tan(45)) + 7x + 9\cos(90x^2)$

Where x may be user defined value.

Conclusion:

_____
_____
_____
_____
_____