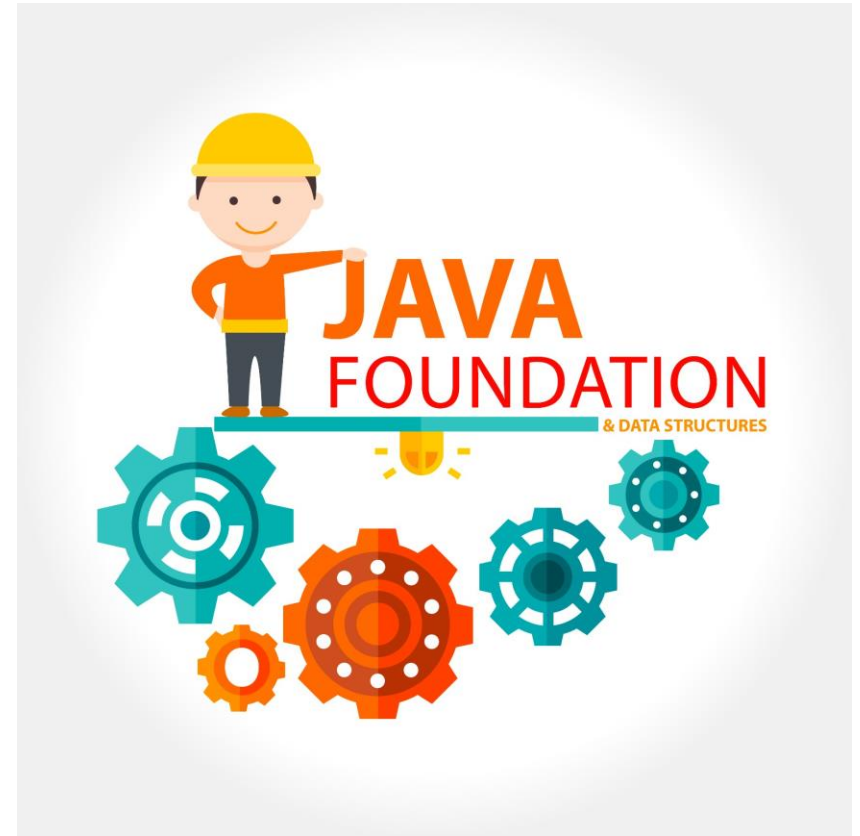# Nucleus

Java Foundation & Data Structures

Lecture 2 : Programming Fundamentals 1
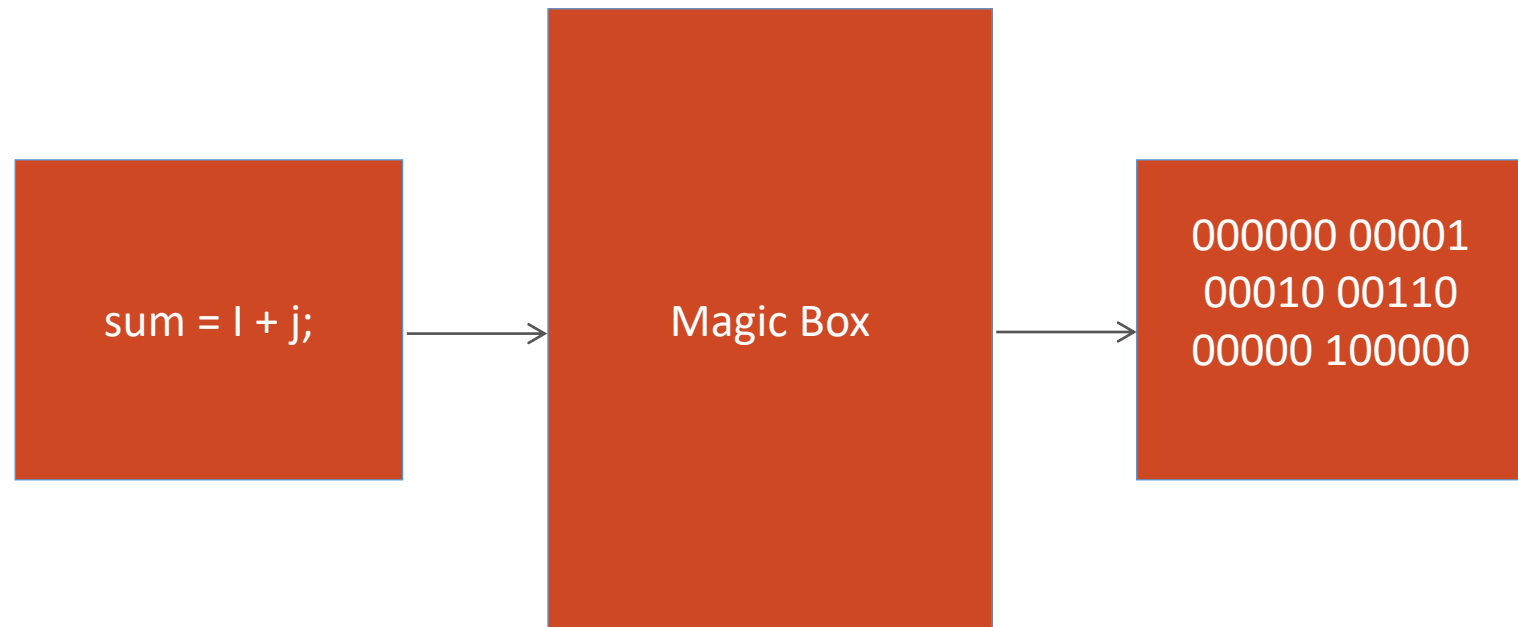

Saturday, 01 September 2018

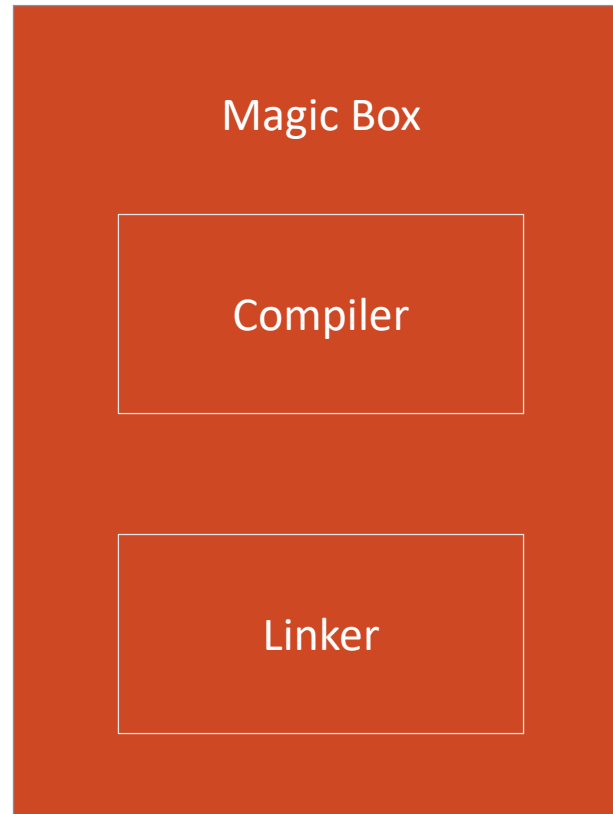# Any Doubts in Assignment ?

Binary Number System

Binary Number System

- The binary, or base-2, numbering system is based on the same principles as the decimal, or base-10, numbering system, with which we are already familiar

- Bit(Binary Digit) is the basic unit. It can have only one of two values (0 or 1), and may therefore be physically implemented with a two-state device.

- Bits are commonly stored and manipulated in groups generally referred as Byte (group of 8 bits)

- Number of bits effect accuracy of result and also limits the size of numbers manipulated by computer.

How does CPP/Java work?

sum = I + j; → Magic Box → 000000 00001 00010 00110 00000 100000

Components of Magic Box

Magic Box

Compiler

Linker

Java Virtual Machine

Eclipse ?

Time to Write Hello World!

Simple Interest Calculation

Primitive Data types

- Boolean
- Character
- Integer
- Floating Point
- Double Floating Point

Range of Integers

Largest of three numbers

Change code to take user input

If Else

- Single If

```
if (a > 10) {
    System.out.print( "Hello!");
}
```

- If Else

```
If (a>10) {
        System.out.print("Hello!");
} else {
        System.out.print("World.");
}
```

- If .. Else If .. Else

```
If (a>10 && a <20) {
        System.out.print ("Hello!");
} else if (a >20 && a <30) {
        System.out.print("Hello World!");
} else {
        System.out.print ("Welcome to Coding Ninjas");
}
```

```
while( condition is true ) {
        //do some stuff
}
```

Print Following table using Formula: C = (5/9)(F - 32)

0	− 17
20	− 6
40	4
60	15
80	26
100	37
120	48
140	60
160	71
180	82
200	93
220	104
240	115
260	126
280	137
300	148

Few more problems

- Find min out of 5 numbers
- Check if a number is prime
- Write code to print the following pattern

```
1
2 3
4 5 6
7 8 9 10
```

Your Turn

- Print Nth Fibonacci Number
- Write code to print the following pattern

```
    1
   232
  34543
 4567654
567898765
```

- Find all prime numbers between 2 to N

Codezen Demo

Time For Brain Teasers!

An evil king has 1000 bottles of wine. A neighboring queen plots to kill the bad king, and sends a servant to poison the wine. The king's guards catch the servant after he has only poisoned one bottle. The guards don't know which bottle was poisoned, but they do know that the poison is so potent that even if it was diluted 1,000,000 times, it would still be fatal. Furthermore, the effects of the poison take one month to surface. The king decides he will get some of his prisoners in his vast dungeons to drink the wine. Rather than using 1000 prisoners each assigned to a particular bottle, this king knows that he needs to murder no more than 10 prisoners to figure out what bottle is poisoned, and will still be able to drink the rest of the wine in 1 month time. How does he pull this off ?

There is a circular jail with 100 cells numbered 1-100. Each cell has an inmate and the door is locked. One night the jailor gets drunk and starts running around the jail in circles. In his first round he opens each door. In his second round he visits every 2nd door (2,4,6---) and shuts the door. In the 3rd round he visits every 3rd door (3,6,9---) and if the door is shut he opens it, if it is open he shuts it. This continues for 100 rounds (i.e. 4,8,12 ---; 5,10,15 ---; ---; 49,98 etc.) and exhausted the jailor falls down. **How many prisoners found their doors open after 100 rounds?**

THANK YOU

CODING
NINJAS