Fundamentals of Object Oriented Programming

CSN- 103

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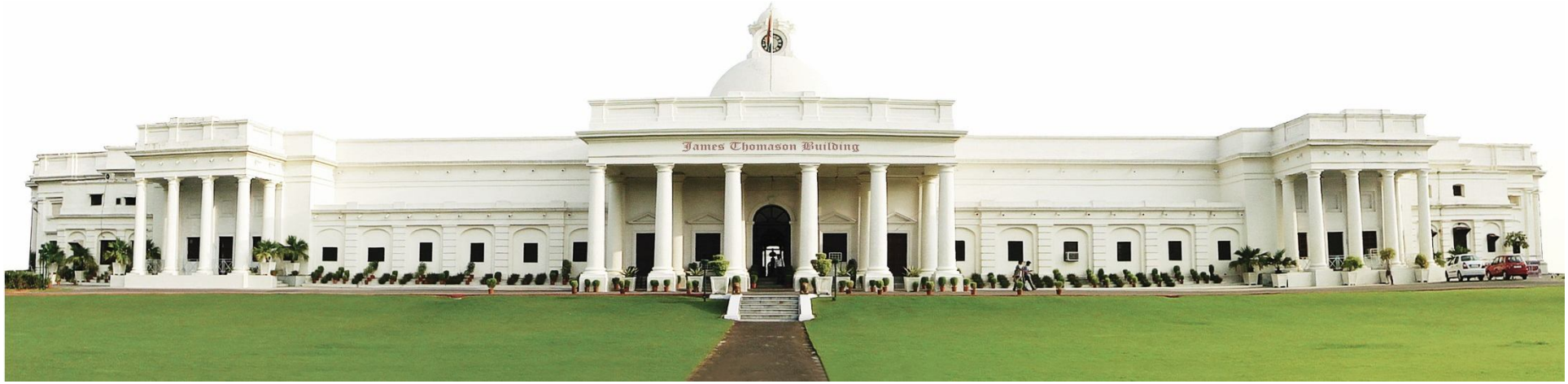


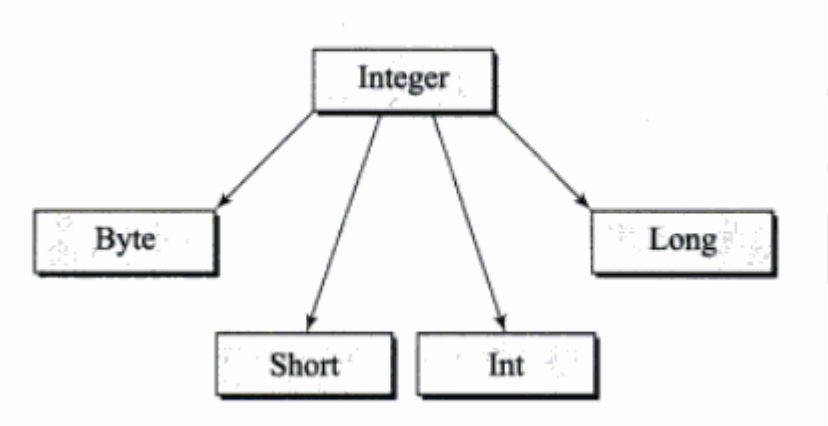
Integer Types

- Integer types can hold whole numbers such as 123, -96, 5639 etc.
- Java supports four types of integer types *byte, short, int*, and *long*.
- Java does not support the concept of *unsigned types* and therefore all Java values are signed (positive or negative).

Type	Size
byte	One byte
short	Two bytes
int	Four bytes
long	Eight bytes

Integer Types

Type	Min Value	Max Value
byte	-128	127
short	-32768	32767
int	-2,147,483,648	2,147,483,647
long	-9,223,372,036,854,775,808	9,223,372,036,854,775,807



```java
public class Add{

    public static void main(String []args){
        byte a=10;
        byte b=30;
        byte c= a+b;
        System.out.println(c);
    }
}
```

```
sh-4.4$ javac Add.java
Add.java:6: error: incompatible types: possible lossy conversion from int to byte
        byte c= a+b;
                 ^
1 error
sh-4.4$
```

https://ideone.com/i2focs

```java
public class Add1{

    public static void main(String []args){
        byte a=10;
        byte b=30;
        int c= a+b;
        System.out.println(c);
    }
}
```

```
sh-4.4$ javac Add1.java
sh-4.4$ java Add1
40
sh-4.4$
```

https://ideone.com/TKaxaa

Integer Type

```
1  import java.util.Scanner;
2
3  class Intfile
4  {
5     public static void main(String args[])
6     {
7        int a;
8        float b;
9        String s=" ";
10
11       Scanner in = new Scanner(System.in);
12
13       System.out.println("Enter an integer");
14       a = in.nextInt();
15       System.out.println("You entered integer "+a);
16    }
17 }
```

// cin >> a;

- Output

```
Terminal
sh-4.3$ javac Intfile.java
sh-4.3$ java Intfile
Enter an integer
200
You entered integer 200
sh-4.3$
```

https://goo.gl/3NcKQN

Floating Point Types

- Integer types can hold whole numbers only.
- We use floating point type to hold the numbers having fractional parts such as 27.59 and -1.342.
- There are two types of floating point storage in Java.
- Floating point numbers are treated as double-precision quantities. To force them to be in single precision mode, we must append f or F to the numbers.

1.23f *7.56923e5F*

Type	Size
float	4 bytes
double	8 bytes

- *Not-a-Number (NaN): Divide by zero and operand is NaN*

```java
public class AddFloat{

    public static void main(String []args){
        float a,b,c;
        a=1.2;
        b=3.2;
        c=a+b;
        System.out.println(c);
    }
}
```

https://ideone.com/4jojmJ

```
sh-4.4$ javac AddFloat.java
AddFloat.java:5: error: incompatible types: possible lossy conversion from double to float
                a=1.2;
                  ^
AddFloat.java:6: error: incompatible types: possible lossy conversion from double to float
                b=3.2;
                  ^
2 errors
sh-4.4$
```

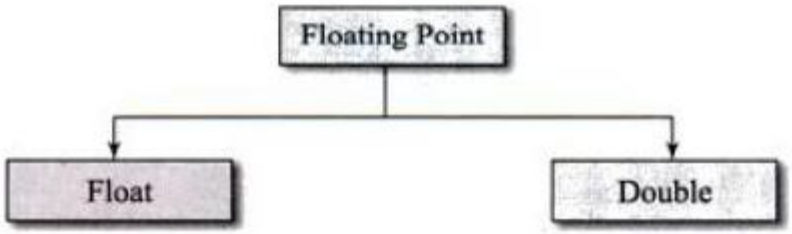
```java
public class AddFloat{

    public static void main(String []args){
        float a,b,c;
        a=1.2f;
        b=3.2f;
        c=a+b;
        System.out.println(c);
    }
}
```

```
Default Term  +  Browser
sh-4.4$ javac AddFloat.java
sh-4.4$ java AddFloat
4.4
sh-4.4$
```

https://ideone.com/oamULO

Floating Point Types

Type	Min Value	Max Value
float	-3.4e+038	3.4e+038
double	-1.7e+308	1.7e+308



Floating Point Type

```java
import java.util.Scanner;

class Floatfile
{
   public static void main(String args[])
   {
      int a;
      float b;
      String s;

      Scanner in = new Scanner(System.in);

      System.out.println("Enter a float");
      b = in.nextFloat();
      System.out.println("You entered float "+b);

    }
}
```

- Output

```
Terminal
sh-4.3$ javac Floatfile.java
sh-4.3$ java Floatfile
Enter a float
20.3
You entered float 20.3
sh-4.3$
```

https://goo.gl/rWw7ok

Floating Point Type

```
1  import java.util.Scanner;
2
3  class Floatfile
4  {
5     public static void main(String args[])
6     {
7        int a;
8        float b=30.2f;
9        String s;
10
11       // Scanner in = new Scanner(System.in);
12
13       // System.out.println("Enter a float");
14       // b = in.nextFloat();
15        System.out.println("You entered float "+b);
16
17    }
18 }
```

```
Terminal
sh-4.3$ javac Floatfile.java
sh-4.3$ java Floatfile
You entered float 30.2
sh-4.3$
```

https://goo.gl/rWw7ok

Character types

```
boolean a;
a = true;
```

- In order to store character in memory, Java provides a character data type called *char.* The *char* type assumes a size of 2 bytes but, basically, it can hold only a single character.

Boolean types:

- Boolean type is used when we want to test a particular condition during the execution of the program.
- There are only two values that a ***boolean*** type can take: `true or false`.
- Boolean type is denoted by the keyword ***boolean*** and use only one bit of storage.
- All comparison operators return boolean type values.

Character Type

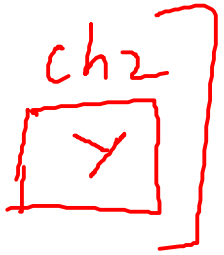
```java
import java.util.Scanner;

class Charfile
{
    public static void main(String args[])
    {
        int a;
        float b;
        String s;

        Scanner in = new Scanner(System.in);

        System.out.println("Enter a string");
        s = in.nextLine();
        System.out.println("You entered string "+s);

    }
}
```

```
Terminal
sh-4.3$ javac Charfile.java
sh-4.3$ java Charfile
Enter a string
Welcome to IIT Roorkee
You entered string Welcome to IIT Roorkee
sh-4.3$
```

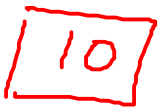
Character Type

```
1  import java.util.Scanner;
2
3  class Charfile
4  {
5     public static void main(String args[])
6     {
7        int a;
8        float b;
9        char ch1, ch2;
10      ch1 = 88; // code for X
11      ch2 = 'Y';
12      System.out.print("ch1 and ch2: ");
13      System.out.println(ch1 + " " + ch2);
14      }
15 }
```

// Program to explore



int a




```
Terminal
sh-4.3$ javac Charfile.java
sh-4.3$ java Charfile
ch1 and ch2: X Y
sh-4.3$
```

//

Character Type

```
1  import java.util.Scanner;
2
3  class Charfile
4  {
5     public static void main(String args[])
6     {
7        char c;
8        Scanner reader = new Scanner(System.in);
9        System.out.println("Enter Your BloodGroup : A/B/O only");
10         c  = reader.next().charAt(0); //
11       System.out.println("You entered BloodGroup "+c);
12
13    }
14 }
```

```
Terminal
sh-4.3$ javac Charfile.java
sh-4.3$ java Charfile
Enter Your BloodGroup : A/B/O only
O
You entered charecter O
sh-4.3$
```

http://goo.gl/MRQiad

charAt(i)

```
1  public class Test {
2
3      public static void main(String args[]) {
4          String s = "OOPS Course at IIT Roorkee";
5          char result = s.charAt(8);
6          System.out.println(result);
7      }
8  }
```

http://goo.gl/16d8L6

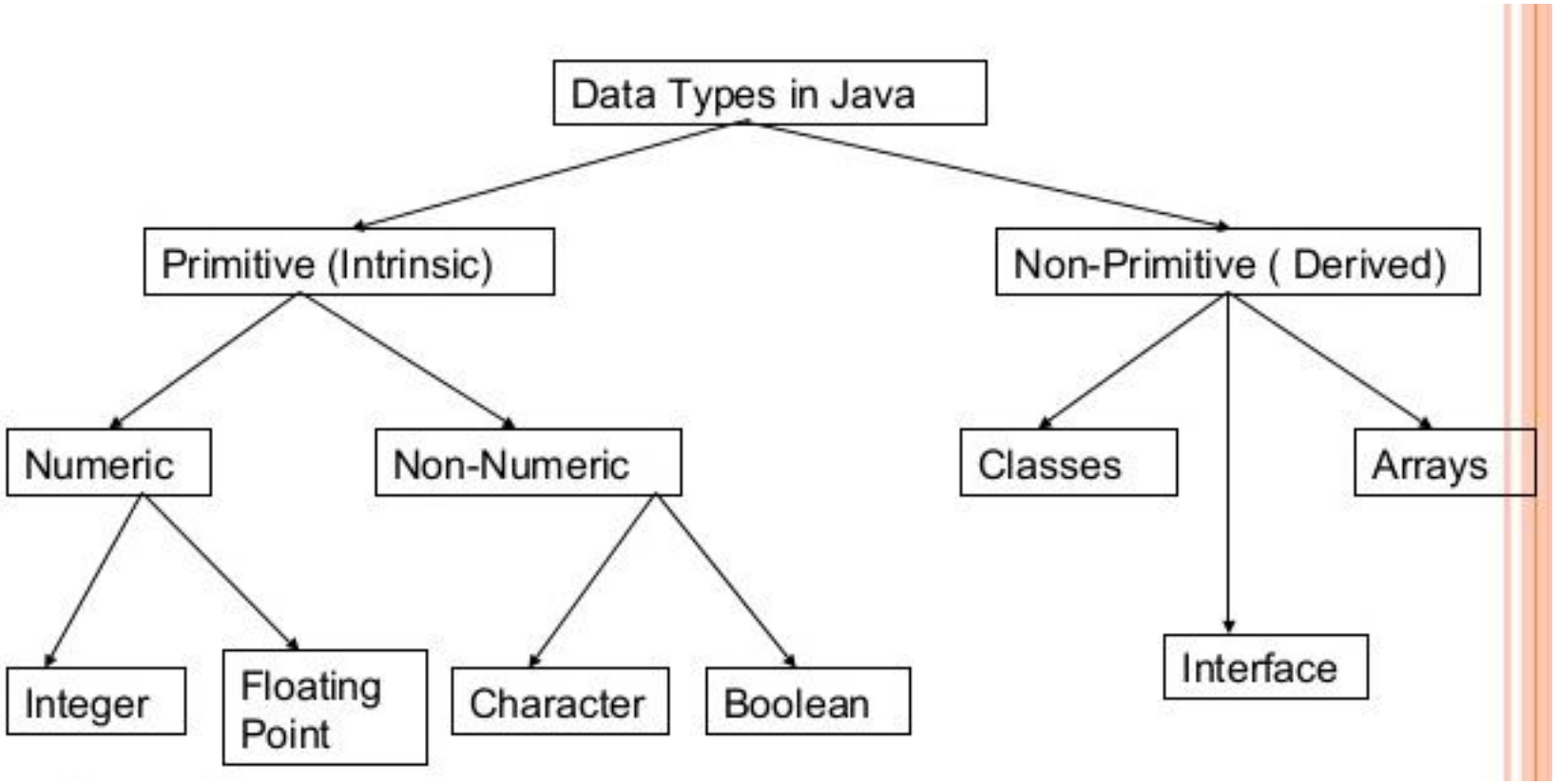
Boolean Data Type

```java
public class BooleanExample{
public static void main(String args[]) {

 boolean b1,b2,b3;

 b1 = true;  // Assigning Value
 b2 = false; // Assigning Value
 b3 = b2;    // Assigning Variable

 System.out.println(b1); // Printing Value
 System.out.println(b2); // Printing Value
 System.out.println(b3); // Printing Value

}
}
```

```
sh-4.4$ javac BooleanExample.java
sh-4.4$ java BooleanExample
true
false
false
sh-4.4$
```

https://ideone.com/StOFZ7

Data Types


Data Types in Java
Primitive (Intrinsic)
Non-Primitive (Derived)
Numeric
Non-Numeric
Classes
Arrays
Integer
Floating Point
Character
Boolean
Interface