

# Programming in Java Lab



## *Lab 01: Basic Building Blocks of Java*

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Course webpage

<http://www.mkbhandari.com/mkwiki>



# Sample Hello World prgram

*text file named HelloWorld.java*

```
public class HelloWorld
{
    public static void main(String[] args)
    {
        // Prints "Hello, World" in the terminal window.
        System.out.print("Hello, World");
    }
}
```

*name*

*main() method*

*statements*

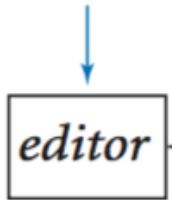
*body*

The diagram illustrates the structure of a Java program. It starts with the text 'text file named HelloWorld.java' followed by a downward arrow pointing to the code. The code is annotated with several labels: 'name' points to the class name 'HelloWorld'; 'main() method' points to the declaration of the main method; 'statements' points to the single line of code 'System.out.print("Hello, World");'; and 'body' points to the entire block of code enclosed in curly braces {}.



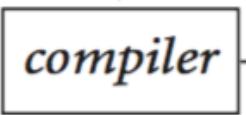
# Editing, compiling, and executing

*use any text editor to  
create your program*



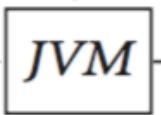
*your program  
(a text file)*

*type javac HelloWorld.java  
to compile your program*



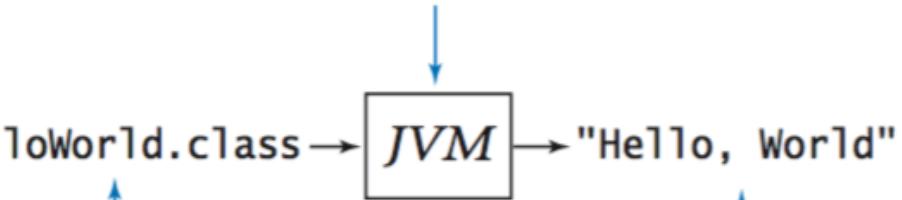
*computer-language  
version of your program*

*type java HelloWorld  
to execute your program*



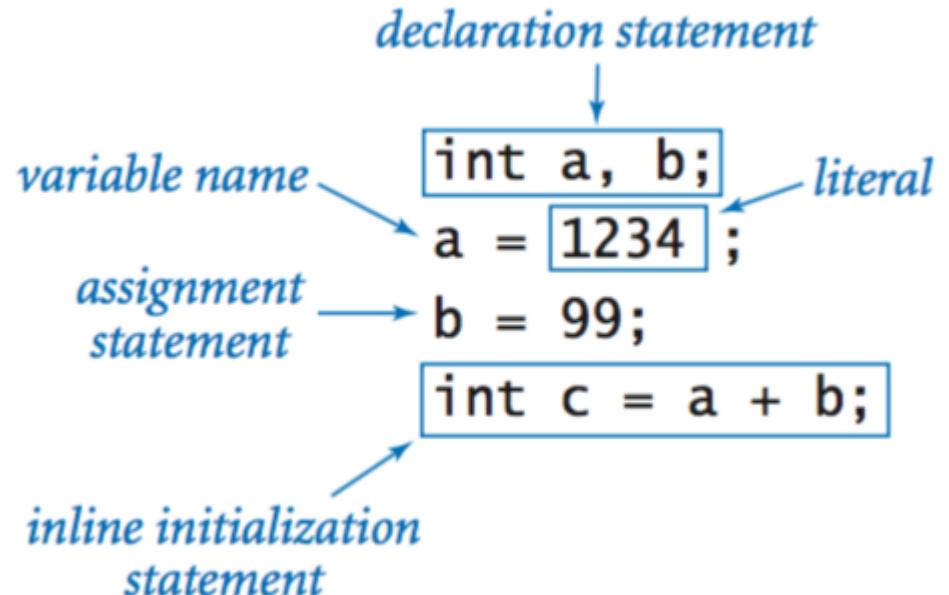
**(ByteCode)**

*output*



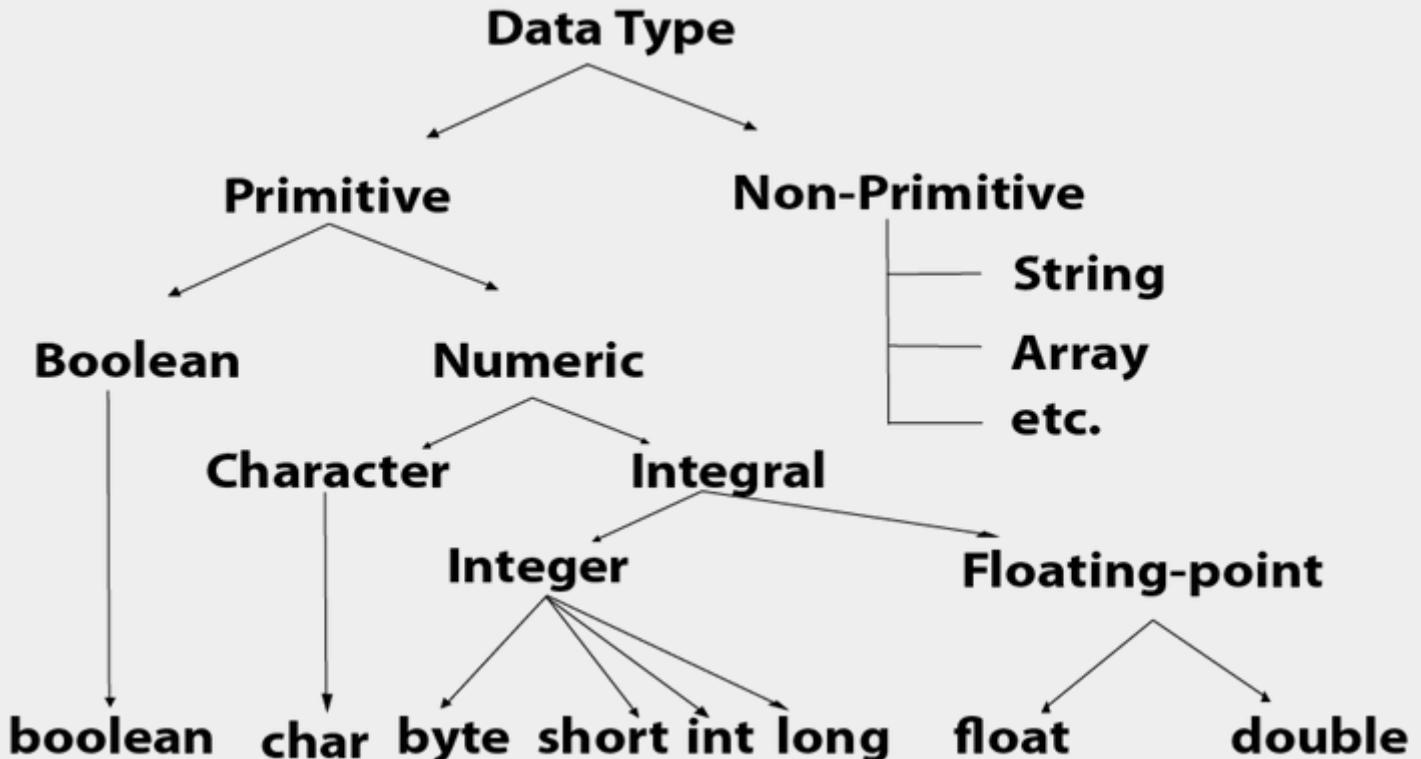


# Declaration and assignment statements





# Data Types





# Default Value and Size of Data Types.

Data Type	Default Value	Default size
boolean	false	1 bit
char	'\u0000'	2 byte
byte	0	1 byte
short	0	2 byte
int	0	4 byte
long	0L	8 byte
float	0.0f	4 byte
double	0.0d	8 byte



# Operators

Operator Type	Category	Precedence
Unary	postfix	<code>expr++ expr--</code>
	prefix	<code>++expr --expr +expr -expr ~ !</code>
Arithmetic	multiplicative	<code>* / %</code>
	additive	<code>+ -</code>
Shift	shift	<code>&lt;&lt; &gt;&gt; &gt;&gt;&gt;</code>
Relational	comparison	<code>&lt; &gt; &lt;= &gt;= instanceof</code>
	equality	<code>== !=</code>
Bitwise	bitwise AND	<code>&amp;</code>
	bitwise exclusive OR	<code>^</code>
	bitwise inclusive OR	<code> </code>
Logical	logical AND	<code>&amp;&amp;</code>
	logical OR	<code>  </code>
Ternary	ternary	<code>? :</code>
Assignment	assignment	<code>= += -= *= /= %= &amp;= ^=  = &lt;=&gt;= &gt;&gt;=</code>



# Printing output

`void System.out.print(String s)`      *print s*

`void System.out.println(String s)`    *print s, followed by a newline*

`void System.out.println()`                *print a newline*

# Parsing Command-Line Arguments



`int Integer.parseInt(String s)`

*convert s to an int value*

`double Double.parseDouble(String s)`

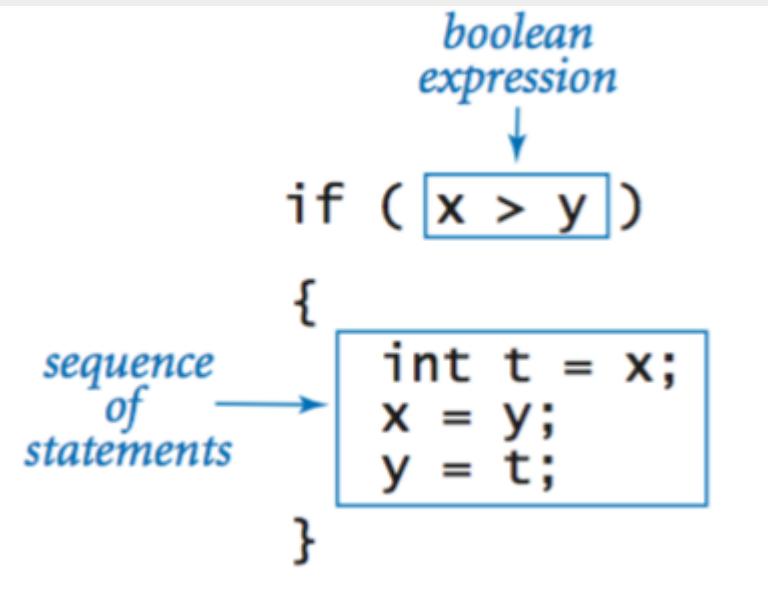
*convert s to a double value*

`long Long.parseLong(String s)`

*convert s to a long value*



# Conditional Statement - if



//Java Program to demonstrate the use of if statement.

```
public class IfExample {  
    public static void main(String[] args) {  
        //defining an 'age' variable  
        int age=20;  
        //checking the age  
        if(age>18){  
            System.out.print("Age is greater than 18");  
        }  
    }  
}
```



# Conditional Statement – if and if-else

<i>absolute value</i>	<pre>if (x &lt; 0) x = -x;</pre>
<i>put the smaller value in x and the larger value in y</i>	<pre>if (x &gt; y) {     int t = x;     x = y;     y = t; }</pre>
<i>maximum of x and y</i>	<pre>if (x &gt; y) max = x; else         max = y;</pre>
<i>error check for division operation</i>	<pre>if (den == 0) System.out.println("Division by zero"); else           System.out.println("Quotient = " + num/den);</pre>
<i>error check for quadratic formula</i>	<pre>double discriminant = b*b - 4.0*c; if (discriminant &lt; 0.0) {     System.out.println("No real roots"); } else {     System.out.println((-b + Math.sqrt(discriminant))/2.0);     System.out.println((-b - Math.sqrt(discriminant))/2.0); }</pre>



# Conditional Statement - Nested if-else

```
if      (income <      0) rate = 0.00;  
else if (income <  8925) rate = 0.10;  
else if (income < 36250) rate = 0.15;  
else if (income < 87850) rate = 0.23;  
else if (income < 183250) rate = 0.28;  
else if (income < 398350) rate = 0.33;  
else if (income < 400000) rate = 0.35;  
else                                rate = 0.396;
```



# While loop

```
initialization is a  
separate statement  
  
int power = 1;  
while ( power <= n/2 )  
{  
    power = 2*power;  
}
```

loop-continuation condition

braces are optional when body is a single statement

body

```
public class WhileExample {  
  
    public static void main(String[] args) {  
  
        int i=1;  
  
        while(i <=10 ){  
  
            System.out.println(i);  
  
            i++;  
        }  
    }  
}
```



# for loop

```
int power = 1;
for (int i = 0; i <= n; i++)
{
    System.out.println(i + " " + power);
    power = 2*power;
}
```

*initialize another variable in a separate statement*

*declare and initialize a loop control variable*

*loop-continuation condition*

*increment*

*body*

//Java Program to demonstrate the example of for loop

//which prints table of 1

```
public class ForExample {
```

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

//Code of Java for loop

```
for(int i=1;i<=10;i++){
```

```
    System.out.println(i);
```

```
}
```

```
}
```

```
}
```



# Lab Assignment no. 1

```
// Assignment no. 1

class CmdSumAll{
    public static void main(String args[ ]) {
        int sum=0;
        for(int i=0; i<args.length ; i++){
            sum = sum+Integer.parseInt(args[ i ]);
        }
        System.out.println("sum is = " + sum);
    }
}
```

- ① Write your Java program using any editor preferably **gedit**:
  
- ② Compile your Java program using Java compiler:  
**Javac CmdSumAll.java**
  
- ③ To run your Java Program using Java interpreter:  
**Java CmdSumAll 12 15 30 20**



# References

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## Reference for this topic

- [ Princeton Java Cheatsheet ]  
<https://introcs.cs.princeton.edu/java/11cheatsheet/>
- [ Java T Point tutorial ]  
<https://www.javatpoint.com/java-tutorial>
- [ GeeksforGeeks ]  
<https://www.geeksforgeeks.org/java/>