# Object-Oriented Programming


# Introduction in Java

## Second Stage

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# Java Programming Language

## Introduction

♨ Java programming language was developed by Sun Microsystems which was initiated by **James Gosling** in 1995. Java is object oriented where everything is an object.

♨ Java has been one of the most popular and widely used programming languages.

♨ Java is **Object Oriented**.

♨ Java syntax is **similar to C/C++**. But Java codes are always written in the form of classes and objects.

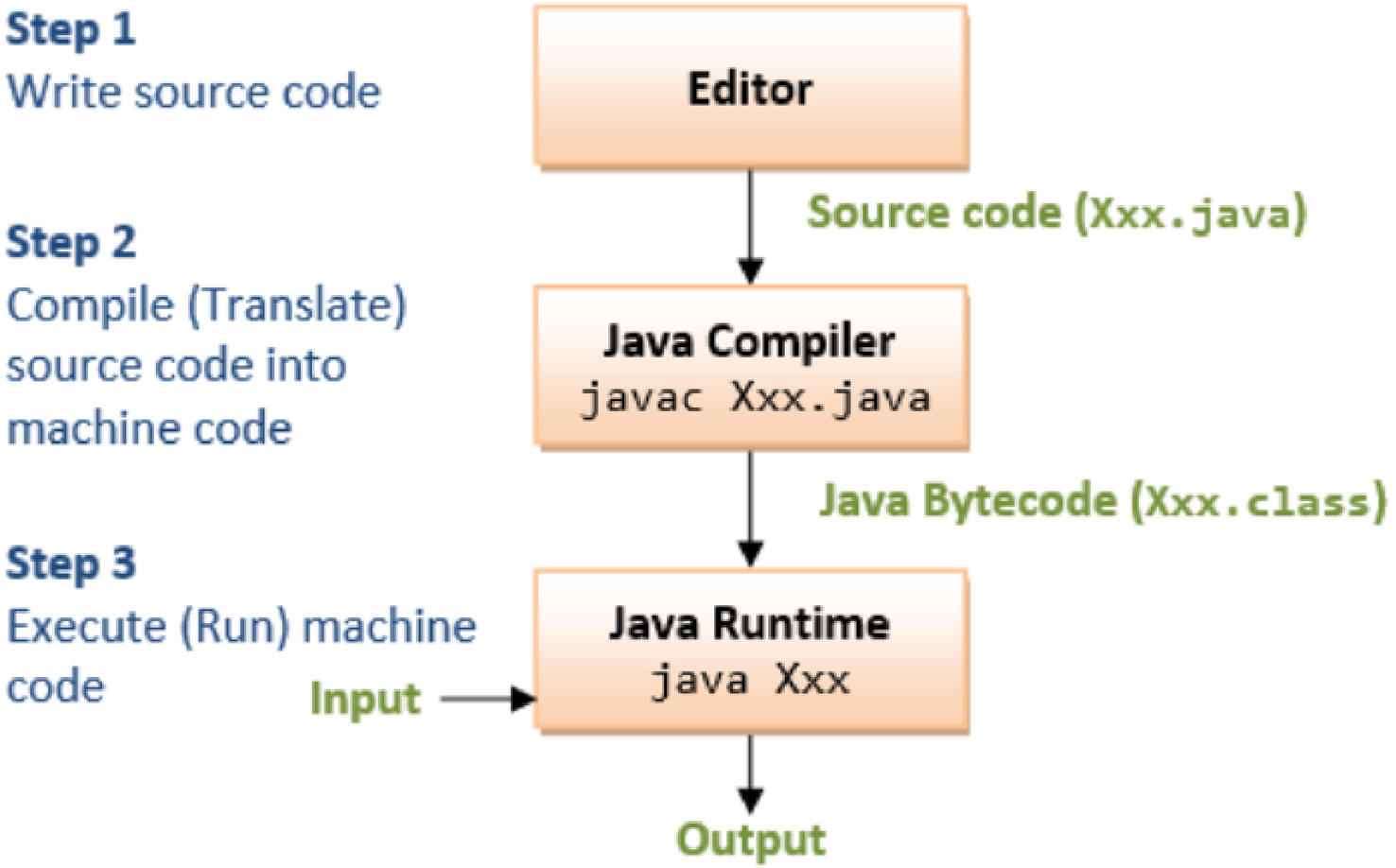
♨ Java is used in all kind of applications like Mobile Applications, desktop applications, web applications and client server applications. Then java is a general-purpose computer programming language.

♨ **JDK (Java Development Kit ):** JDK includes development tools such as the Java compiler, Javadoc, and a debugger.

♨ **JRE (Java Runtime Environment):** JRE contains the parts of the Java libraries required to run Java programs.

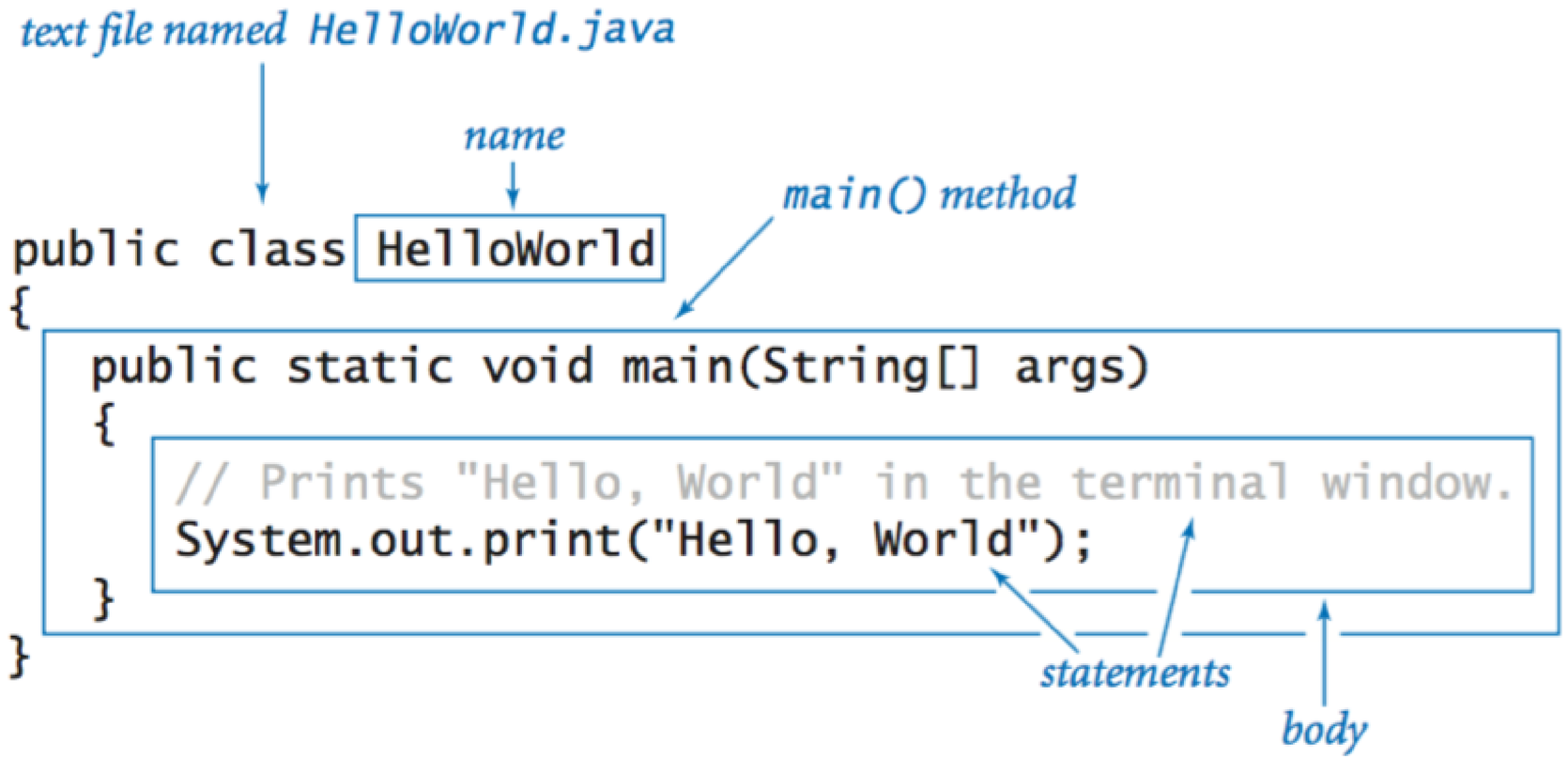
# Java Programming Language

## Java Programming Steps



# Java Programming Language

## A program template for Java programs



# Java Programming Language

## About Java program, it is very important to keep in mind the following points:

♨ **Case Sensitivity-** which means identifier Hello and hello would have **different meaning** in Java.

♨ **Class Names -** For all class names the first letter should be in Upper Case.

♨ **Method Names -** All method names should start with a Lower Case letter.

♨ **public static void main(String args[]) -** Java program processing starts from the main() method which is a mandatory part of every Java program.

# Java Programming Language

## A Data types of Java programs

| Data Type | Range | Example |
|---|---|---|
| byte | -128 to 127 | byte myByte = 42; |
| short | -32,768 to 32,767 | short myShort = 1000; |
| int | -2.1 billion to 2.1 billion | int myInt = 123456; |
| long | Huge range | long myLong = 1234567890L; |
| float | Large range, ~7 decimal places | float myFloat = 3.14f; |
| double | Large range, ~15 decimal places | double myDouble = 2.71828; |
| char | 0 to 65,535 (Unicode characters) | char myChar = 'A'; |
| boolean | true or false | boolean isJavaFun = true; |
| String | Sequence of characters | String myString = "Hello, Java"; |

# Java Programming Language

**Write a java program to calculate the area of circle where the radius equal 5 ?**

```
package javaapplication1;

public class Main {

    public static void main(String[] args) {

        int r = 5;
        double pi;
        pi = 3.14;
        double area = pi * r * r;
        System.out.println("area = " + area);

    }
}
```

Output (F6)

```
run:
the area of circle is 78.5
BUILD SUCCESSFUL (total time: 0 seconds)
```

# Java Programming Language

**Write a java program to calculate your birth year from your age?**

```
package javaapplication1;

public class Main {

    public static void main(String[] args) {

        int age = 27;
        int birth = 2023 - age ;
        System.out.println("your Birth year is " + birth);

    }
}
```

Output (F6)

```
run:
your Birth year is 1996
BUILD SUCCESSFUL (total time: 0 seconds)
```

# Java Programming Language

**Write a java program to calculate the sum, sub, multi, div and avg when x = 6 and y = 4 ?**

```
package javaapplication1;

public class Main {

    public static void main(String[] args) {

        int x = 6;
        int y = 4;
        int sum = x + y;
        int sub = x - y;
        int multi = x * y;
        double div = y / (x + 0.4);
        System.out.println("sum = " + sum);
        System.out.println("sub = " + sub);
        System.out.println("multi = " + multi);
        System.out.println("div = " + div);
        System.out.println("avg = " + sum / 2);

    }
}
```

## Output (F6)

```
run:
sum = 10
sub = 2
multi = 24
div = 0.625
avg = 5
BUILD SUCCESSFUL (total time: 0 seconds)
```

# Java Programming Language

## Input in java

To input from the keyboard, at first must create scanner object as follows:

- import java.util.Scanner ;
- Scanner read = new Scanner(System.in) ;
- int num = read.nextInt() ;

# Java Programming Language

**Write a java program to calculate your age from your birth year ?**

```java
package javaapplication1;

import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        Scanner read = new Scanner(System.in);
        System.out.print("Enter your Birth year  ");
        int birth = read.nextInt();
        int age = 2023 - birth;
        System.out.println("your age is " + age);

    }
}
```

Output (F6)

```
run:
Enter your Birth year  2001
your age is 22
BUILD SUCCESSFUL (total time: 17 seconds)
```

# Java Programming Language

## Input in java

| Method | Description | Example |
|---|---|---|
| next() | Reads and returns the next token as a String. | Scanner.next() |
| nextInt() | Reads and returns the next token as an int. | Scanner.nextInt() |
| nextDouble() | Reads and returns the next token as a double. | Scanner.nextDouble() |
| nextLine() | Reads and returns the next line as a String. | Scanner.nextLine() |
| nextFloat() | Reads and returns the next token as a float. | Scanner.nextFloat() |
| nextByte() | Reads and returns the next token as a byte. | Scanner.nextByte() |

# Java Programming Language

## Control Structures

### 1. If

**Syntax:**

```
If (condition){
    //conditional code }
```

```
int age = 25;
 if (age >= 18) {
    System.out.println(“this is if statements"); }
```

### 2. If … Else

**Syntax:**

```
If (condition){
    //if code }
else{
    // else code }
```

```
int age = 25;
 if (age >= 18) {
    System.out.println(“this is if statements"); }
Else {
    System.out.println(“this is else statements"); }
}
```

# Java Programming Language

**Write a java program to login the system when user =admin & password = admin ?**

```
package javaapplication1;

import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        String user, pass;
        Scanner read = new Scanner(System.in);
        System.out.print("Enter your username ... ");
        user = read.next();
        System.out.print("Enter your password ... ");
        pass = read.next();
        if (user.equals("admin") && pass.equals("admin")) {
            System.out.println("Access Login *_* ");
        } else {
            System.out.println("user / password invalid T_T ");
        }
    }
}
```

Output (F6)

```
run:
Enter your username ... admin
Enter your password ... admin
Access Login *_*
BUILD SUCCESSFUL (total time: 8 seconds)
```

```
run:
Enter your username ... admin
Enter your password ... sam
user / password invalid T_T
BUILD SUCCESSFUL (total time: 8 seconds)
```

# Java Programming Language

## Control Structures

### 3. If … if … else

**Syntax:**

```
If (condition){
    If (condition){
        //conditional code ; }
}
```

```
int num = 25;
 if (num > 0) {
    if (num % 2 == 0 ) {
        System.out.println(“this is even positive ");
    }
 }
```

### 4. If … else … if

**Syntax:**

```
If (condition){
    //if code }
Else If (condition){
    //conditional code ; }
else {
Else code ; }
```

```
int num = 5;
 if (num == 0 ) {
    System.out.println(“num is zero"); }
Else if (num > 0 )  {
    System.out.println(“num is positive"); }
 Else {
    System.out.println(“num is negitive"); }
```

# Java Programming Language

**Write a java program to login the system when user =admin & password = admin with error details?**

```
package javaapplication1;
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        String user, pass;
        Scanner read = new Scanner(System.in);
        System.out.print("Enter your username ... ");
        user = read.next();
        System.out.print("Enter your password ... ");
        pass = read.next();
        if (user.equals("admin")) {
            if (pass.equals("admin")) {
                System.out.println("Access Login *_* ");
            } else {
                System.out.println(" password invalid  ");
            }
        } else {
            System.out.println(" user not found !  ");
        }
    }
}
```

## Output (F6)

```
run:
Enter your username ... admin
Enter your password ... admin
Access Login *_*
BUILD SUCCESSFUL (total time: 12 seconds)
```

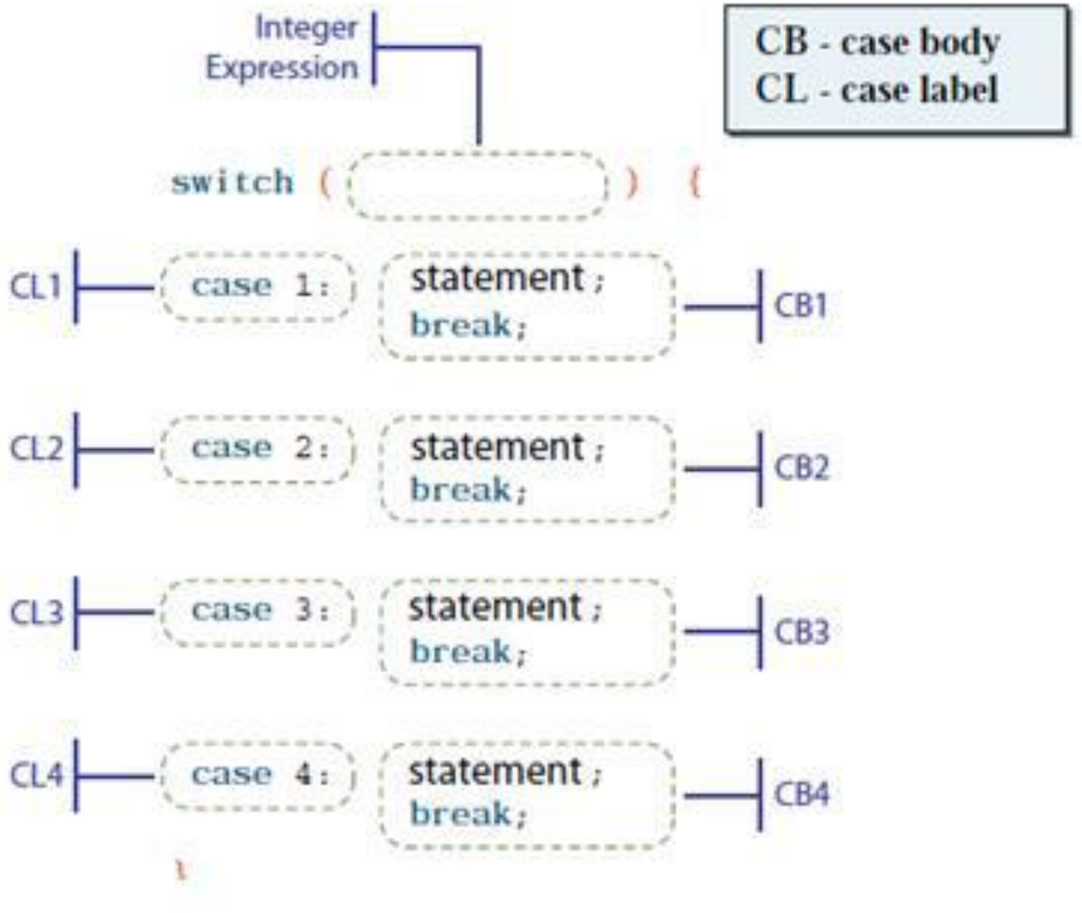
```
run:
Enter your username ... admin
Enter your password ... abc123
 password invalid
BUILD SUCCESSFUL (total time: 20 seconds)
```

```
run:
Enter your username ... sauc
Enter your password ... admin
 user not found !
BUILD SUCCESSFUL (total time: 1 minute 13 seconds)
```

# Java Programming Language

## Control Structures
## 3. switch

```
switch(expression){
   case value :  // Statements
                 break;       //optional

   case value :  // Statements
                 break;       //optional


    //You can have any number of case
                statements.

   default : //Optional

             // Statements
}
```



# Java Programming Language

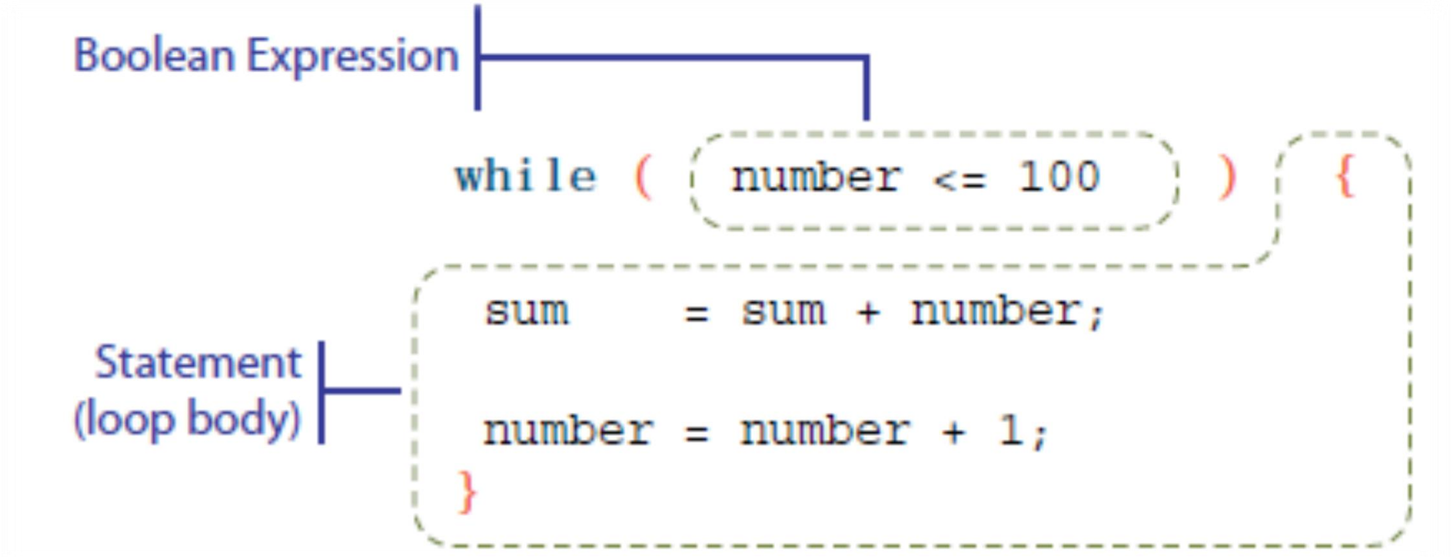
```
package javaapplication1;
public class Main {
    public static void main(String[] args) {

        char grade = 'C';
        switch (grade) {
            case 'A':
                System.out.println("Excellent!");
                break;
            case 'B':
                System.out.println("very good");
            case 'C':
                System.out.println("Well done");
                break;
            case 'D':
                System.out.println("You passed");
            case 'F':
                System.out.println("Better try again");
                break;
            default:
                System.out.println("Invalid grade");
        }
        System.out.println("Your grade is " + grade);
    }
}
```

## Output (F6)

```
run:
Well done
Your grade is C
BUILD SUCCESSFUL (total time: 0 seconds)
```

# Java Programming Language

## Loop Structures
## 1. while



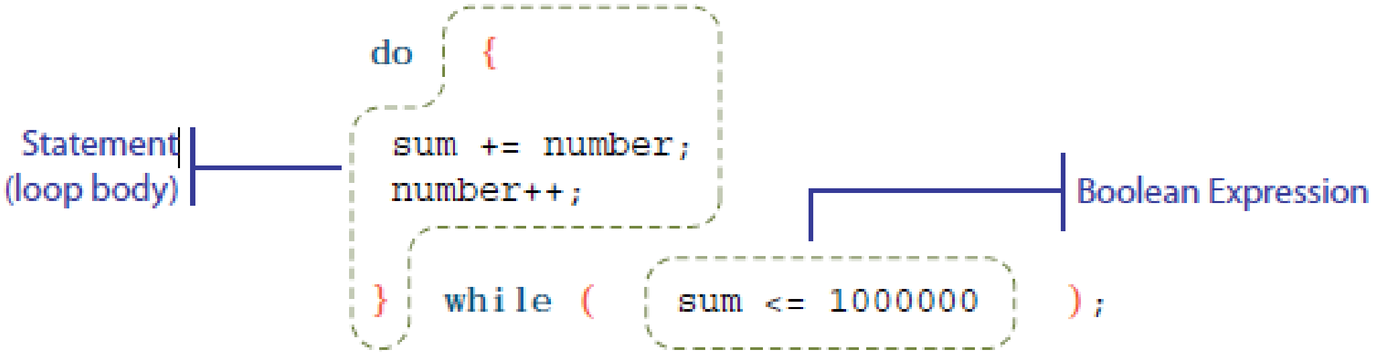

Output (F6)

```
run:
value of x : 10
value of x : 11
value of x : 12
value of x : 13
value of x : 14
value of x : 15
value of x : 16
value of x : 17
value of x : 18
value of x : 19
BUILD SUCCESSFUL (total time: 0 seconds)
```

```
package javaapplication1;
public class Main {
    public static void main(String[] args) {
        int x = 10;
        while (x < 20) {
            System.out.print("value of x : " + x);
            x++;
            System.out.println();
        }
    }
}
```

# Java Programming Language

## Loop Structures
## 2. Do .. while



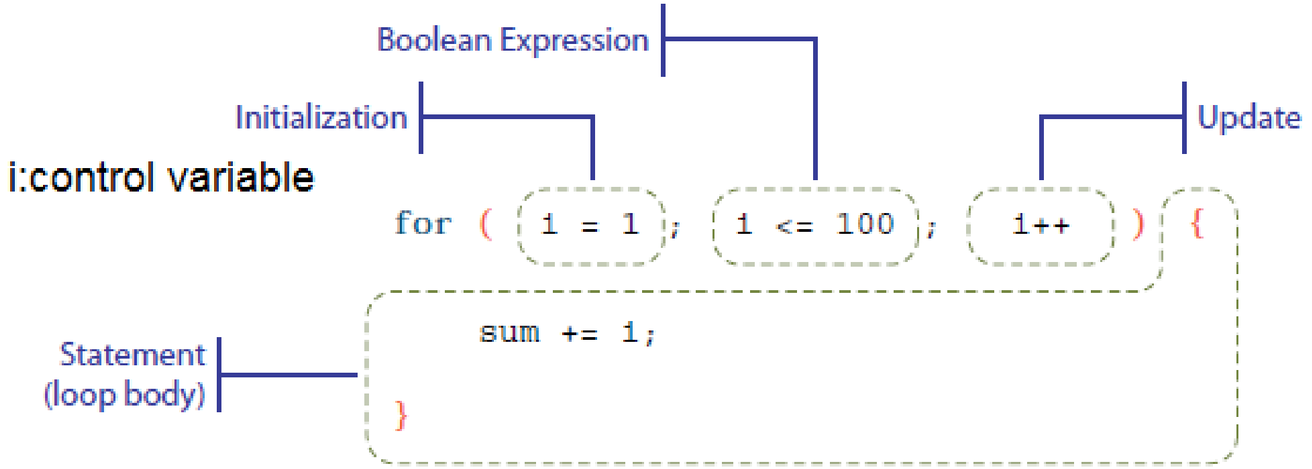

Output (F6)

```
run:
value of x : 10
value of x : 11
value of x : 12
value of x : 13
value of x : 14
value of x : 15
value of x : 16
value of x : 17
value of x : 18
value of x : 19
BUILD SUCCESSFUL (total time: 0 seconds)
```

```
package javaapplication1;
public class Main {
    public static void main(String[] args) {
        int x = 10;
        do {
            System.out.print("value of x : " + x);
            x++;
            System.out.print("\n");
        } while (x < 20);
    }
}
```

# Java Programming Language

## Loop Structures
## 3. for




Output (F6)

```
run:
value of x : 10
value of x : 11
value of x : 12
value of x : 13
value of x : 14
value of x : 15
value of x : 16
value of x : 17
value of x : 18
value of x : 19
BUILD SUCCESSFUL (total time: 0 seconds)
```

```
package javaapplication1;
public class Main {
    public static void main(String[] args) {
        for (int x = 10; x < 20; x = x + 1) {
            System.out.println("value of x : " + x);
        }
    }
}
```

# Java Programming Language

## Break in loops

```
package javaapplication1;

import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        Scanner read = new Scanner(System.in);
        int x;
        for (int i = 0; i < 5; i++) {
            x = read.nextInt();
            if (x == 23) {
                System.out.println("you find the number");
                break;
            }
        }
    }
}
```

Output (F6)

```
run:
65
28
12
23
you find the number
BUILD SUCCESSFUL (total time: 14 seconds)
```