Core Java

Agenda

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    4. String

What is Java?

1. Java is a programming language and computing platform first released by Sun Microsystems in 1995.

2. Later, in 2009, Oracle Corporation acquired Sun Microsystems and took ownership of Java.

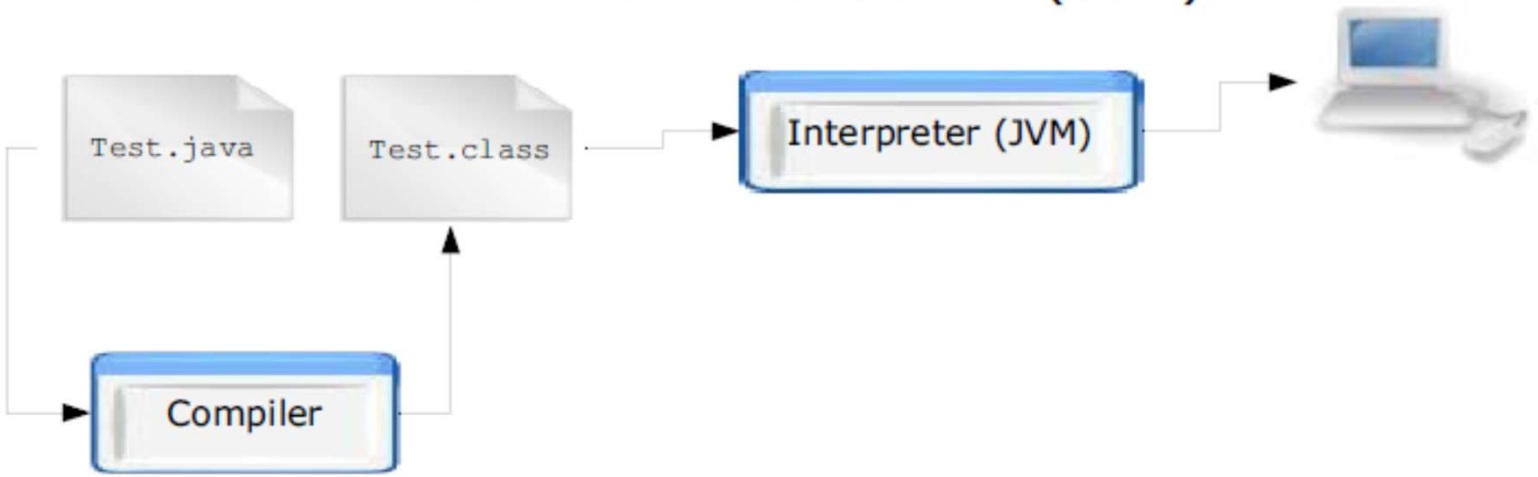
3. It is used for:
   - Mobile applications (specially Android apps)
   - Desktop applications
   - Web applications
   - Games

Why use Java?

1. Java works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc.)
2. It is one of the most popular programming language in the world
3. It is open-source and free
4. It is secure, fast and powerful
5. It has a huge community support (tens of millions of developers)
6. Java is an object oriented language which gives a clear structure to programs and allows code to be reused, lowering development costs

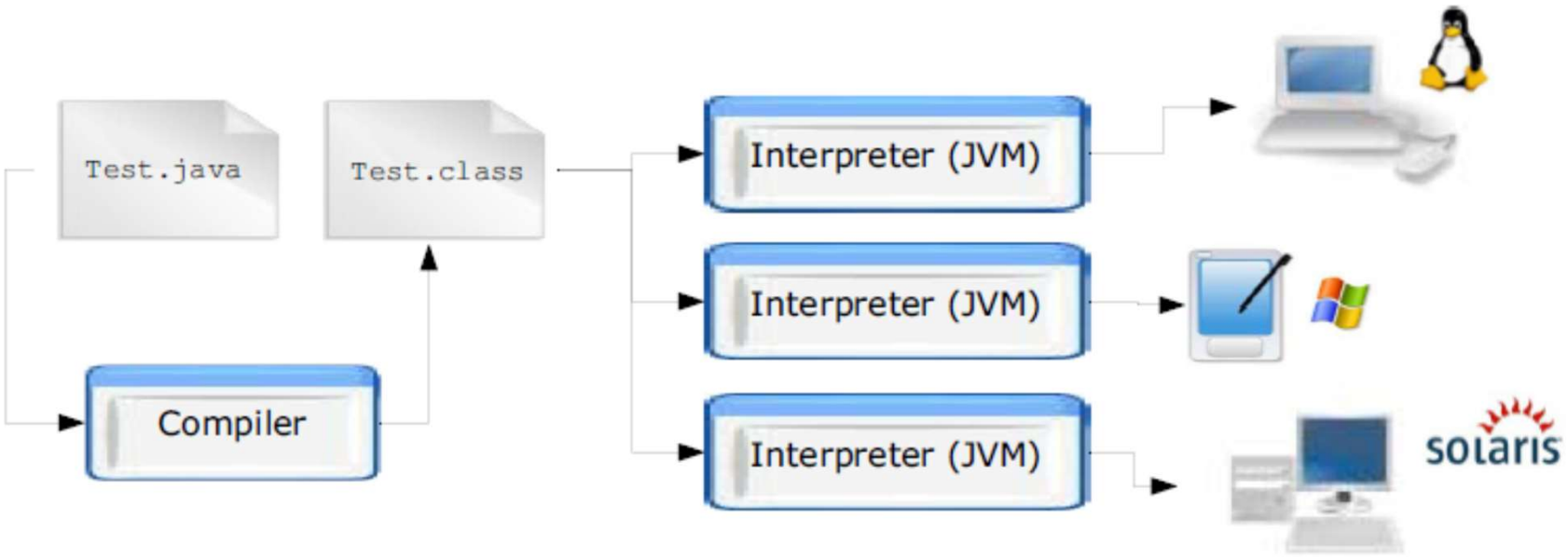
Java Platform

- Java programs are compiled to Java byte-codes, a kind of machine independent representation. The program is then executed by an interpreter called the Java Virtual Machine (JVM).



Java is Machine Independent

- The compiled code is independent of the architecture of the computer.



Our First Program

```java
/**
* Hello World Application
* Our first example
*/
public class HelloWorld {
  public static void main(String[] args) {
    System.out.println("Hello World!"); // display output
  }
}
```

```
$ javac HelloWorld.java

$ ls
HelloWorld.class
HelloWorld.java

$ java HelloWorld
Hello World
```

Data Types

- integers: **byte**, **short**, **int** and **long**
- floating point: **float** and **double**.
- characters: **char**.
- **boolean**
- **void**
- String

Variables

- The variables are declared specifying its type and name, and initialized in the point of declaration, or later with the assignment expression:

```
int x;
double f = 0.33;
char c = 'a';
String s = "abcd";

x = 55;
```

Constants

- Constants are declared with the word **final** in front. The specification of the initial value is compulsory:

```
final double pi = 3.1415;      // constant PI
final int maxSize = 100;       // integer constant
final char lastLetter = 'z';   // last lowercase letter
final String word = "Hello";   // a constant string
```

Expressions

1. Arithmetic
2. Relational
3. Logical
4. String

Arithmetic Operators

- Java provides the usual set of arithmetic operators:
  - addition (+)
  - subtraction (-)
  - division (/)
  - multiplication (*)
  - modulus (%)

Arithmetic Operators

```
class Arithmetic {
  public static void main(String[] args) {
    int x = 12;
    int y = 2 * x;
    System.out.println(y);
    int z = (y - x) % 5;
    System.out.println(z);
    final float pi = 3.1415F;
    float f = pi / 0.62F;
    System.out.println(f);
  }
}
```

```
$ java Arithmetic
24
2
5.0669355
```

Shorthand Operators

```
class ShortHand {
  public static void main(String[] args) {
    int x = 12;

    x += 5;                    // x = x + 5
    System.out.println(x);

    x *= 2;                    // x = x * 2
    System.out.println(x);
  }
}
```

```
$ java ShortHand
17
34
```

Relational Operators

- Java provides the following relational operators:
  - equivalent (==)
  - not equivalent (!=)
  - less than (<)
  - greater that (>)
  - less than or equal (<=)
  - greater than or equal (>=)

- Important: relational expressions always return a **boolean** value.

Relational Operators

```
class Boolean {
  public static void main(String[] args) {
    int x = 12,y = 33;

    System.out.println(x < y);
    System.out.println(x != y - 21);

    boolean test = x >= 10;
    System.out.println(test);
  }
}
```

```
$ java Boolean
true
false
true
```

Logical Operators

- Java provides the following operators:
  - and (&&)
  - or (||)
  - not(!)

- ***Important***: The logical operators can only be applied to **boolean** expressions and return a **boolean** value.

Logical Operators

```
class Logical {
  public static void main(String[] args) {
    int x = 12,y = 33;
    double d = 2.45,e = 4.54;

    System.out.println(x < y && d < e);
    System.out.println(!(x < y));

    boolean test = 'a' > 'z';
    System.out.println(test || d - 2.1 > 0);
  }
}
```

```
$ java Logical
true
false
true
```

String Operators

- Java provides many operators for Strings:
  - Concatenation (+)
  - many more...

- *Important*: If the expression begins with a string and uses the + operator, then the next argument is converted to a string.

- *Important*: Strings cannot be compared with == and !=.

String Operators

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

    String s1 = "Hello" + " World!";
    System.out.println(s1);

    int i = 35,j = 44;
    System.out.println("The value of i is " + i +
                       " and the value of j is " + j);
  }
}
```

```
$ java Strings
Hello World!
The value of i is 35 and the value of j is 44
```

Control Structure(If)

```
class If {
  public static void main(String[] args) {
    char c = 'x';

    if ((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z'))
      System.out.println("letter: " + c);
    else
      if (c >= '0' && c <= '9')
        System.out.println("digit: " + c);
      else {
        System.out.println("the character is: " + c);
        System.out.println("it is not a letter");
        System.out.println("and it is not a digit");
      }
  }
}
```

```
$ java If
letter: x
```