

# Tutorial 1

## CSC 201

Java Programming Concepts

مبادئ البرمجة باستخدام الجافا

# Chapter 1

## 1. Computer Programming

1- برمجة الحاسوب

## 2. What is Java?

2- ما هي الجافا؟

## 3. Why Learn Java?

3- لماذا نتعلم الجافا؟

### a. Java Is Platform Independent

الجافا لا تعتمد على بيئة التشغيل

### b. Java is Easy to learn

الجافا سهلة التعلم

## 4. Programming In Java

4- البرمجة باستخدام الجافا

### a. Getting and installing the software

الحصول على المشغل وتثبيته

### b. Creating a Java program

بناء برنامج بلغة الجافا

## 5. Comments

5- التعليقات

## 6. Errors

6- الأخطاء

### a. Syntax Errors

أخطاء في قواعد الكتابة

### b. Logic Errors

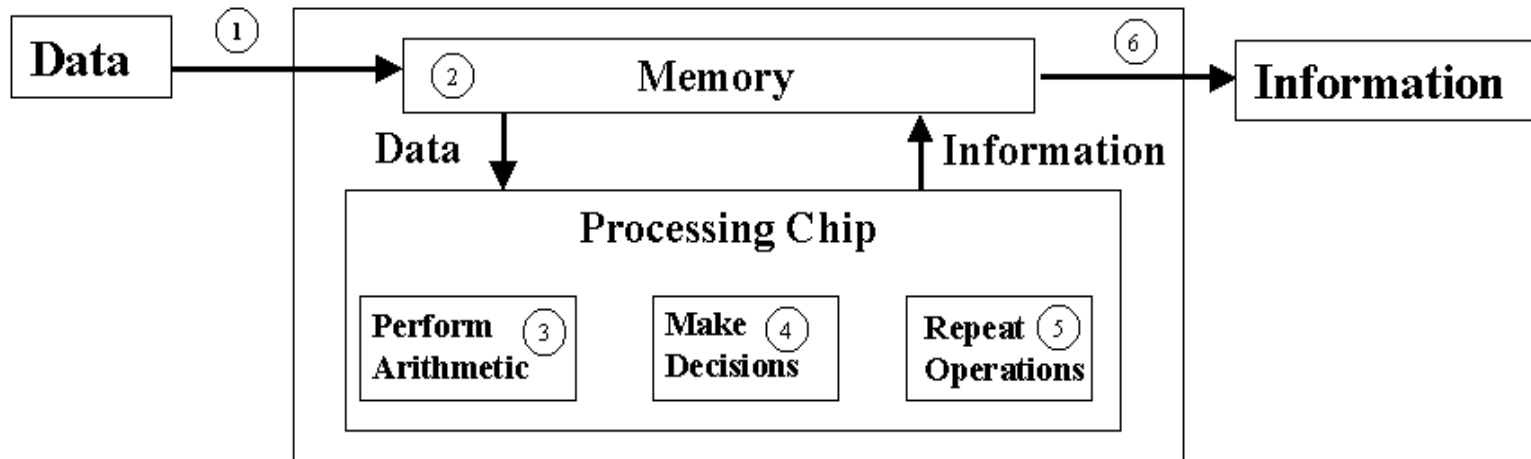
أخطاء منطقية

## Summary

# Data and Information

- Data are raw facts
- Examples of data include transactions, dates, amounts, etc.
- Information are data that have been processed into a usable form
- Information includes tables, documents, charts, etc.
- Goal of computer applications is to process data into information

# Computer Operations



1. A computer can receive (input) data
2. A computer can store data in memory
3. A computer can perform arithmetic and manipulate text strings
4. A computer can compare the contents of two memory locations and select one of two alternatives
5. A computer can repeat a group of operations
6. A computer can output information (processed data)

# Programs and Programming

A program is a very specific set of rules that tell the computer which switches should be "ON" or "OFF".

The process of creating a program is called programming.

The computer only knows what it is told through programs, so they must be accurate and very specific.

- 1- Deciding if there is a task to be accomplished or problem to be solved using a computer, e.g., is there a need for a program?
- 2- Determining the nature of the task or problem, e.g., what must the program do?
- 3- Developing a plan that will accomplish the task or solve the problem, e.g., generating the step-by-step process that the program will follow (algorithm).
- 4- Converting the plan into a computer language program
- 5- Testing the program to ensure it accomplishes task or solves problem defined earlier.
- 6- Implementing the program to accomplish the task or solve the problem.

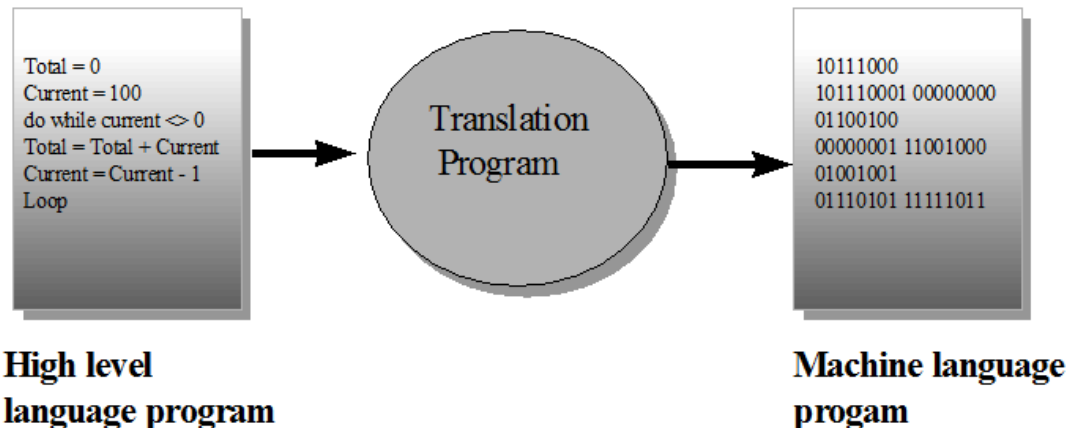
# Levels of Computer Languages

**Low Level:** at the level of the computer, i.e., in binary (0-1) format Computer can only execute a binary form of a program

**Intermediate Level:** close to the computer but uses English words or mnemonics, e.g., Assembler, that is converted directly into binary

**High Level:** at the level of the programmer using English words and clearly defined syntax; must be converted or translated into binary for computer to implement it, e.g., Visual Basic

Need a software program to handle the conversion of high-level into binary  
Compiler - Interpreter



## 2.What is Java?

Java is an object oriented programming language. It has been developed by Sun Microsystems. Java is a high-level language. The Java language goal was to be a small, simple, and portable programming language.

لغة الجافا هي لغة برمجة هيكلية (بناؤها الأساسي هو الفئة class) وهي من لغات المستوي العالي (مفهومة للقارئ) وتعتبر لغة برمجة محمولة يمكن استخدامها على الأجهزة وأنظمة التشغيل المختلفة.

*(Tip: Everything that we have in life is almost an object. A car for example is an object. The TV set is also an object. Now Java is very powerful in representing these types of objects)*

# 3.Why Learn Java ?

الجافا لا تعتمد على بيئة التشغيل — يمكن تنفيذ برنامج الجافا على أي جهاز مثبت عليه آلة الجافا الافتراضية (JVM)

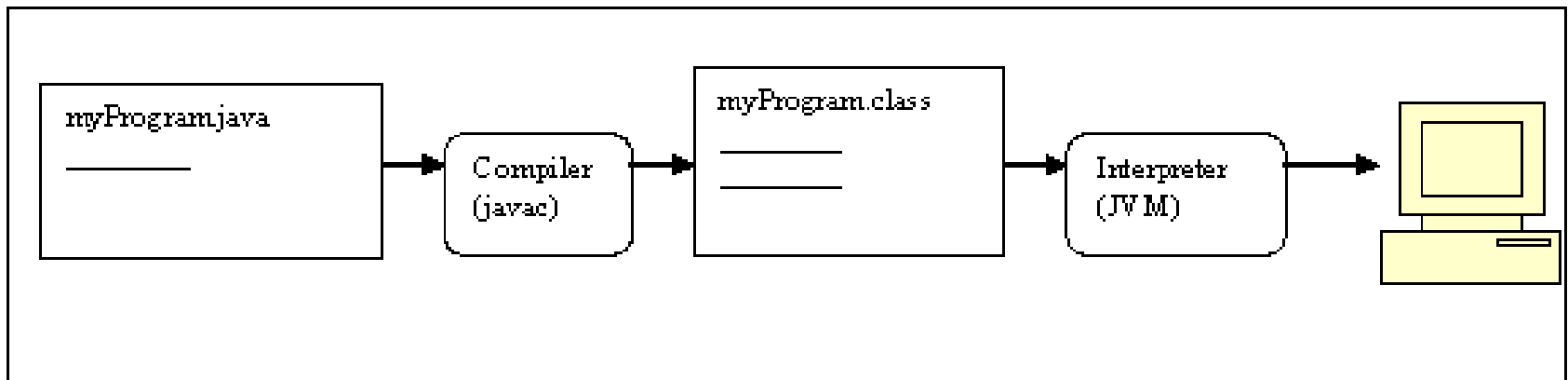
## Java is Platform Independent

A platform is the hardware or software environment in which a program runs. Platform independence is one of the most significant features where you can write your code once and run it anywhere that supports a Java virtual machine (JVM). That means that as long as a computer has a JVM, the same program written in the Java programming language can run on Windows 2000, Linux, a Solaris workstation, or on an iMac, briefly, on any operating system.

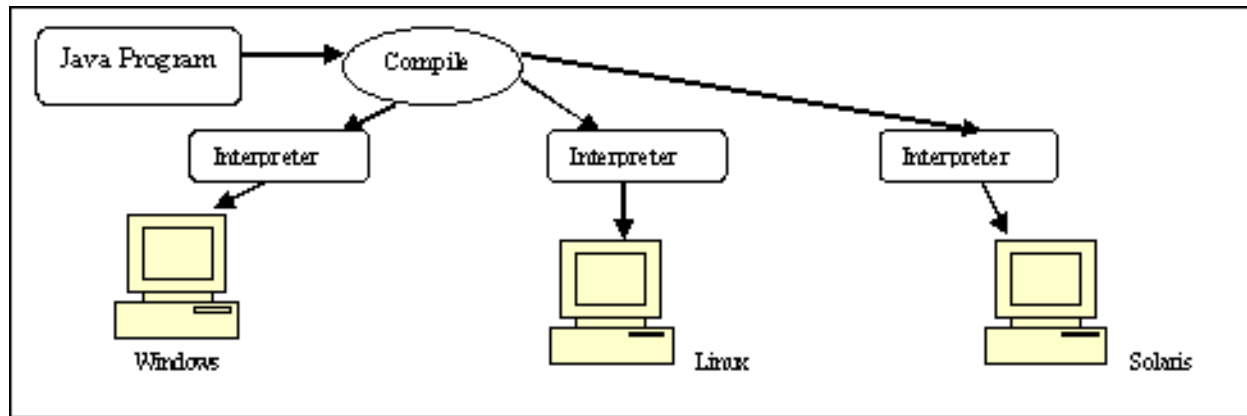
This feature will be clearly understood if you know that with most programming languages, you either compile or interpret a program so that you can run it on your computer. Compilations means to translate the file into machine code. Interpretation means to execute the compiled file using another program.



The Java programming language is unusual in that a program is both compiled and interpreted. With the compiler, first you translate a program into an intermediate language called Java "bytecode". The interpreter runs each Java bytecode instruction on the computer. Compilation happens just once and interpretation occurs each time the program is executed. The following figure illustrates how this works.



Java bytecodes help make "write once, run anywhere" possible. You can compile your program into bytecodes on any platform that has a Java compiler. The bytecodes can then be run on any implementation of the Java VM.



لغة الجافا سهلة التعلم وقد صممت لتكون سهلة الكتابة — سهولة التجميع —  
سهلة التصحيح, على الرغم من بساطتها فإنها لغة قوية ومرنة

## Java is Easy to Learn

Java was constructed to be a simple programming language. Its initial design goals was for it to be a small and simple language that would be easy to write, easy to compile, and easy to debug. Though its simplicity it is still a very powerful and flexible programming language.

# 4. Programming in Java

البرمجة باستخدام الجافا

## Creating a Java program

إنشاء برنامج جافا

Create a source file. A source file contains text, written in Java programming language that you and other programmers can understand. You can use any text editor to create and edit source files.

ملف المصدر (كود البرنامج) يحتوي على نص مكتوب بلغة الجافا يستطيع أي مبرمج أن يفهمه. يمكنك باستخدام أي محرر نص إنشاء أو تعديل ملف مصدر

```
/* This program simply displays "Hello World!" on the screen */
```

```
class Hello
```

هذا البرنامج ببساطة يعرض رسالة على الشاشة

```
{  
    public static void main(String[] args)  
    {  
        System.out.println("Hello World!");  
    }  
}
```

***Note: Java Language is case sensitive, "A" is different than "a". Write the above code and be careful with capital and small letters.***

الجافا حساسة لحالة الأحرف – الحرف الكبير 'A' يختلف عن الحرف الصغير 'a' – كن حذرا عند كتابة الكود

التعليقات على الأوامر في البرنامج - جزء من الكود ولكنها مهملة من المترجم أي  
أنها لا تنفذ فائدتها فقط التعليق على خطوة أو شرح خطوة

## 5. Comments

A comment is a piece of text in a source file that is ignored by the compiler. Comments are used to allow the programmer to express any comment that he/she needs to write about the program.

The Java language supports two kinds of comments:

`/*` This is the first kind of comment. It allows you to write comments for any number of lines. A single

comment continues until it is terminated with the closing characters.

`*/`

تعليق متعدد الأسطر يبدأ بـ `/*`  
وينتهي بـ `*/`

`//` *This is the second kind of comment.*  
`//` *It only covers one line.*

تعليق سطر واحد يبدأ بـ `//`

## 6. Errors

There are two types of errors: **syntax** and **logic** errors.

### a. Syntax Errors

A syntax error is an error in the syntax of the code written. Such an error will cause a compile-time error that prevents the program from running.

#### Missing a semicolon

```
System.out.println("Hello")
```

أ - خطأ في قواعد الكتابة يسبب خطأ أثناء ترجمة البرنامج  
ويمنع تنفيذه

#### Unclosed/Unopened Quotation Marks

```
System.out.println("Hello);
```

مثال: نسيان الفاصلة المنقوطة في نهاية أي جملة

```
System.out.println(Hello");
```

مثال: نسيان فتح أو غلق علامة التنصيص

#### Class Name different from file name

Try writing the following code:

```
public class Hello()  
{  
    public static void main(String[] args)  
    {  
        System.out.println("Hello");  
    }  
}
```

مثال: اسم الكلاس مختلف عن اسم الملف المنشأ للبرنامج

Then save the file as a different name than "Hello.java". This will cause a compile-time error because the class and file name do not match.

# 5. Errors

## a. Syntax Errors

أ — خطأ في قواعد الكتابة

### Spelling mistakes

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

مثال: الأخطاء الإملائية

### Case Sensitivity

```
public static void main(string[] args)
```

مثال: الحساسية لحالة الأحرف

### Un-terminated Comment

```
/* The following statement  
displays Hello
```

مثال: بداية تعليق وعدم غلقه

```
System.out.println("Hello");
```

مثال: استخدام متغير غير معلن عنه أو ليس له قيمة مبدئية

The previous will cause a compile-time error because the comment has not been terminated.

### Using an un-initialized variable

```
public static void main(String[] args)  
{  
    int x;  
    int y = x + 5;  
}
```

This program will give a compile-time error because the variable x has not been initialized before using it.

ب- خطأ منطقي لا يسبب ظهور رسالة خطأ وبالتالي ينفذ البرنامج ولكنه لا يؤدي العملية المطلوبة  
بشكل صحيح (خطأ في منهجية الحل وليس في كتابة البرنامج)

## b. Logic Errors

A logic error is an error that will not cause an error message. It occurs when the program does not perform what the programmer intended for it to do. With this type of error, the program will compile as well as run, but it will give undesired results.

مثال: طباعة الرسالة بشكل خطأ في البرنامج الموضح سابقا      The following is an example of a logic error:

```
System.out.println("Hell");
```

The previous statement was meant to print the word "Hello". Instead it will print "Hell".

ناقشنا باختصار لغة الجافا كلغة برمجة ومميزاتها وكيف يمكنك الحصول على البرنامج المشغل  
وتثبيته وعرضنا كيف يمكن كتابة برنامج جافا وترجمته وتنفيذه

## Summary

We have briefly discussed Java as a programming language and its advantages. We talked about how to get an install the java software development kit or JSDK. We also have demonstrated how to create, compile and run program.