



Visual Programming

Lecture 1: JAVA Revision

Types, Variables, Operators

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Be a Falcon



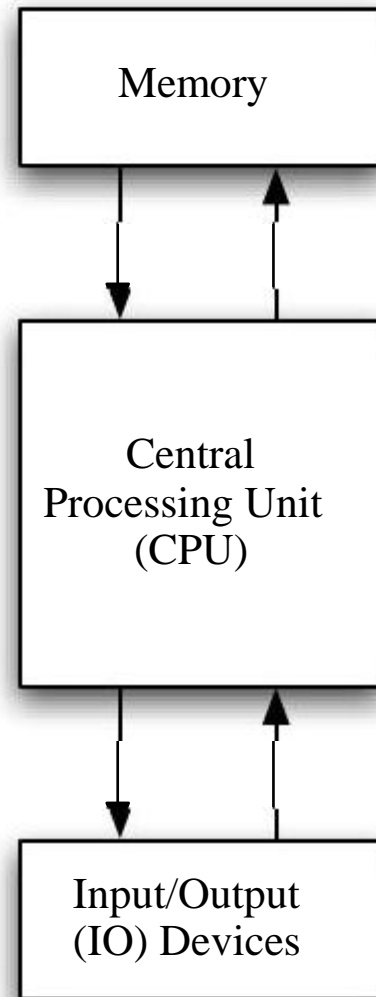
RESPECT
IS THE KEY



Goal

- *Learn enough Java to do something useful*
- *Examples:*
 - ◆ Simulate a natural/engineering process
 - ◆ Draw pretty graphics
- *While focusing on **Object-Oriented Concepts***

The Computer



CPU Instructions

$$z = x + y$$

Read location x

Read location y

Add

Write to location z

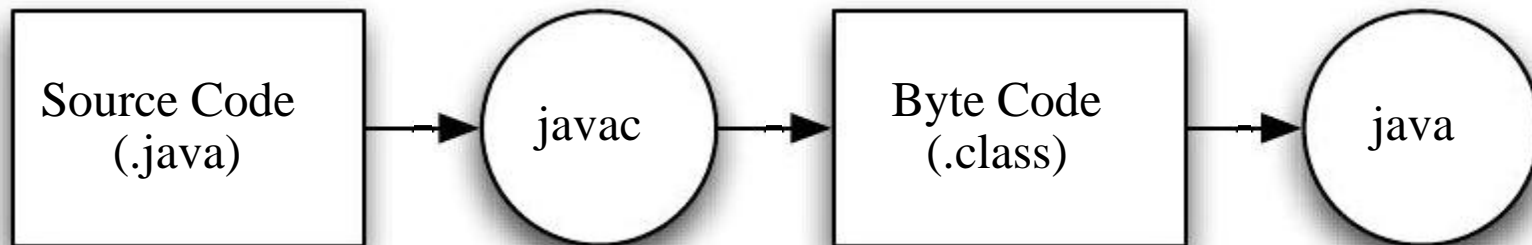
Programming Languages

- *Easier to understand than CPU instructions*
- *Needs to be translated for the CPU to understand it*

Java

- *“Most popular” language*
- *Runs on a “virtual machine” (JVM)*
- *More complex than some (eg. Python)*
- *Simpler than others (eg. C++)*

Compiling Java



First Program

```
class Hello {  
    public static void main(String[] arguments) {  
        // Program execution begins here  
        System.out.println("Hello world.");  
    }  
}
```

Program Structure

```
class CLASSNAME {  
    public static void main(String[] arguments) {  
        STATEMENTS  
    }  
}
```

Output

`System.out.println(some String)` outputs to the console

Example:

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

Second Program

```
class Hello2 {  
    public static void main(String[] arguments) {  
        System.out.println("Hello world."); // Print once  
        System.out.println("Line number 2"); //Again!  
    }  
}
```

Types

Kinds of values that can be stored and manipulated

boolean: Truth value (**true** or **false**).

int: Integer (0, 1, -47).

double: Real number (3.14, 1.0, -2.1).

String: Text (“hello”, “example”).

Variables

Named *memory* location that stores a value of one particular type.

TYPE NAME;

Example:

String foo;

Assignment

Use = to give variables a value.

Example:

```
String foo;  
foo = "IAP 6.092";
```

Assignment

Can be combined with a variable declaration.

Example:

```
double badPi = 3.14;
```

```
boolean isJanuary = true;
```

Third Program

```
class Hello3 {  
    public static void main(String[] arguments) {  
        String foo = "IAP 6.092";  
        System.out.println(foo);  
        foo = "Something else";  
        System.out.println(foo);  
    }  
}
```

Operators

Symbols that perform simple computations

Assignment: =

Addition: +

Subtraction: -

Multiplication: *

Division: /

Reminder: %

Order of Operations

Follows standard math rules:

1. Parentheses
2. Multiplication, division, and remainder
3. Addition and subtraction

Fourth Program

```
class DoMath {  
    public static void main(String[] arguments) {  
        double score = 1.0 + 2.0 * 3.0;  
        System.out.println(score);  
        score = score / 2.0;  
        System.out.println(score);  
    }  
}
```

String Concatenation (+)

```
String text = "hello" + " world";  
text = text + " number " + 5;  
// text = "hello world number 5"
```