

Dissecting Simple Java Programs

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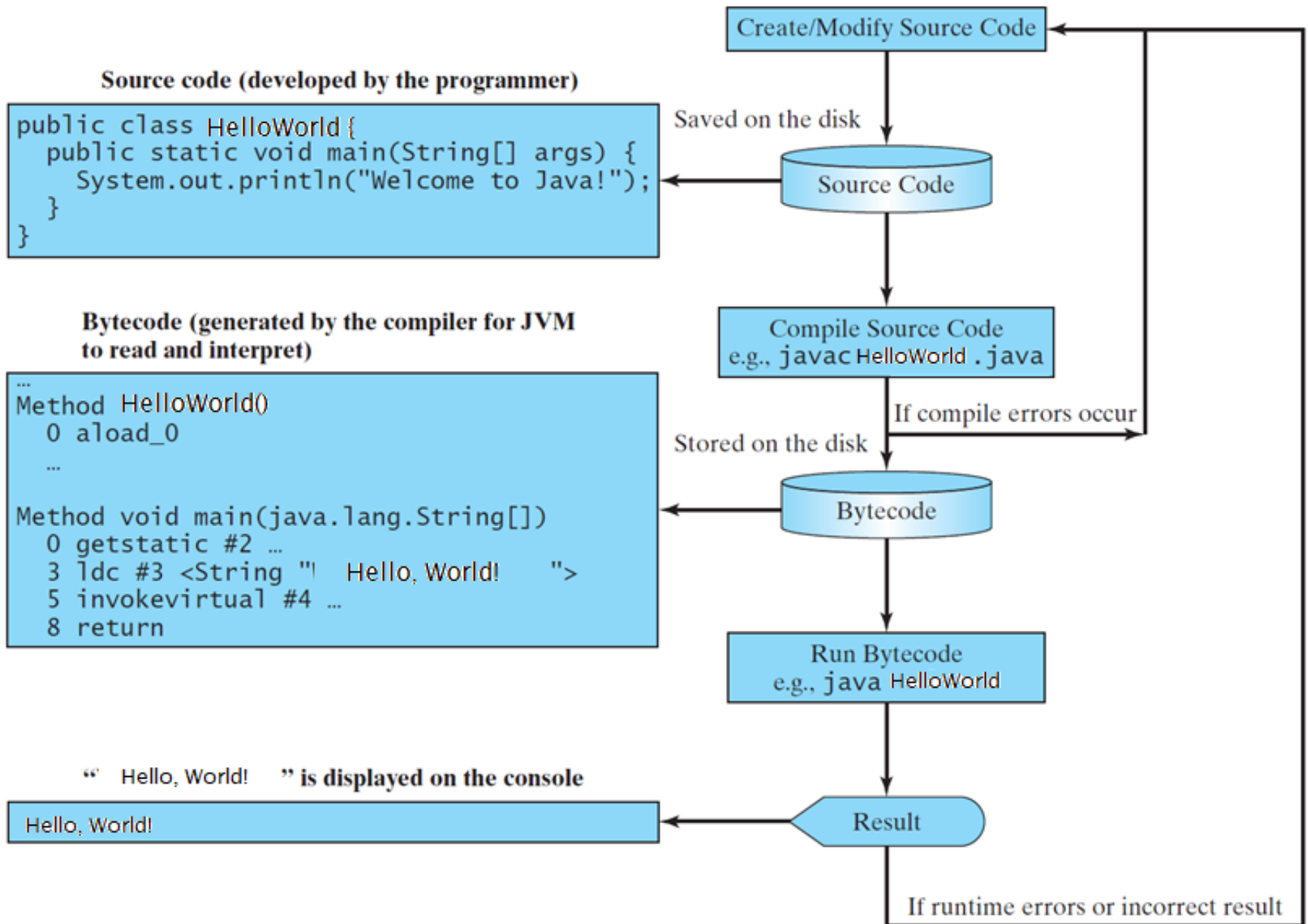
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Outlines

- Review simple Java programs
- Review program development process
- More examples

Recall the “Hello, World” program

```
// This program prints Welcome to Java!  
public class HelloWorld {  
    public static void main(String[] args) {  
        System.out.println("Hello, World!");  
    }  
}
```



More Examples

- Print “Hello, World!” 3 times
- Compute an expression and print the result

Questions?

Anatomy of a Java Program

- Class name
- Main method
- Statements
- Statement terminator
- Reserved words
- Comments
- Blocks

Class Name

- Every Java program must have at least one class.
- Each class has a name.
 - By convention, class names start with an uppercase letter.
 - Best practice examples
 - HelloWorld
 - HelloWorldThreeTimes
 - TriangleArea
 - CircleArea

Main Method

- In order to run a class, the class must contain a method named main.
- The program is executed from the main method.

Statement

- A statement represents an action or a sequence of actions.
- Example
 - `System.out.println("Hello, World!")`
 - To display the greeting "Hello, World!".

Statement Terminator

- Every statement in Java ends with a semicolon (;).

Reserved Keywords

- Reserved words or keywords are words that have a specific meaning to the compiler and cannot be used for other purposes in the program.
- Example.
 - “class” is a reserved keyword
 - when the compiler sees the word “class”, it understands that the word after class is the name for the class.
 - Any other keywords have we used?

Blocks

- A pair of braces in a program forms a block that groups components of a program

Special Symbols

Character Name	Description
{ }	Opening and closing braces Denotes a block to enclose statements.
()	Opening and closing parentheses Used with methods.
[]	Opening and closing brackets Denotes an array.
//	Double slashes Precedes a comment line.
" "	Opening and closing quotation marks Enclosing a string (i.e., sequence of characters).
;	Semicolon Marks the end of a statement.

Questions?

Programming Style and Documentation

- Appropriate Comments
- Naming Conventions
- Proper Indentation and Spacing Lines
- Block Styles

Programming Style and Documentation

“Programs must be written for people to read, and only incidentally for machines to execute.”

— Harold Abelson, Structure and Interpretation of Computer Programs

Appropriate Comments

- Include a summary at the beginning of the program to explain
 - what the program does,
 - its key features,
 - its supporting data structures, and
 - any unique techniques it uses.
- Include author information
 - Example
 - your name, class section, instructor, date, and a brief description at the beginning of the program.

Naming Convention

- Choose meaningful and descriptive names.
- Class names:
 - Capitalize the first letter of each word in the name. For example, the class name `ComputeExpression`.

Indentation and Spacing

Proper Indentation and Spacing

- Indentation
 - Indent same spaces for code on the same level
- Spacing
 - Use blank line to separate segments of the code.

Block Styles

- Next-line style vs. End-of-line style
- Suggest to use end-of-line style for braces.

*Next-line
style*

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

*End-of-line
style*

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

Questions

What if there is an error?

- What kind of error?
 - Compilation errors
 - Runtime errors
 - Logic errors
- How do we deal with errors?
- Let's write a few more programs

Syntax Errors

- Let's see several examples

Runtime Errors

- Let's observe an example
 - Given two numbers, compute the division
 - What if the denominator is 0?
 - An example of runtime error – a situation the program cannot handle

Logic Errors

- Let's observe an example
 - Given a temperature in Celsius, convert it to Fahrenheit
 - Write the program
 - Does the program produce an expected result?
 - An example of logic error – the situation that the program does not perform the way it was intended to.

Questions

Lab Exercise

- Computer and print out the area and the perimeter of a circle given its radius
 - Recall that
 - Perimeter = $2 \pi r$
 - Area = πr^2