Computer Science I

Chapter 1 Notes

Computer Programming

- Program – a set of instructions that tell the computer how to perform a task
- Programmer – a person who writes computer programs
- Programming language – a set of words and symbols that are used to write a program. Each programming language has its own set of rules.

Computer Program Basics

Computer programs perform these basic instructions:

- Input: get data, from the keyboard, a file, or other source
- Process: perform calculations or other operations on the data
- Output: display the results, on the screen, to a file, or other device

Java Programming Language

- Java is an object-oriented programming language
- Steps to writing and using a Java program:
  1. Write the instructions in the Java language
  2. Enter the instructions into an editor and save the file with the extension .java. This file is called the **source code**.
  3. Compile the source code using a program called the Java compiler. The Java compiler creates a new file called the **bytecode**.
  4. Run the bytecode using a program called the Java interpreter.
  5. Were there errors? Fix the errors and go back to step 3 until the program works correctly.

Comments

- A comment is text that a programmer adds to a program to help others understand the program better.
- Comments are ignored by the compiler.
- Java has two types of comments:

  Single line comment: begins with / / and ends at the end of the line

  Multi line comment: begins with / * and ends with * /
- In this course we will use only single line comments.

White Space

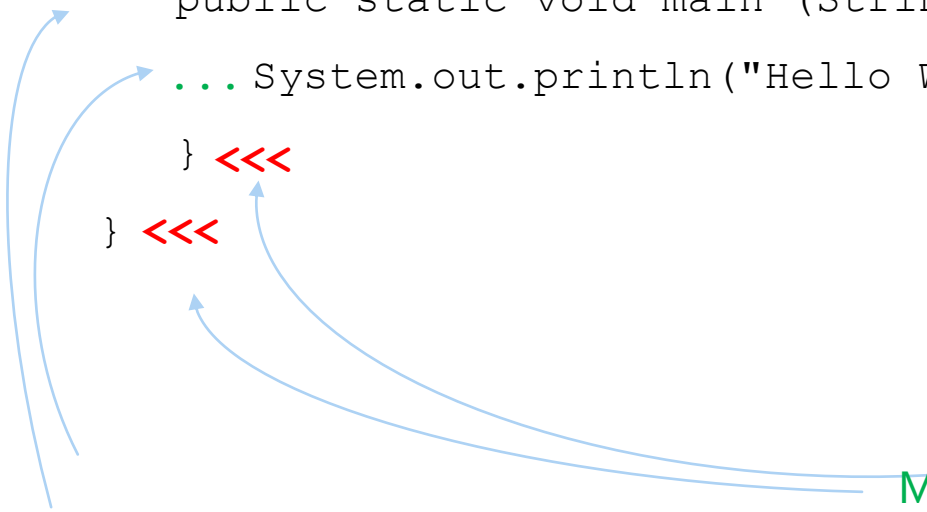
- white space separates words and symbols
- white space characters are:
  - space
  - tab
  - newline character (when the Enter key is pressed)
- white space makes programs easier to read (readability)
- white space is ignored by the compiler
- be consistent with your spacing

First Java Program

```
// demonstrates the basic structure of a Java application
public class HelloWorld {
   public static void main (String [] args)    {
      System.out.println("Hello World!");
   }
}
```

First Java Program - Indentation

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



Indent 3 spaces (press the space bar 3 times) each time you open a curly brace.

Move back 3 spaces to the left each time before you close a curly brace.

First Java Program – Curly Braces

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

Course Style Guidelines:

- Place the opening (left) curly brace at the end of a line of code.
- Every closing (right) curly brace goes on a line all by itself.
- Every closing (right) curly brace has a comment.

Identifiers & Reserved Words

- Identifiers – words and names of things in a program
  - words that the programmer makes up
  - words that another programmer chose
  - words that are reserved for special purposes

Java has special purpose words are called "reserved words" or "keywords". You cannot use reserved words as names of things in your program.

See the list of reserved words.

Rules for Creating Identifiers

- A valid identifier:
  - Starts with a letter
  - Contains only letters, digits, $ or _ (underscore)
  - Cannot be a reserved word
- Identifiers are case-sensitive
  - total is different from Total
  - shoeSize is different from shoesize
- Examples of valid identifiers:

  total MAX_HEIGHT num3 keyboard System

Types of Errors

- **Syntax errors** – spelling, punctuation, wrong words, or words out of order
  - Syntax refers to the rules that you must follow in order to write statements in the language (in this case Java). If you don't follow the rules, you get a syntax error when you compile.
- **Run-time errors** – something that happens when the program is running that causes it to crash. Java calls these "exceptions".
- **Logic error** – The program compiles and runs, but doesn't give the right output.