

Chapter 1: Computer Systems

Lab Exercises

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Your First Program - HelloWorld

1. Start the BlueJ IDE program on your desktop.
2. Create an empty Java class, `New Class...` in your `\APCS\Chapter 1` directory.
3. Name the file `HelloWorld`, exactly the same name you will use for the class name, case-sensitive. A file `HelloWorld.java` will be created.
4. Type the following program into a file called `HelloWorld.java`. (This is the traditional first program a computer scientist writes in a new language.)

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

5. Compile and run the program to see what it does.

When you make syntax errors in your program the compiler gives error messages and does not create the bytecode file. It saves time and frustration to learn what some of these messages are and what they mean. Unfortunately, at this stage in the game many of the messages will not be meaningful *except* to let you know where the first error occurred. Your only choice is to carefully study your program to find the error. In the following you will introduce a few typical errors into a simple program and examine the error messages.

Then make the changes below, answering the questions as you go.

6. **Class name different from file name.** Delete one `l` (el) from the name of the class (so the first non-comment line is `public class Helo`), save the program, and recompile it. What was the error message?
7. **Misspelling inside string.** Correct the mistake above, then delete one `l` from the `Hello` in the message to be printed (inside the quotation marks). Save the program and recompile it. There is no error message—**why not?** Now run the program. What has changed?
8. **No ending quotation mark in a string literal.** Correct the spelling in the string, then delete the ending quotation mark enclosing the string `Hello, World!`. Save the program and recompile it. What error message(s) do you get?
9. **No beginning quotation mark in a string literal.** Put the ending quotation mark back, then take out the beginning one. Save and recompile. How many errors this time? Lots, even though there is really only one error. **When you get lots of errors always concentrate on finding the first one listed!!** Often fixing that one will fix the rest. After we study variables the error messages that came up this time will make more sense.
10. **No semicolon after a statement.** Fix the last error (put the quotation mark back). Now remove the semicolon at the end of the line that prints the message. Save the program and recompile it. What error message(s) do you get?

Poem

Write a Java program `Poem.java` that prints the message, "Roses are red". Your program will be a class definition containing a *main* method—see the *Lincoln* example in Listing 1.1 of the text if you need guidance. Remember the following:

- The name of the class must match the name of the file (but without the `.java` extension).
- The *main* method must be inside the class definition (between the first `{` and the last `}`).
- The statement that prints the message must be inside the *main* method.

Compile and run your program. When it works correctly, modify it so that it prints the entire poem:

```
Roses are red  
Violets are blue  
Sugar is sweet  
And so are you!
```

Comments

Open the file `Count.java` you downloaded into your Chapter 1 directory from Moodle. `Count.java` contains a Java program that counts from 1 to 5 in English, French, and Spanish. Save this file to your directory and compile and run it to see what it does. Then modify it as follows:

1. Use `//` style comments to add a comment header at the top of the file that includes the name of the program, your name, and a brief description of what the program does, neatly formatted. Include a delimiter line (e.g., all stars) at the beginning and end of the header.
2. Add a comment before each `println` that indicates what language the next line is in. Experiment with leaving a blank line before each of these comment lines (in the program itself, not the output). Is the program easier to read with or without these blank lines?
3. Remove one of the slashes from one of your comment lines and recompile the program, so one of the comments starts with a single `/`. What error do you get? Put the slash back in.
4. Try putting a comment within a comment, so that a `//` appears after the initial `//` on a comment line. Does this cause problems?

`Count.java`

```
public class Count
{
    public static void main (String[] args)
    {
        System.out.println ("one two three four five");
        System.out.println ("un deux trois quatre cinq");
        System.out.println ("uno dos tres cuatro cinco");
    }
}
```

Program Names

File `Simple.java` contains a simple Java program that prints a message. The identifier that represents the name of this program is `Simple`, but we could have chosen a different identifier subject to certain rules and conventions. An identifier may contain any combination of letters, digits, the underscore character, and the dollar sign, but cannot begin with a digit. Furthermore, by convention, identifiers that represent class names (which includes program names) begin with a capital letter. This means that you won't get an error if your program name doesn't start with a capital letter (as long as what it starts with is legal for an identifier), but it's better style if you do. This may seem arbitrary now, but later when you have lots of identifiers in your programs you'll see the benefit. Of course, the program name should always be reasonably descriptive of the program.

Indicate whether each name below is a legal identifier, and if so, whether it is a good choice to name this program. If the answer to either question is no, explain why. Then save `Simple.java` to your directory and check your answers by modifying it to try each—note that you will have to change the file name each time to match the program name or you will always get an error.

1. `simple` (Why do you even have to change the name of the file in this case?)

2. `SimpleProgram`

3. `1Simple`

4. `_Simple_`

5. `*Simple*`

6. `$123_45`

7. `Simple!`

```
// *****
// Simple.java
//
// Print a simple message about Java.
//
// *****

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

Correcting Syntax Errors

File `Problems.java` contains a simple Java program that contains a number of syntax errors. Save the program to your directory, study it and correct as many of the errors as you can find. Then compile the program; if there are still errors, correct them. Some things to remember:

1. Java is case sensitive, so, for example, the identifiers `public`, `Public`, and `PUBLIC` are all considered different. For reserved words such as `public` and `void` and previously defined identifiers such as `String` and `System`, you have to get the case right. You will learn the conventions about case soon, but for now you can look at a sample program in the text to see what case should be used where.
2. When the compiler lists lots of errors, fix the first one (or few) and then recompile—often the later errors aren't really errors in the program, they just indicate that the compiler is confused from earlier errors.
3. Read the error messages carefully, and note what line numbers they refer to. Often the messages are helpful, but even when they aren't, the line numbers usually are.
4. When the program compiles cleanly, run it.

```
// *****
//   Problems.java
//
//   Provide lots of syntax errors for the user to correct.
//
// *****

public class problems
{

    public Static main (string[] args)
    {

        System.out.println ("!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!");
        System.out.println (This program used to have lots of problems,");
        System.Out.println ("but if it prints this, you fixed them all.")
        System.out.println ("          *** Hurray! ***");
        System.out.println ("!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!");

    }

}
```