Computer Programming Fundamentals

CS 152
Professor: Leah Buechley
TAs: Melody Horn, Noah Garcia, Andrew Geyko, Juan Ormaza
Time: MWF 10:00-10:50am
https://handandmachine.cs.unm.edu/classes/CS152_Fall2021/

WEBSITE

https://handandmachine.cs.unm.edu/classes/CS152_Fall2021

Syllabus

Schedule
with class slides, assignments, etc.

Policies

Links to other material

USE PIAZZA FOR QUESTIONS DURING LECTURE

- We'll use the live chat feature
- Post questions or issues you're having
- Up vote and down vote other posts
- I will check in periodically during lecture
- Also feel free to raise your hand
- Please don't interrupt and wait until you are called on to ask a question.

DUE MONDAY: ASSIGNMENT 1

- Due Monday 8/30 by 9:30am
- Essay: What Excites you about Computing?
- Include an example of a person or project that you find inspiring.
- Submit via UNM Learn

LETS START PROGRAMMING

IntelliJ

IF YOU'RE ON A CHROMEBOOK or IPAD OPEN UP REPLIT

SETTING UP YOUR FIRST PROJECT

OPEN UP FirstProgram PROJECT
OR
START FROM SCRATCH

WE’LL USE A DIFFERENT PROCESS

DON’T JUMP AHEAD

The next steps are important to get just right.

They’re easy to mess up.

Be patient :)

DON’T JUMP AHEAD

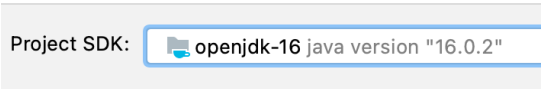
IntelliJ does a lot behind the scene

Creates a lot of files and folders

The project structure can get messed up

IntelliJ PROJECT SETUP

1. Create a new project
2. Select your newly downloaded SDK

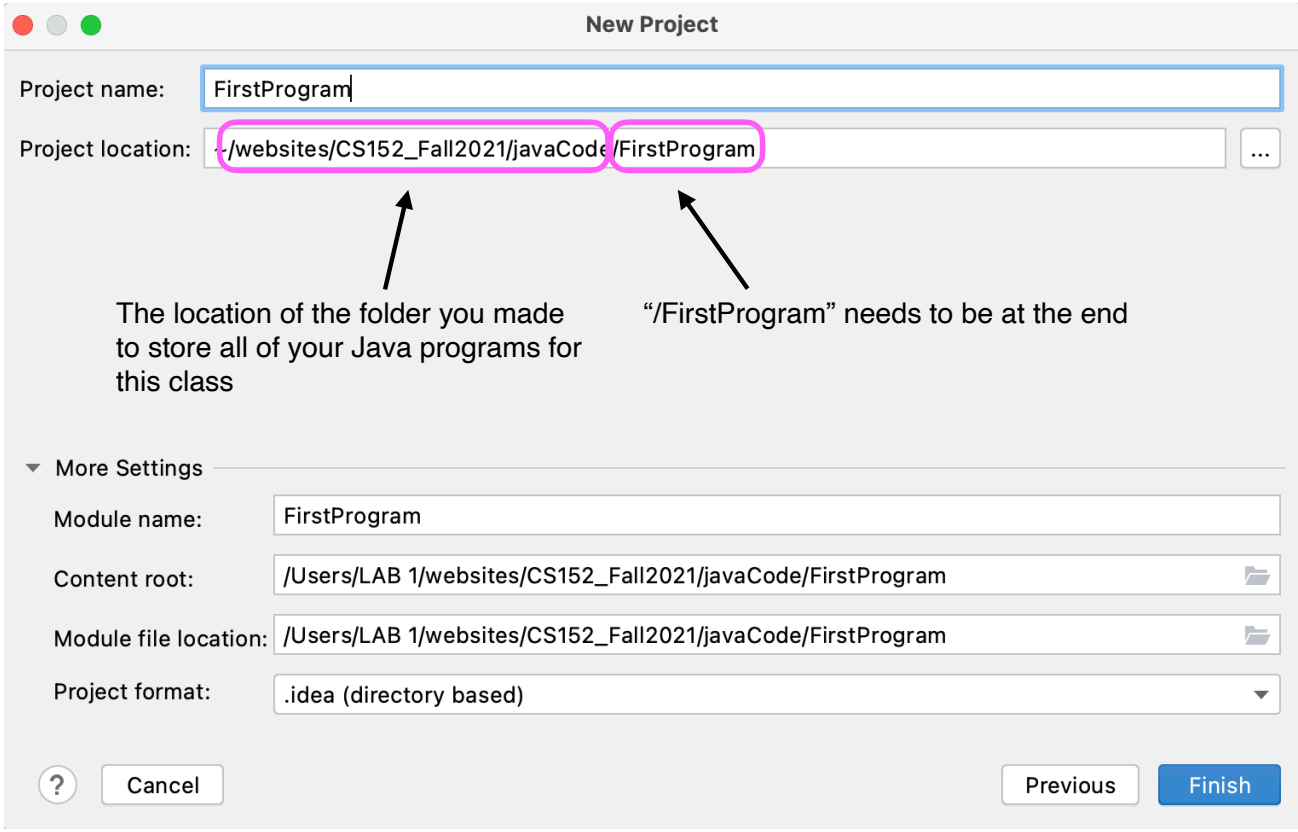


3. Click “Next”
4. Click “Next”

IntelliJ PROJECT SETUP

1. Under Project location, browse to a location you will remember. This is where you'll store all your Java programs. Create a new folder called "CS152Java" or something similar
2. For PCs:
   C:\Users\YOUR_ACCOUNT\CS152Java\FirstProgram
3. Type in "FirstProgram" for Project name
4. IMPORTANT: Make sure "FirstProgram" is at the end of the text you see in Project location. Add this text if it isn't there. This creates a folder for your new project called FirstProgram.

IntelliJ PROJECT SETUP

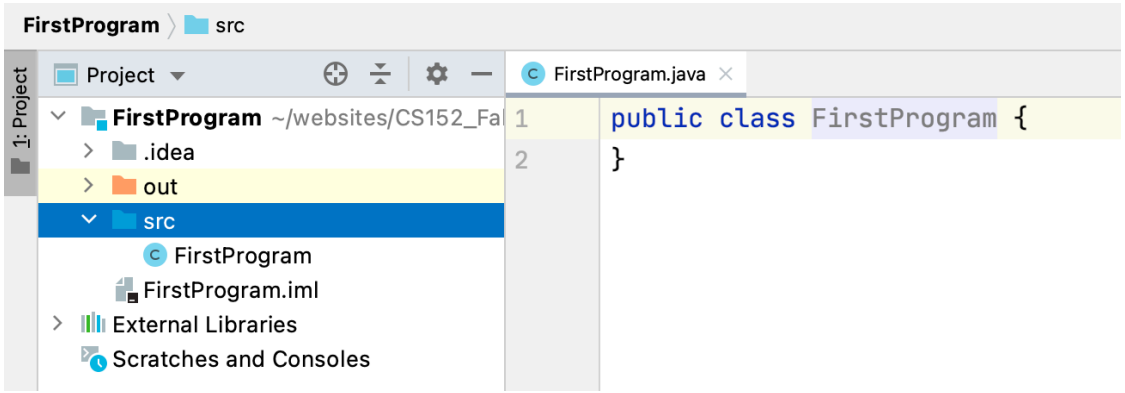


IntelliJ PROJECT SETUP

1. Find the CS152Java folder on your computer
2. For PCs:
   C:\Users\YOUR_ACCOUNT\CS152Java\FirstProgram

CREATE A NEW FILE

- Create a new Java Class file in the src directory. directory = folder, src = “source code”
- Name it “FirstProgram.java”
- This will generate the basic code structure (see below)



JAVA PROGRAMS

- Class name “FirstProgram” must match file name “FirstProgram.java”
- Class name should start with a capital letter
- If name is more than 2 words, all words are capitalized. No spaces. “FirstProgram”, “GreenApple”, etc.

ADD A MAIN METHOD

- Type “main” inside of the curly brackets
- Hit return and notice how the structure for a piece of code automatically pops up
- This is the main method

```
public class FirstProgram {

    public static void main(String[] args) {
        |
    }
}
```

MAIN METHOD

- Every Java program has a main() method
- Always has the same structure and syntax:

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

}
```

- This is the piece of code that runs when your program runs.

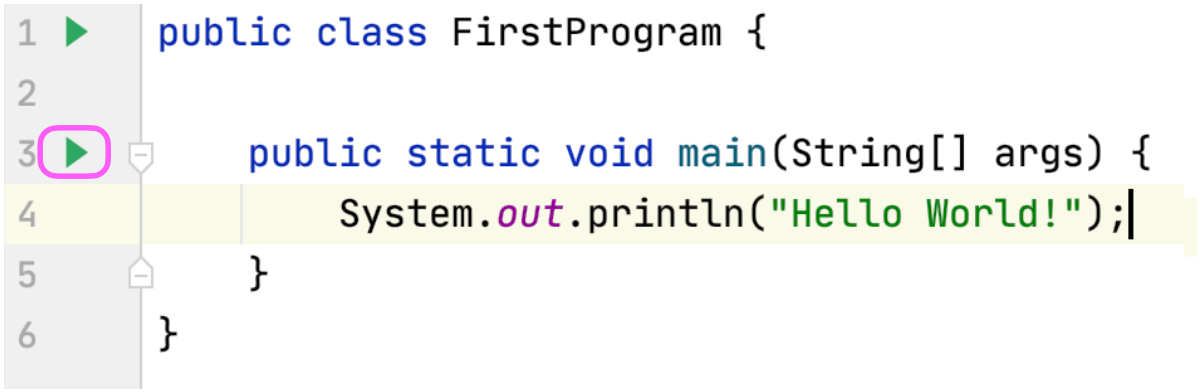
ADD A PRINT STATEMENT

- Add a line that will print “Hello World!”
- System.out.println(“Hello World!”)

```
public class FirstProgram {

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

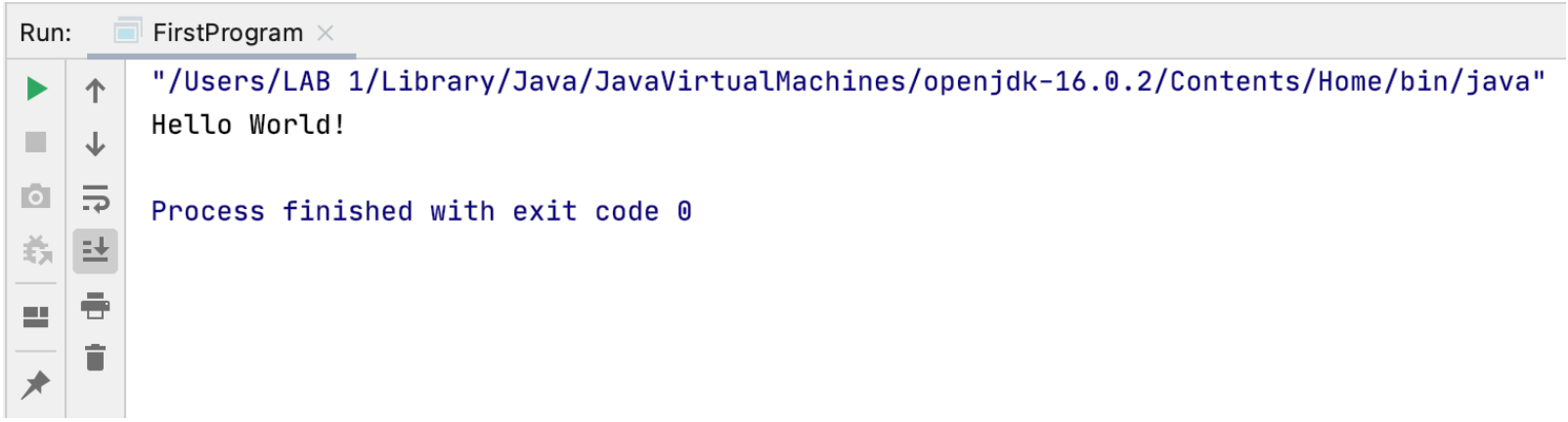
COMPILE & RUN YOUR PROGRAM

- Click on the green arrow next to the main method
- Click “Run FirstProgram.main()”



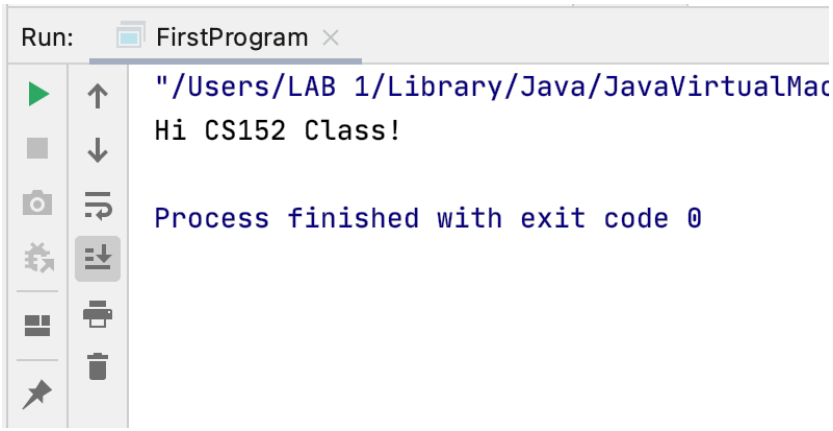
COMPILE & RUN YOUR PROGRAM

- Look at the bottom half of your screen



PLAY WITH THE TEXT THAT'S PRINTED

```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```



WRITING CODE

- Important strategy
- Try to ignore stuff that doesn't make sense
- It just has to be there for the program to work
- The fact that it doesn't make sense is because Java isn't an ideal programming language
- A better language would make more sense!
- Focus on the part you can control and understand

WRITING CODE: FOCUS

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

This says write something on a line
print = write
ln = line

The stuff in green is what gets written

WRITING CODE: FOCUS, STRUCTURE

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

Notice two curly brackets at the beginning and end of the program
These tell the compiler when FirstProgram begins and ends

WRITING CODE: FOCUS, STRUCTURE

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

Notice two curly brackets at the beginning and end of the main() method
These tell the compiler when the main() method begins and ends

WRITING CODE: FOCUS, STRUCTURE

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

semicolon at the end of each statement
statements are inside curly brackets
a period for programming in Java

WRITING CODE: FOCUS, STRUCTURE

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

Indentations help you keep track of what is part of FirstProgram

WRITING CODE: FOCUS, STRUCTURE

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

And what is part of the main() method

questions?

PLAY WITH THE TEXT THAT'S PRINTED

```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
    }
}
```

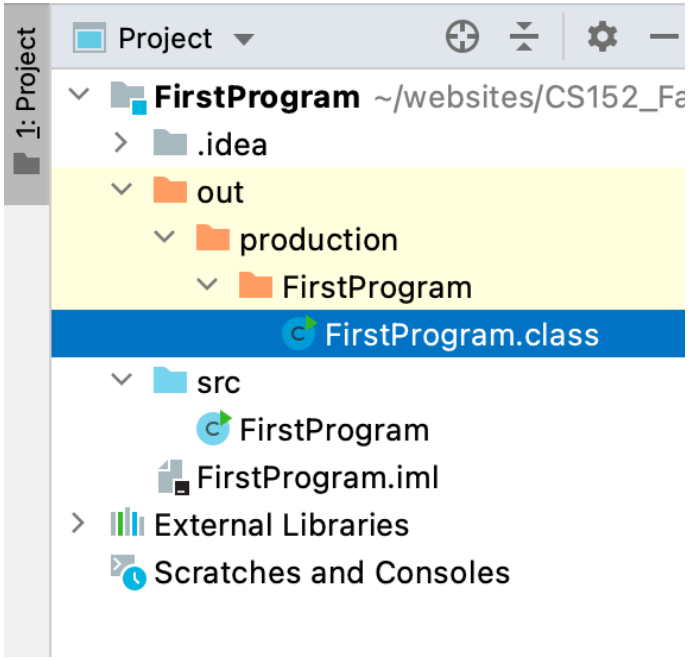
PLAY WITH THE TEXT THAT'S PRINTED

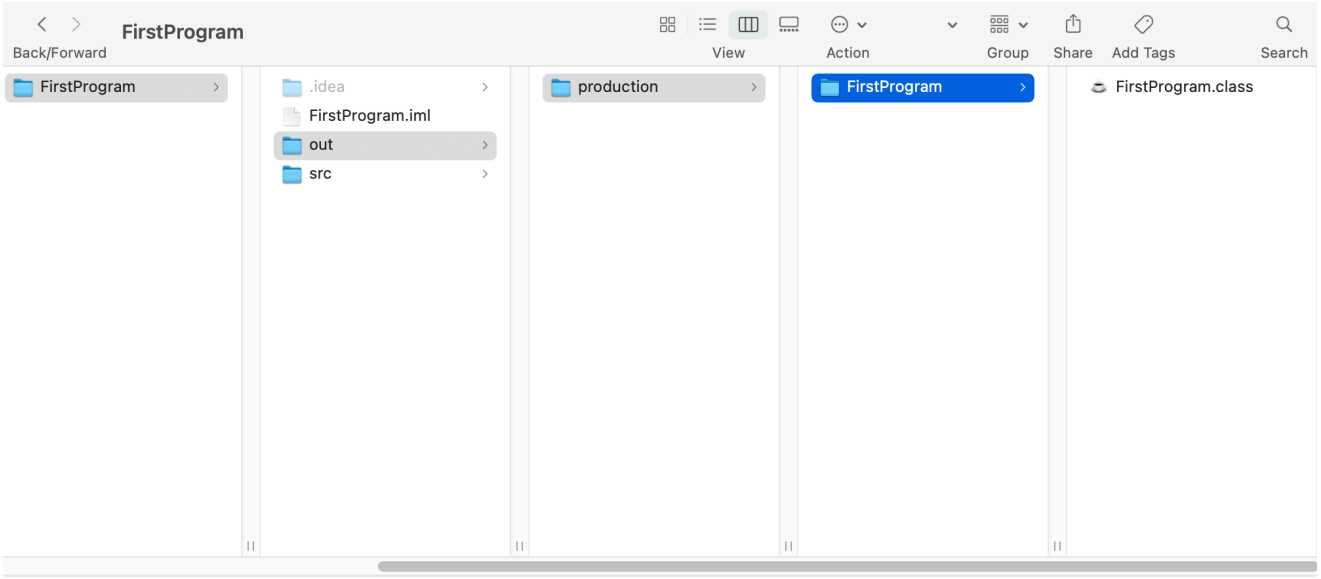
```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Hi CS152 Class!");
        System.out.println("How's it going?");
    }

}
```

COMPILING & RUNNING JAVA PROGRAMS

- Source code written in a .java file
- Compiler converts source code into byte code, a .class file
- The Java Virtual Machine (JVM) runs this byte code, translating it into instructions that your computer executes

FIND THE .CLASS FILE





COMMENTS

COMMENTS

```
public class FirstProgram {

    /*
        this is a comment that
        is more than one line
     */
    public static void main(String[] args) {
        //this is a comment on a single line
        System.out.println("Hi CS152 Class!");
    }

}
```

COMMENTS

- A way to write yourself notes in the code
- Ignored by the compiler
- Multiline comments: /* comment text */
- Single line comments: // comment text

ADD SOME COMMENTS TO YOUR CODE

```
public class FirstProgram {

    //this is the main method
    public static void main(String[] args) {
        //this is my nifty print statement
        System.out.println("Hi CS152 Class!”);
    }

}
```

questions?

A LITTLE COMPUTING

- Make a Fahrenheit to Celsius converter
- Let's look up today's high temperature
- And print it on the screen

PRINT OUT A NUMBER

```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println(93);
    }

}
```

PRINT VS PRINTLN

```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.println("Today's high temperature will be: ");
        System.out.println(93);
    }

}
```

```
Today's high temperature will be:
93
```

```java
public class FirstProgram {

    public static void main(String[] args) {
        System.out.print("Today's high temperature will be: ");
        System.out.println(93);
    }

}
```

```
Today's high temperature will be: 93
```

PRINT VS PRINTLN

```
public class FirstProgram {

    public static void main(String[] args) {
        System.out.print("Today's high temperature will be ");
        System.out.print(93);
        System.out.println(" degrees F.");
    }

}
```

```
Today’s high temperature will be 93 degrees F.
```

F to C CONVERTER

- Celsius = (93F - 32) * 5/9

A CONVERTER PROGRAM

```
public class FirstProgram {

    public static void main(String[] args) {
        //print temperature in Farenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(93);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print((93-32)*5/9);
        System.out.println(" in degrees C.");
    }

}
```

```
Today's high temperature will be 93 degrees F.
That's 33 in degrees C.
```

NOTE COMMENTS!

```
public class FirstProgram {

    public static void main(String[] args) {
        //print temperature in Farenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(93);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print((93-32)*5/9);
        System.out.println(" in degrees C.");
    }

}
```

```
Today's high temperature will be 93 degrees F.
That's 33 in degrees C.
```

IF WE WANT TO CHANGE THE TEMP?

```java
public class FirstProgram {

    public static void main(String[] args) {
        //print temperature in Farenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(93);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print((93-32)*5/9);
        System.out.println(" in degrees C.");
    }

}
```

```
Today's high temperature will be 93 degrees F.
That's 33 in degrees C.
```

IF WE WANT TO CHANGE THE TEMP?

```
public class FirstProgram {

    public static void main(String[] args) {
        //print temperature in Farenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(93);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print((93-32)*5/9);
        System.out.println(" in degrees C.");
    }

}
```

```
Today's high temperature will be 93 degrees F.
That's 33 in degrees C.
```

Have to change the value in two places.

ADD A VARIABLE

```
public static void main(String[] args) {
    int temperatureF = 93;
```

VARIABLES IN JAVA

variable's type

```
int temperatureF = 93;
```

int = integer
a whole number

variable's name

```
int temperatureF = 93;
```

variable's value

```
int temperatureF = 93;
```


semicolon
int temperatureF = 93;

USE THE VARIABLE

```
public static void main(String[] args) {
    int temperatureF = 93;

    //print temperature in Farenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print((temperatureF-32)*5/9);
    System.out.println(" in degrees C.");
}
```

```
Today's high temperature will be 93 degrees F.
That's 33 in degrees C.
```

Now we only need to change the value in one place.

CHANGE THE VALUE OF THE VARIABLE

```
public static void main(String[] args) {
    int temperatureF = 85;

    //print temperature in Farenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print((temperatureF-32)*5/9);
    System.out.println(" in degrees C.");
}
```

```
Today's high temperature will be 85 degrees F.
That's 29 in degrees C.
```

ADD ANOTHER VARIABLE

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;
```

USE THE VARIABLE

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

```
Today's high temperature will be 85 degrees F.
That's 29 in degrees C.
```

A NICE CLEAR PROGRAM

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

questions?

COMPILE ERRORS

COMPILE ERRORS

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

COMPILE ERRORS

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ")0
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

```
/Users/LAB 1/websites/CS152_Fall2021/javaCode/FirstProgram/src/FirstProgram.java:8:62
java: ';' expected
```

COMPILE ERRORS

- Errors in the syntax of your program
- Like spelling and punctuation mistakes when you write
- The compiler is picky and not super smart!
- The program won’t compile if there are any errors in your code

COMPILE ERRORS

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(temperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

COMPILE ERRORS

```
public static void main(String[] args) {
    int temperatureF = 85;
    int temperatureC = (temperatureF-32)*5/9;

    //print temperature in Fahrenheit
    System.out.print("Today's high temperature will be ");
    System.out.print(TemperatureF);
    System.out.println(" degrees F.");

    //print temperature in Celsius
    System.out.print("That's ");
    System.out.print(temperatureC);
    System.out.println(" in degrees C.");
}
```

```
/Users/LAB 1/websites/CS152_Fall2021/javaCode/FirstProgram/src/FirstProgram.java:9:26
java: cannot find symbol
  symbol:   variable TemperatureF
  location: class FirstProgram
```

COMPILE ERRORS

```
public class FirstProgram {

    public static void main(String[] args) {
        int temperatureF = 85;
        int temperatureC = (temperatureF-32)*5/9;

        //print temperature in Fahrenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(temperatureF);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print(temperatureC);
        System.out.println(" in degrees C.");
    }

}
```

COMPILE ERRORS

```
public class FirstProgram {

    public static void main(String[] args) {
        int temperatureF = 85;
        int temperatureC = (temperatureF-32)*5/9;

        //print temperature in Fahrenheit
        System.out.print("Today's high temperature will be ");
        System.out.print(temperatureF);
        System.out.println(" degrees F.");

        //print temperature in Celsius
        System.out.print("That's ");
        System.out.print(temperatureC);
        System.out.println(" in degrees C.");
    }
```

0

/Users/LAB 1/websites/CS152_Fall2021/javaCode/FirstProgram/src/FirstProgram.java:16:6
java: reached end of file while parsing

COMPILE ERRORS

- You'll always have compile errors
- Part of the programming process
- You'll get better & better at finding and fixing them
- IntelliJ will help you (most of the time):
  - telling you where the error is
  - changing the color of text where there is a problem
  - moving your cursor to the location of the error
  - printing error messages
  - etc.

questions?

DUE MONDAY: ASSIGNMENT 1

- Due Monday 8/30 by 9:30am
- Essay: What Excites you about Computing?
- Include an example of a person or project that you find inspiring.
- Submit via UNM Learn

Thank you!

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