1. Create a directory name hw2 (case sensitive) in your it114 directory, then go to this directory and post your solutions there, like the way you did for hw1.

2. Write a program name Variables.java with as usual a main method inside. Then, in the body of the main method write statements in order from top to bottom with the following specification:

   (a) A declaration statement which defines a variable of type int name A.
   (b) An assignment statement which assigns value 20 to variable A.
   (c) A declaration statement which defines a variable of type double name B.
   (d) An assignment statement which assigns value 2.01 to variable B.
   (e) A declaration statement which defines a variable of type double name C.
   (f) An assignment statement which assigns to variable C the sum of variables A and B.
   (g) A declaration statement which defines a variable of type double name D.
   (h) An assignment statement which assigns to variable D the expression $A - B$ (subtraction).
   (i) A declaration statement which defines a variable of type boolean name E.
   (j) An assignment statement which assigns to variable E the boolean expression: C is greater or equal to B OR A is less than D.
   (k) An initialization statement which declares a variable name F of type double and initialize it with the following expression:

   \[ \frac{C}{5.43} - \frac{A - 2.1}{D} \]

   (l) A statement which prints the value of variable A.
   (m) A statement which prints the value of variable B.
   (n) A statement which prints the value of variable C.
(o) A statement which prints the value of variable D.
(p) A statement which prints the value of variable E.
(q) A statement which prints the value of variable F.

Note that if you want you can combine the statements (a) and (b) into a compound one line initialization statement. The same is true for pairs (c) and (d), (e) and (f), (g) and (h) and finally (i) and (j).

3. Copy the program BooleanKeys.java from /home/sbaraty/ja va. First look at its source code using an editor such as emacs. Then compile and run it. Explain in memo.txt why you are getting this output? change the statement boolean key1 = true; to boolean key1 = false;. Compile, run and explain the output in memo.txt.

4. Converting Fahrenheit to Celsius  The degree Fahrenheit (F) is a unit of temperature named for the German physicist Gabriel Fahrenheit (1686 - 1736). In the Fahrenheit scale of temperature the freezing point of water is 32 degrees and the boiling point is 212 degrees placing the boiling and melting points of water 180 degrees apart. Zero degrees Fahrenheit indicates the lowest temperature Fahrenheit could obtain by a mixture of ice and salt.

The degree Celsius (C) is a unit of temperature named for the Swedish astronomer Anders Celsius (1701-1744) who first proposed it. The Celsius temperature scale was designed so that the freezing point of water is 0 degrees and the boiling point is 100 degrees at standard atmospheric pressure. Since there are one hundred steps between these two reference points the original term for this system was Centigrade (100 parts).

The formula for converting the Fahrenheit degree of temperature to Celsius is:

\[
C = \frac{5.0 \cdot (F - 32.0)}{9.0}
\]

Write a program name F2C.java which gets a double number representing a Fahrenheit degree from command line. Then it converts the Fahrenheit degree to Celsius and prints it. Here are some guidelines for writing this program:

(a) Start by renaming another java file to F2C.java, changing the class name and deleting the statements inside the main method.
(b) Convert the first command line input (args[0]) from type String to type double using Double.parseDouble method and assign the double value into a variable.
(c) Compute the above formula using basic arithmetic operations.
(d) Print the result.
If the program is written correctly it should behave as follows:

> java F2C 212
The degree in Celsius is 100.0.
> java F2C 32.0
The degree in Celsius is 0.0.
> java F2C -40.0
The degree in Celsius is -40.0.
> java F2C 50.0
The degree in Celsius is 10.0.

5. Write a program name Polynomial.java which computes accepts a real number from command line and computes and prints the following polynomial function for that number:

\[ f(x) = 12.1x^3 - 7.8x^2 + 1.02x - 7.3. \]

Here are a couple of instances of running the program Polynomial.java:

```
blade71(6)% java Test 9.34
f(9.34) = 9060.283700000004
blade71(7) % java Test -2.1
f(-2.1) = -155.8981
blade71(8)% java Test 2
f(2.0) = 60.34
blade71(9)% java Test 0.001
f(0.0010) = -7.2989877879
```

**HINTS:**

(a) for raising a number to an exponent such as \(x^4\) you can use multiplication. That is, \(x^4\) can be computed as \(x \times x \times x \times x\).

(b) The number you get from the command line, is going to be of type String by default. So in order to perform arithmetics on input, you need to first convert it type double. As we discussed in class, this can be done using a call to method:

```
double Double.parseDouble(String s)
```

6. Write a program name PN.java which accepts an integer from command-line and outputs “positive or zero? true” if the integer is greater or equal to zero and ”positive or zero? false” if the input is less than zero. Some examples:

```
java PN 302
positive or zero? true
java PN -781
positive or zero? false
java PN 0
positive or zero? true
```
Files that need to be delivered in hw2 directory:

1. memo.txt
2. Variables.java
3. Polynomial.java
4. F2C.java
5. PN.java

Note1:

1. If you want to finish your homework on time without any stress and pressure, I strongly advice you to start working on it as soon as I post it. In this way if you encounter some problem, you will have some time to consult with your classmates, or me.

2. Here is how I will collect your works. One minute after the due date and time I will copy all your files from your hw2 directories to my account. Thus, you can work on your solutions in your account freely before the due date, but you can not touch them after that.

3. Any homework submitted late by 24 hours will not get 30% of its score. A late submission of homework by 24 to 48 hours will lead to 50% deduction of the total grade. Any homework submission later than 48 hours will be considered as not submitted (zero).

4. Don’t forget to write comments for all of the above programs. I will allocate some points for writing proper comments.