Run the command `handin --checkout a2` from your home directory. This will create a directory called `a2` containing all necessary files, as well as a Makefile. The Makefile will be discussed in class. Complete all exercises below. Include comments describing what significant portions of code do. Programs without comments will be docked 1 point. To turnin your assignment, run the command `handin a2` from your home directory. This assignment is due on Tuesday, July 2nd, 2019. **Note:** Do not print a prompt before scanning for input when writing these programs.

1. Write a program called `p01.c` that accepts three integers as input, representing the three sides of a triangle. Output `valid` if the triangle is valid, otherwise output `not valid`. **Note:** Each side of a triangle must be shorter than the sum of the other sides.

2. Write a program called `p02.c` that accepts the three parts of a quadratic equation as input. These should be accepted as `float` type variables. Output the real roots of the equation. If all roots are imaginary, output `no real roots exist`. **Note:** Research the quadratic equation, particularly the descriminant. (Or ask me outside of class for a lengthy explanation.)

3. Write a program called `p03.c` that accepts an integer n as input. Output the Fibonacci sequence up to and including n. **Note:** The Fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21, ... and so on, where $f_i = f_{i-1} + f_{i-2}$ for all $i > 2$.

4. Write a program called `p04.c` that accepts an integer n as input. Output the product of the individual digits of n. **Note:** If you did the bonus on the last assignment, you should find this easy.

5. Write a program called `p05.c` that accepts an integer n as input. Output the following pattern on n rows:

```
   *
  **
 ***
****
```

6. Write a program called `p06.c` that accepts an integer n as input. Output the following pattern on n rows:

```
   *
  ***
 *****
*******
```

7. Write a program called `p07.c` that accepts an integer n as input. Output the following pattern on n rows:

```
*******
 *****
  ***
   *
```

8. Write a program called `p08.c` that reads 10 integers into one array, and 10 integers into another. Print all numbers that are found in both arrays. If there are no duplicates, print `unique`.

9. Write a program called `p09.c` that accepts a string as input. If the string is a palindrome output `yes`, otherwise output `no`. **Note:** A palindrome is a word that is spelled the same backwards as it is forwards.

10. Write a program called `p10.c` that accepts a string as input. Enure the string is large enough to hold a significantly sized paragraph. Print out the counts of each alphabetical character.

BONUS: Write a program called `bonus.c` that accepts first a word, then another string as input. Count how many times the word occurs in the second string. Print the count.