Assignment 1
Due date (on or before): Announced in class.

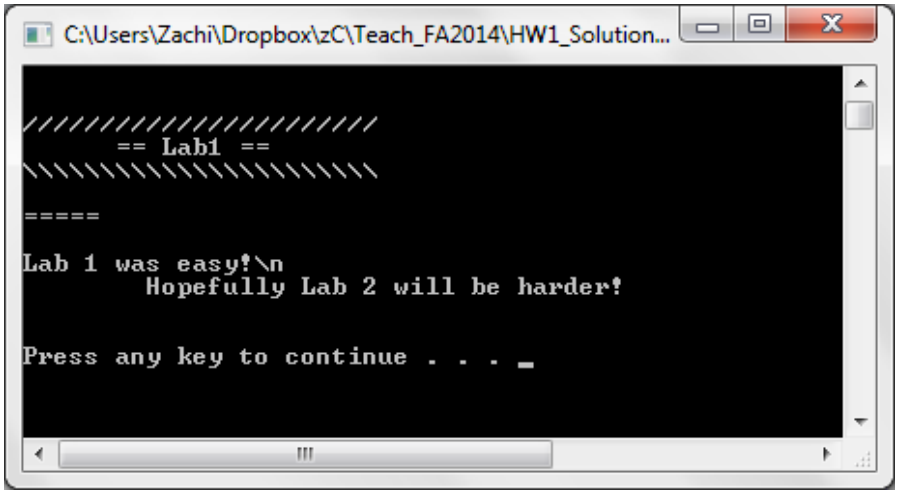
1. Write a C program that will print out the following message highlighted below (including the row of equal signs, and no need for highlighting in your C program…):

```
//////////////////////
      == Lab1 ==
\\\\\\\\\\\\\\\\\\\\\\

=====

Lab 1 was easy!\n
      Hopefully Lab 2 will be harder!
```

Screen shot:



********** Start of code + Screen shot**********

```c
#include <stdio.h>
#include <stdlib.h>

int main(void)
{
	printf("\n\n");
	printf("//////////////////////\n");
	printf("      == Lab1 ==\n");
	printf("\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\n");

	printf("\n=====\n\n");
```

```
        printf("Lab 1 was easy!\\n\n");
        printf("\tHopefully Lab 2 will be harder!\n");

        printf("\n\n");
        system("pause");
        return(0);
}
```

********** End of code + Screen shot**********

3. Identifiers, variables, and constants (20 points)

a. What is the difference between a variable and a constant?

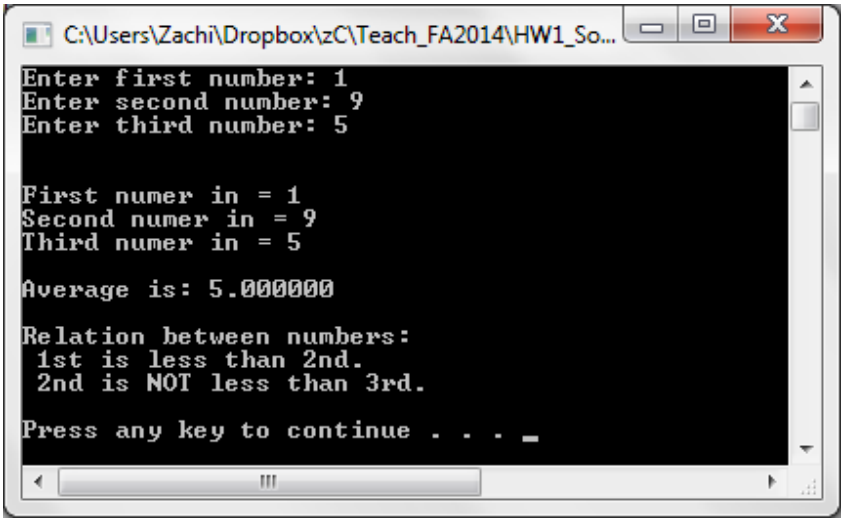
Variable can be assigned new value during the program. Constant has a value that cannot be changed.

b. Explain what each of the lines below does as a comment:

```
int x;          // Declare an integer variable x
x = 3;          // Assign x the value 3
int y = 3;      // Declare and integer variable y and Assign it the value 3.
char c;         // Declare a variable of type Character, named c.
float num;      // Declare a variable of type float, and call it num.
```

4. Modify the average-program we wrote in class in the following manner:
   4.a Read 3rd integer from user.
   4.b Calculate the average of the three numbers.
   4.c Print whether the first integer is smaller than the second.
   4.d Print whether the second integer is smaller than the third.

Screen shot:



********** Start of code + Screen shot**********

```c
#include <stdio.h>
#include <stdlib.h>

// main function: Does the job!
int main(void)
{
	int a,b,c;
	float avg;

	printf("Enter first number: ");
	scanf("%d",&a);

	printf("Enter second number: ");
	scanf("%d",&b);

	printf("Enter third number: ");
	scanf("%d",&c);

	printf("\n\nFirst numer in = %d\n",a);
	printf("Second numer in = %d\n",b);
	printf("Third numer in = %d\n\n",c);

	avg = (a+b+c )/3.0;
	printf("Average is: %f\n\n",avg);

	printf("Relation between numbers:\n");
	if (a<b)
		printf(" 1st is less than 2nd.\n");
	else
		printf(" 1st is NOT less than 2nd.\n");

	if (b<c)
		printf(" 2nd is less than 3rd.\n");
	else
		printf(" 2nd is NOT less than 3rd.\n");
```

```
        printf("\n");

        system("pause");
        return(0);
}
```

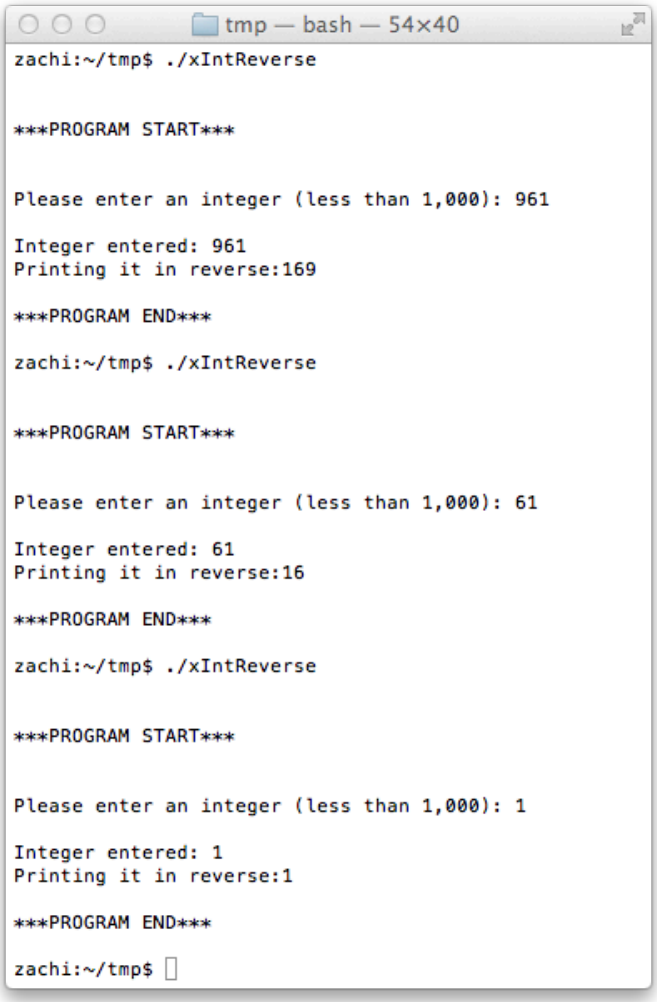
********** End of code + Screen shot**********

5. Challenge question (1/2):

Write a program that takes as an input an integer number between 0 and 999, and prints it in reverse.

See three examples of running the program below (with input 961,61, and 1).

Use ONLY what we learned so far in class.



********** Start of code + Screen shot**********

```c
#include <stdio.h>

int main(void)
{
    int a;
    int b;

    printf("\n\n***PROGRAM START***\n\n\n");


    printf("Please enter an integer (less than 1,000): ");
    scanf("%d",&a);
```

```
    printf("\nInteger entered: %d\n",a);
    printf("Printing it in reverse:");

    // Does the number has only one digit?
    if (a<10)  printf("%d",a);

    // The number has at least two digits
    if (a>=10)
    {
        // extract the least digit and remove it from number
        b = a%10 ;
        printf("%d",b);
        a = (a-b)/10;

        // Does the number NOW has two digits?
        if (a<10) printf("%d",a);

        // The number NOW has at least two digits
        if (a>=10)
        {
            b = a%10 ;
            printf("%d",b);
            a = (a-b)/10;

            // Print the last digit
            printf("%d",a);

        }

    }


    printf("\n\n***PROGRAM END***\n\n");
    return(0);
}
```

********** End of code + Screen shot**********

6. (This one IS extra. Do if you can.) Challenge question (2/2):

Write a program that takes as an input an integer number between 0 and 15, and prints it's representation as a 4-digit binary number.

See three examples of running the program below (with input 13, 2, and 10).

Use ONLY what we learned so far in class.

********** Start of code + Screen shot**********

```c
#include <stdio.h>

int main(void)
{
    int a;
    int b;

    printf("\n\n***PROGRAM START***\n\n\n");


    printf("Please enter an integer (0..15): ");
    scanf("%d",&a);
```

```
    printf("\n Integer %d = Binary ",a);

    // Going from MSB
    // Bit 4
    b = a/8 ;
    if (b)
        printf("1");
    else
        printf("0");

    a -= b*8;

        // Bit 3
        b = a/4 ;
        if (b)
            printf("1");
        else
            printf("0");

        a -= b*4;

    // Bit 2
    b = a/2 ;
    if (b)
        printf("1");
    else
        printf("0");

    a -= b*2;

    // Bit 1
    b = a/1 ;
    if (b)
        printf("1");
    else
        printf("0");



    printf("\n\n***PROGRAM END***\n\n");
    return(0);
}
```

********** End of code + Screen shot**********