Due: Midnight 10 November 1999. Mail to pcolsen@draper.com

1 Goal

The goal of this project is to have you practice writing simple C using repetition and simple I/O.

2 Project Description

There are three parts to this project. When you have completed each part, run it using the typescript program you used in project1 and send the results to pcolsen@draper.com.

2.1 Practice with scanf()

Type in this program, compile it, and run it.

```c
#include <stdio.h>
#include <stdlib.h>
main ( )
{
    int num ;
    printf ("Enter a positive integer : ");
    scanf ("%d", &num);
```
while ( num < 0 )
{
    printf ("\nThat’s incorrect, try again\n");
    printf ("Enter a positive integer : ");
    scanf ("%d", &num);
}
printf ("You entered %d\n", num);

Try this with several different numbers.

2.2 More scanf() Practice

Type in this program, compile it, and run it with the datasets given below.

#include <stdio.h>
#include <stdlib.h>
main ( )
{
    float average;
    int counter, grade, total;
    total = counter = 0;
    /* tell user the sentinel value in the prompt*/
    printf ("Enter grade, -1 to end : ");
    scanf ("%d", &grade); /* priming read */

    while (grade != -1)
    {
        total = total + grade;
        counter = counter + 1;
        printf ("Enter grade, -1 to end : ");
        scanf ("%d", &grade);
    }
    average = ( float ) total / counter;
    printf ("The average was %.2f\n", average);
}

Set 1 90, 78, 87, 55, 26, 98, 89, 88, 88, 77, 76, 96.
Set 2 31, 41, 59, 26, 53, 58, 97, 93, 23, 84, 62, 64, 55, 83, 27.
Set 3 39, 95, 10, 94, 70, 44, 63, 94, 79, 84, 48, 92, 90, 99.

2.3 Factorial

You are to write a program to calculate the factorial of any positive integer. When you run the program, it should print a prompt such as

Enter a non-negative integer:

accept an integer, and print out the resulting factorial like this

The Factorial of <input number goes here> is <factorial goes here>

The program should be robust, meaning that it should not fail the user enters a negative number. (Recall that the factorial of zero is 1.)

3 Input/Output

We’ve talked about printf() in class, so you should be able to handle the output easily.

But the input may be a different problem. We will talk about the input function you need on Wednesday, 3 November, but here is a short refresher in case you miss the class.

I want you to use the scanf() function to get the user’s input. Suppose you want to get the user’s input and store it in a variable named int inpt. You would use the command

scanf("%d", &inpt)

You can see that there are two arguments to scanf(). The first part, "%d", tells scanf() what kind of variable will be used to hold the data, in this case an int. The second part, &inpt, tells scanf() where to put the data after it is read. The ampersand (&) in front of the variable name (inpt) is necessary because scanf() expects to receive the address of the variable to be used and not the variable itself. The ampersand is the “Address of” operator, so in this case &inpt returns the address of inpt and not its value.

Don’t worry if you don’t understand the reasons yet. You will later. For now, just use the line I gave you above, substituting your variable name for inpt.