

CSE 130 Fall 2009

Programming Assignment 1

NOTE: It is very important for this course that you obtain a sparky account for completing assignments. If you don't have one, visit the SINC site in the main library building and speak to a representative to obtain one as soon as possible.

Due Date: At 4pm, Thursday Sept 24, 2009. Use `~cse130/submit` command from your sparky account. Do not forget to change to your working directory first. Include your name and Id number as a comment. Make sure that your program compiles with no errors and runs on sparky. **DO NOT MAIL YOUR PROGRAM** to cse130 account on sparky.

This assignment is designed to give you some practice with reading user input, performing simple integer calculations, type casting and writing a simple loop. There are two parts to this assignment. If you are not able to do both parts, you may submit your program with only one part that is working and get partial credit.

Important: Although this program has two parts, it is going to be just one program. Write the second part after the first one in the same file `prog1.c`

First prompt the user asking for two positive (> 0) integers m and n . Use a `printf` statement for printing your prompt message. State that m must be less than n . But we do not check that in our program. Read these two integers (m and n) using `scanf` function.

```
scanf("%d%d", &m, &n);
```

Here `%d` indicates that decimal integers are expected for m and n . These must be declared as integer variables. `&m` is to be read as 'address of m '. We have studied `scanf` function. While testing your program, respond by typing m and n on the same line with a space in between.

Part 1: For the first part, calculate 4 integers. First calculate m_cubed (m^3) and n_cubed (n^3) as shown. So we have, $m_cube = m*m*m$ and $n_cube = n*n*n$. Next calculate integer quotient (iq) of cubes, $iq = n_cube / m_cube$, and remainder of cubes $r_cube = n_cube \% m_cube$. Print all four integers (m^3 , n^3 , iq and r_cube) using a SINGLE `printf` statement. See the sample output. All commas must be printed. Do not forget to declare all variables.

Next perform a floating point division $ftq = n_cube / m_cube$. For this you need to convert one of the cubes to float. Use `(float)` for type-casting. Print ftq using another `printf` statement.

Part 2: For part 2, write a simple while loop to compute the power n^m (n raised to m). Print your answer using another `printf` statement. **DO NOT USE** built-in functions (provided by C) for this part. Use the algorithm given below (its pseudo-code). Here exponentiation is performed as a repeated multiplication. You need to accumulate the product in an integer variable `product`. See example of `Lab2.c` for writing a simple while loop.

Algorithm for exponentiation

0. We have read m and n already.
1. initialize count and product to proper values.
2. while (count $<$ m) do
 - product = product * n
 - count = count+1end-of-while
3. print product

Make sure that you declare all variables, and initialize them properly. Write plenty of comments in your program. Some points are reserved for that.

Program Structure:

```
// Program-1, date
// Your name id etc.
// See comments for Lab2.c

#include <stdio.h>
int main (void)

{
    // Variable declarations for both parts.

    printf("Type in ..... .. ");
    scanf("%d%d", &m, &n);

    // Part-1: Calculate 4 integer values.

    // Prin these 4 integer values.

    // Do not forget the \n in printf statement.

    // Calculate and print floating point division ftq.

    // Part-2: While loop

    // Print product

    return 0;

}
```

Sample Session (on sparky):

Type in integers m and n, with $m < n$.

5 6

$m_cubed = 125, n_cubed = 216, iq = 1, r_cube = 91$

floating point division $ftq = 1.728$

6 raised to 5 = 7776