CSCD 240

In order to finish this lab with the maximum understanding, complete the following.

1) Type in, compile and execute the following code (name your program cscd240_s13_lab6.c):

```
#include <stdio.h>
int main()
{
    int twod[4][3] = { {2, 4, 6}, {8, 10, 12}, {14, 16, 18}, {20, 22, 24}};
    printf("%p\n", twod);
    return 0;
}
```

   a) Obtain the base address of the array (as reported by the system)
   b) Save the base address in a text file named twod_firstrun.txt
   c) In twod_firstrun.txt, create a memory map that shows the memory locations of each element of the array

2) Create a text file named twod_myguess.txt that clearly outlines what you believe will happen based on the following code. Use the base address from #1 as the base address of the 2D array. In your explanation clearly explain what is happening, don't just give memory addresses or values. You will also notice that in each printf statement there is a %?. In your explanation you will need to explain the type and the value for each printf.

```
printf("%p\n", twod);
printf("twod is: %?\n", twod);
printf("twod + 3 is: %?\n", twod + 3);
printf("*(*(twod + 1)) is: %?\n", *(*(twod + 1)));
printf("*twod + 1 is: %?\n", *twod+1);
printf("*twod[2] is: %?\n", *twod[2]);
printf("*(twod + 2) + 2 is: %?\n", *(twod + 2) + 2);
printf("twod[1] is: %?\n", twod[1]);
printf("twod[1][2] is: %?\n", twod[1][2]);
int *ptr;
ptr = * twod;
printf("ptr %p\n", ptr);
printf("twod [1] %?\n", twod [1]);
printf("ptr[1] %?\n", ptr[1]);
printf("ptr[1] %?\n", ptr[1]);
printf("twod + 1 %?\n", twod+1);
printf("ptr[10] %?\n", ptr[10]);
```

a) Is it possible (will the code compile) to use ptr[1][2]? Why or Why not? Justify your answer. If you don't justify you will receive 0 points for the part. This answer will be placed in twod_myguess.txt.

NOTE: non C answers will be placed in your final output file specified in problem 9.

3) Edit cscd240_s13_lab6.c
   a) Add the code from problem #2 to your C file
   b) Compile and execute – capture the output in a file named twod_results.txt. Compare your answers from twod_myguess.txt to twod_results.txt. Denote in twod_results.txt if your answers were incorrect. Clearly explain any differences.

4) Add a function named function1 to cscd240_s13_lab6.c. This function will take the 2D array from above as a parameter. The array will be passed in using the square brackets. Using the square bracket notation to print out the values in the array. The print out should look similar to how we draw a 2D array (rows and cols). You may also pass in the rows and columns as ints as needed.

5) Add a function named function2 to cscd240_s13_lab6.c. This function will take the 2D array from above as a parameter. The array will be passed in using the square brackets. Using the pointer notation to print out the values in the array. The print out should look like a 2D array. You may also pass in the rows and columns as ints as needed.

6) Add a function named function3 to cscd240_s13_lab6.c. The function will take a the 2D array from above as a parameter, and as a 1D array. void function3(int * array, int rows, int cols); The call will be function3(twod[0], 4, 3). Using the pointer notation to print out the values in the array. The print out should look like a 2D array.

7) After adding the functions to cscd240_s13_lab6.c
   a) Compile and execute and capture the output in a file named twod_function_test.txt. NOTE: You will not have any compiler warnings, if you do you are doing it wrong.

8) Can we pass the array known as twod to a function such as function4(twod, 4, 3) where the prototype is function4(int ** twod, int rows, int cols)? Why or why not? What happens if we try? Justify your answer. NOTE you don't need to write code for this problem. Place your answer in twod_function_test.txt as a comment.

9) As a comment at the end of twod_function_test.txt explain, the similarities and the differences of passing an array with the [] and passing the array as a pointer as it relates to a 1D array and a 2D array. HINT with a 2D array when you pass by [] you have to give the number of columns why? If you pass only by pointer how does that affect the use of the []? Explain you answer.

TO TURN IN:

- All text files
- All C file(s)/files needed to compile your code
- A make file so the grader can compile the target will be lab6

Zip these files named with your last name first letter of your first name lab6.zip. (Example steinerslab6.zip)