**Programming Principles II**

**Lab01**

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A) Answer the following

1. Declare an array of integers B of size 4 x 3 and initialize it to the odd numbers between 1 and 24.
2. Draw the array you initialized in a) as a 2D table
3. What is the size of B in bytes, assuming the size of int is 4 bytes.
4. Assume the memory address of B[2][1] is 2345, what are the memory addresses of B[2][2], B[3][1], B[0][2], and B[3][[2]
5. How many integers separates the cells B[3][1] from B[2][2]
6. How many bytes separates the location B[3][1] from B[2][2]
7. Write c++ statements to obtain the:
   * *o sum of the second row*
   * o the sum of the 3rd column
   * o assign the sum of the first and second column to the third column
   * o subtract the sum of the first raw from the diagonal elements
   * o subtract the third column from the second column and add the result to the first column.

B) Answer the following

1. Declare a 3x4 array of doubles and initialize it to the values of 1-12
2. What is its size in bytes assume size of double is 8 bytes.
3. If the address of the array cell D[0][2] is at 2344, what is the memory address of the array cell D[2][3]
4. How many bytes separates the cell D[2][3] and D[1][2], how many doubles separates them?

C) Write a C++ statements to do the following:

1. Declare an array E of short integers of size n x m, where n and m arbitrary integers greater than zero.
2. Find the sum of all elements
3. Find the maximum number in the matrix
4. Find the minimum number in the matrix
5. Assuming n > 2, find the sum of the second row
6. Assume m> 3, find the sum of the third element
7. Assume the address of the array cell E[0][3] is 1234 and the size of short int is 2 bytes, what is the address of the cell E[0][0]
8. What is the memory address of an arbitrary cell at row i and column j.

**D) Consider the following program and then answer the following questions**

*void func( int A[][2], int r, int c) { // L1  
    // modifying the array A  
    for ( int i=0; i<r; i++) { /// L2  
        int t = A[i][0];  
        A[i][0] = A[i][1];  
        A[i][1] = t;  
    }  
    // modifying r  
    r = 117;  
}  
  
int main () {  
    const int rows = 4; /// L3  
    const int columns = 2; /// L4  
    int r = 4;  
    int c = 2;  
    int A[rows][columns] = {1,2,3,4,5,6,7,8};  
    func(A, r, c);  
}*

1. What will be stored in the array A and the variables r and c after calling the function func. Guess the answer first and then find it by running the code. Was your answer correct? if not explain it .
2. Remove the const reserved word in the line labeled L3. Guess the answer? Try it? was your guess correct or wrong and why?
3. Change the declaration of the function func in the line labeled L1 to:

*void func( int A[4][], int r, int c) { ///L1*

Will you get an error? is it a compilation or run time error? Guess the answer first and then try it?

1. Change r to r+1 in line labeled L2

          for ( int i=0; i<r; i++) { /// L2

What kind of error would you get? compilation error or run time error? guess the answer and then try it out.