[CSIE] Data Structures: Homework 2022

Scope: CH 2

Note that this homework does not need to be handed in, and no score is calculated. Some of these questions may appear in the mid-term exam.

1. Rewrite the matrix transpose function of **Program 1.22** using dynamically allocated arrays. The header for your function should be

   void transpose(int **a, int rows)

   ```
   void transpose(int a[ ][MAX_SIZE])
   {
     int i, j, temp;
     for( i = 0; i < MAX_SIZE-1; i++)
       for( j = i+1; j < MAX_SIZE; j++)
         SWAP( a[ i ][ j ], a[ j ][ i ], temp);
   }
   ```

   Program 1.22: Matrix transposition function

2. Given a 2-D array, in which address of $A(3,2)$ and $A(2,3)$ is 1110 and 1115, respectively. The size of every element stored in this array is 1. What's the address of $A(5,4)$ in this array?

3. Given a 2-D array, in which address of $A(3,3)$, $A(6,4)$ is 121 and 151. The size of every element stored in this array is 1. What's the address of $A(0,6)$ in this array?

4. Write a function that accepts as input a *string* and determines the frequency of occurrence of each of the distinct characters in *string*.

5. Compute the failure function for each of the following patterns:
   (a) $a\ a\ a\ a\ b$
   (b) $a\ b\ a\ b\ a\ a$
   (c) $a\ b\ a\ a\ b\ a\ a\ b$

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