**In The Name Of God**

**The most compassionate and merciful**

**#1 : any fraud or cheating will negatively affect your score.**

**#2 : please use ANSI C standard in coding .**

**#3 : syntax error is equal to zero .**

**#3 : you should only zip and upload your “.c” files .**

**#4 : name your zip as “ stdNo\_hw2.zip”**

**#5 : name your .c files as follows : “stdNo\_HW2\_Q?.c”**

**( ? stands for the question number which is between 1-7 )**

**1-Vectors (Dynamic Arrays):**Vectors are arrays that change their size according to the count of elements that is in them. Write the following set of functions whom get the pointer to head of the  
vector (and more arguments if necessary) and return the pointer to head of the same vector.(because it might change) assume that your array only holds integer numbers. Size is given as a pointer because you must change that variable too.  
int \* insert(int \*head, int \*size,int item);  
int \* delete(int \*head, int \*size, int item);  
Example:  
int size = 0;  
int \* arr = NULL;  
arr = insert(arr, &size, 4); // arr -> {4} size -> 1 arr = insert(arr, &size, 1); // arr -> {4, 1} size -> 2  
arr = delete(arr, &size, 4); // arr -> {1} size -> 1 arr = delete(arr, &size, 56); // arr -> {1} size -> 1  
free(arr);

**2- Matrices:**write the following set of functions that given two two dimensional integer arrays and  
their size, computes the required values and put the result in given two dimensional array. You can assume that the destination array is big enough.

(Bonus : U can also use vectors that u learned above.)

void mat\_add(int \* mat1[], int mat1\_rows, int mat1\_cols, int \* mat2[], int mat2\_rows, int  
mat2\_cols, int \* mat\_res[]);  
void mat\_mult( just as above );  
void mat\_transpose(int \* mat[], int mat\_rows, int mat\_cols, int \* mat\_res[]);

**3-prints the last n lines of input:**

Write a program in c that get input from user(with getchar and EOF)

You should write this functions with using pointer:

char \* get\_input()

void write\_last\_nl(char\* arr,int n)

If the array that getting from user doesn’t have n lines print all the text

**4-** برنامه ای بنویسید که تا زمانی که EOF دریافت کند به ازای هر خط یک string دریافت کند و همه ی آن ها را در یک char \*\* ذخیره کند. و برای آن تابع های زیر را بنویسید. (به صورت داینامیک مموری allocate کنید)

1. Swap: ایندکس دو استرینگ را دریافت کند و آن ها را با هم جابجا کند.

2. Replace: ایندکس یک استرینگ را دریافت کند، درون تابع استرینگ دیگری از کاربر بگیرد و جایگزین استرینگ قبلی کند.

3. Delete: ایندکس یک استرینگ را دریافت کند، آن را حذف کند و بقیه را شیفت دهد.

4. Add: درون تابع یک استرینگ از کاربر بگیرد و آن را در ذخیره کند.

5. Sort: استرینگ ها را sort کند.

6. Print\_all: تمام استرینگ های ذخیره شده را به ترتیب چاپ کند.

**·**  علاوه بر آرگومان های گفته شده، توابع میتوانند آرگومان های دیگری هم دریافت کنند.

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| Example:   Knowledge talks, wisdom listens. Those who criticize our generation forget who raised it. Not to care for philosophy is to be a true philosopher. If your words aren't grounded in the truth, they will backfire.  >>> sort () >>> add () Make sure the facts are straight before you start drawing conclusions. >>> remove (0) >>> print\_all () Knowledge talks, wisdom listens. Not to care for philosophy is to be a true philosopher. Those who criticize our generation forget who raised it. Make sure the facts are straight before you start drawing conclusions.  >>> swap (0, 1) >>> delete (0) >>> print\_all () Knowledge talks, wisdom listens. Those who criticize our generation forget who raised it. Make sure the facts are straight before you start drawing conclusions. |

**5-** You are given a string containing characters *A* and *B* only. Your task is to change it into a string such that there are no matching adjacent characters. To do this, you are allowed to delete zero or more characters in the string.

Your task is to find the minimum number of required deletions.

For example, given the string *s*=*AABAAB*, remove an *A* at positions 0 and 3 to make *s*=*ABAB* in 2 deletions.

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| More Examples :   input : AAAA output : 3   input : BBBBB output : 4  input : AAABBB output : 4 |

6- یک ماژول بنویسید که در آن یک لیست با سایز متغیر ( پوینتر به آرایه ) داریم با مقدار اولیه 3 . در این ماژول چند تابع را پیاده سازی کنید :( توجه کنید که این توابع + لیست مورد نظر باید در یک ماژول جداگانه غیر از Main نوشته شوند . طبیعیست که ساختن هدرفایل ( header file ( .hمتناسب نیز به عهده خود شما میباشد.

1. Add( char key[] , int value ) ;
2. My\_realloc ( new pointer , new size ) ;
3. Delete ( int value )
4. delete\_All ( int value )
5. delete( char key[])
6. Print\_list ()
7. // Attentions : All prototypes are up to you . you can change them due to your needs.but it must satisfy the standards.

توجه کنید که اگر کاربر تابع add را بیشتر از سایز لیست صدا بزند ، برنامه باید بتواند تشخیص دهد که لیست پر شده و باید ظرفیت اضافه کند

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| Ex : // Assume we have a list called A\_List . // The initial size of A\_List is 3 Add( " Apple " , 15000 ) ; // Full : 1/3 Add( " Orange " , 13500 ); // :Full 2/3 Add("$" , 14800 ) ; // Full 3/3 => Notice that the list is full because the user has called the add function for 3 times. Now the program should add another 3 spaces to the list . the list should have 6 spaces totally by now . Add ( " plum" , 30000 ); // 4/6 Add ( " X " , 13500 ) ;// 5/6 print(A\_list) ; >> Apple : 15000 >> Orange : 13500 >> $ : 14800 >> plum : 30000 >>X : 13500  Delete ( "plum" ) ; print(A\_list) ; >> Apple : 15000 >> Orange : 13500 >> $ : 14800 >> X : 13500  Delete\_All ( 13500 ) ; print(A\_list) ; >> Apple : 15000 >> $ : 14800 |

**7-** Given two strings S1 and S2 ( size of S1 <= Size of S2 ). The task is to find the minimum number of characters to be replaced in the string S2, such that the string S1 is a substring of S2.(you should implement string with pointer).

input:  
s1=cdef , s2=abbdef

Output : 1

input:  
s1=gfg , s2=fgg

Output : 1

**Good luck to U :)**