Homework 3
ENGR 213

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1 Part A

1. What's wrong with this scrap of code?

```c
#include <stdio.h>
int main() {
int a[5];
    for(int i = 1; i <= 5; i++)
        a[i] = 0;
}

```

The code above is wrong for a few small reasons, however i think the biggest reason is that the array **a** is being indexed improperly instead of starting at 0, the code begins to index at 1.
It should look like:

```c
#include <stdio.h>
int main() {
    int a[5];
    for(int i = 0; i < 5; i++) {
        a[i] = 0;
    }
}

```

2. What is the maximum number of dimensions an array in C may have?

C arrays can have any number of dimensions.

2 Part B

1 Write a program in C to delete an element at the desired position from

```c
/*////////////////////////////////////////////
//   Title:          HW3_Q1.c
//   Author:         Ryan L.
//   Question:       Write a program in C to delete an element at the desired
   position from
*////////////////////////////////////////////
#include <stdio.h>

int main(){

    //(test case: [1,2,3,4,5] (1 2 4 5))
    //formats the beginning of the program
    printf("Delete an element at the desired position from an array: \n");
    printf("-----------------------------------------------------------\n");

    // Declare  and initialize variables
    int n, pos;

    printf("Input the size of array: ");
    scanf("%d", &n); //input the size of the array
    int arr[n];

    printf("Input %d elements in the array in ascending order: \n", n);
    for (int i = 0; i < n; i++){
        printf("element - %d: ", i);
        scanf("%d", &arr[i]); //input the elements of the array for the size of n
    }

    printf("Input the position where to delete: ");
    scanf("%d", &pos); //input the position to delete

    for (int i = pos-1; i < n; i++){
        arr[i] = arr[i+1]; //shifts the elements to delete the desired position
    }
    //n--;

    printf("The new list is : ");
    for (int i = 0; i < n; i++){
        printf(" %d ", arr[i]); //prints the new list
    }
    return 0;
}

```

2 Write a program in C to print or display the lower triangular of a given

```c
/*////////////////////////////////////////////
//   Title:          HW3_Q2.c
//   Author:         Ryan L.
//   Question:       Write a program in C to print or display the lower triangular
    of a given matrix.
*////////////////////////////////////////////
#include <stdio.h>

int main(){
    // Declare and Initialize variables
    int n, i;
    printf("Input the size of the square matrix: ");
    scanf("%d", &n); // input the size of the square matrix
    int arr[n][n];

    printf("Input elements in the first matrix: \n");
    for (i = 0; i < n; i++){
        for (int j = 0; j < n; j++){
            printf("element - [%d],[%d]: ", i, j);
            scanf("%d", &arr[i][j]); //input the elements of the matrix one by
   one
        }
    }

    // Work
    printf("The matrix is: \n");
    for (i = 0; i < n; i++){
        for (int j = 0; j < n; j++){
            printf("%d ", arr[i][j]); //prints the matrix in the matrix format
        }
        printf("\n");
    }

    printf("Setting zero in the lower triangular matrix \n");
    for (i = 0; i < n; i++){
        for (int j = 0; j < n; j++){
            if (i > j){
                arr[i][j] = 0; //sets the lower triangular matrix to zero

            }
            printf("%d ", arr[i][j]); //then prints the matrix
        }
        printf("\n");
    }
    return 0;
}

```

3 Write a program to read a string from the keyboard:

(a) Find the frequency of a specific character.

(b) The expected output:

Input the string: This is a test string
Input the character to find frequency: i
The frequency of 'i' is: 3

```c
/*////////////////////////////////////////////
//   Title:          HW3_Q3.c
//   Author:         Ryan L.
//   Question:       Write a program to read a string from the keyboard and prints the frequency of a specific character.
*////////////////////////////////////////////
#include <stdio.h>

int main(){
    // Declare variables (test case: This is a test string. (i))
    char str[100];
    char ch;
    int count = 0;

    // Initialize variables
    printf("Input the string: ");
    fgets(str, sizeof(str), stdin);

    printf("Input the character to find frequency: ");
    scanf("%c", &ch);

    //Work
    for(int i = 0; str[i] != '\0'; i++){
        if (str[i] == ch){
            count++; //increments the count each time the character is found in the string
        }
    }

    //Output
    printf("The frequency of the character %c is: %d\n", ch, count);
    return 0;
}

```