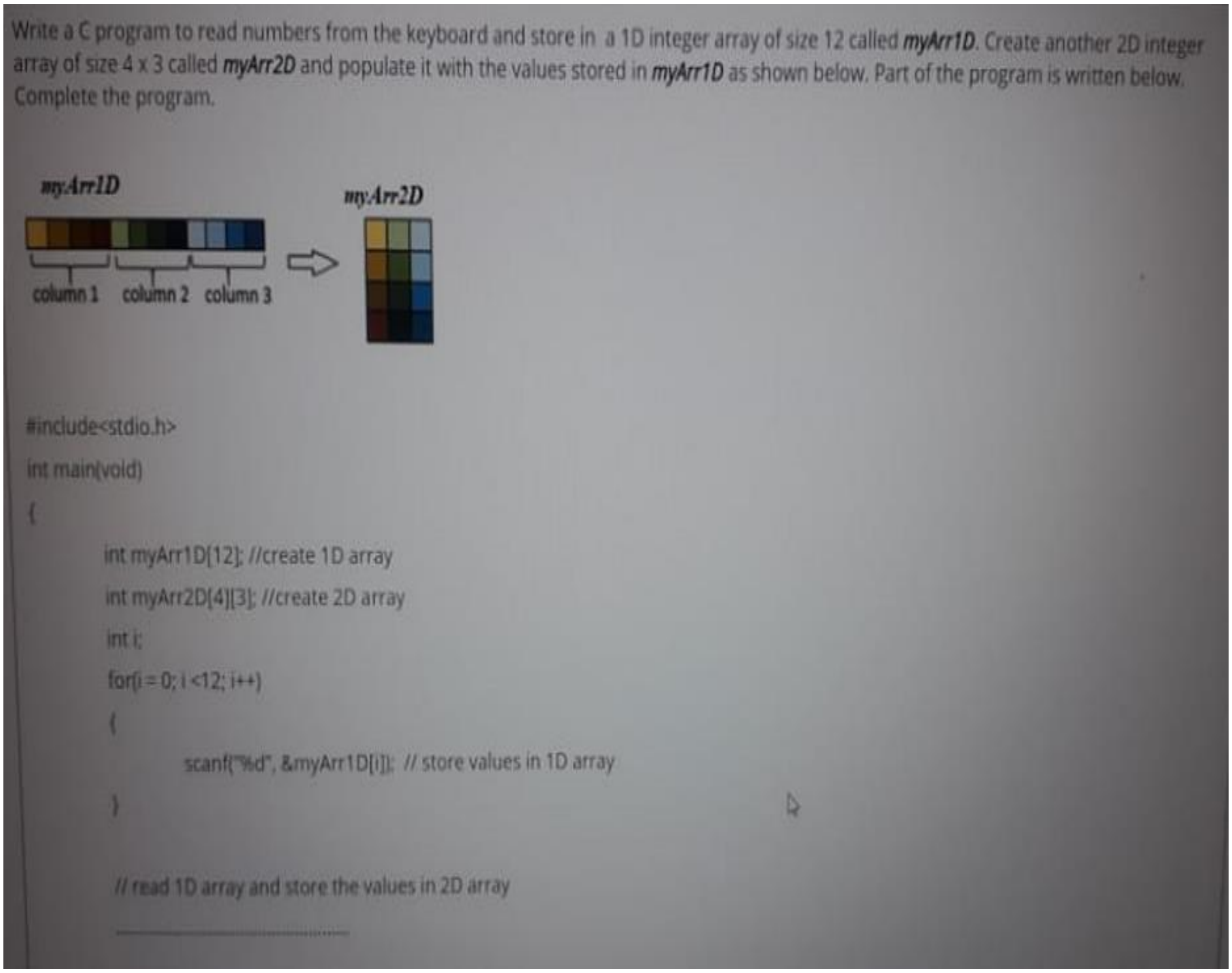
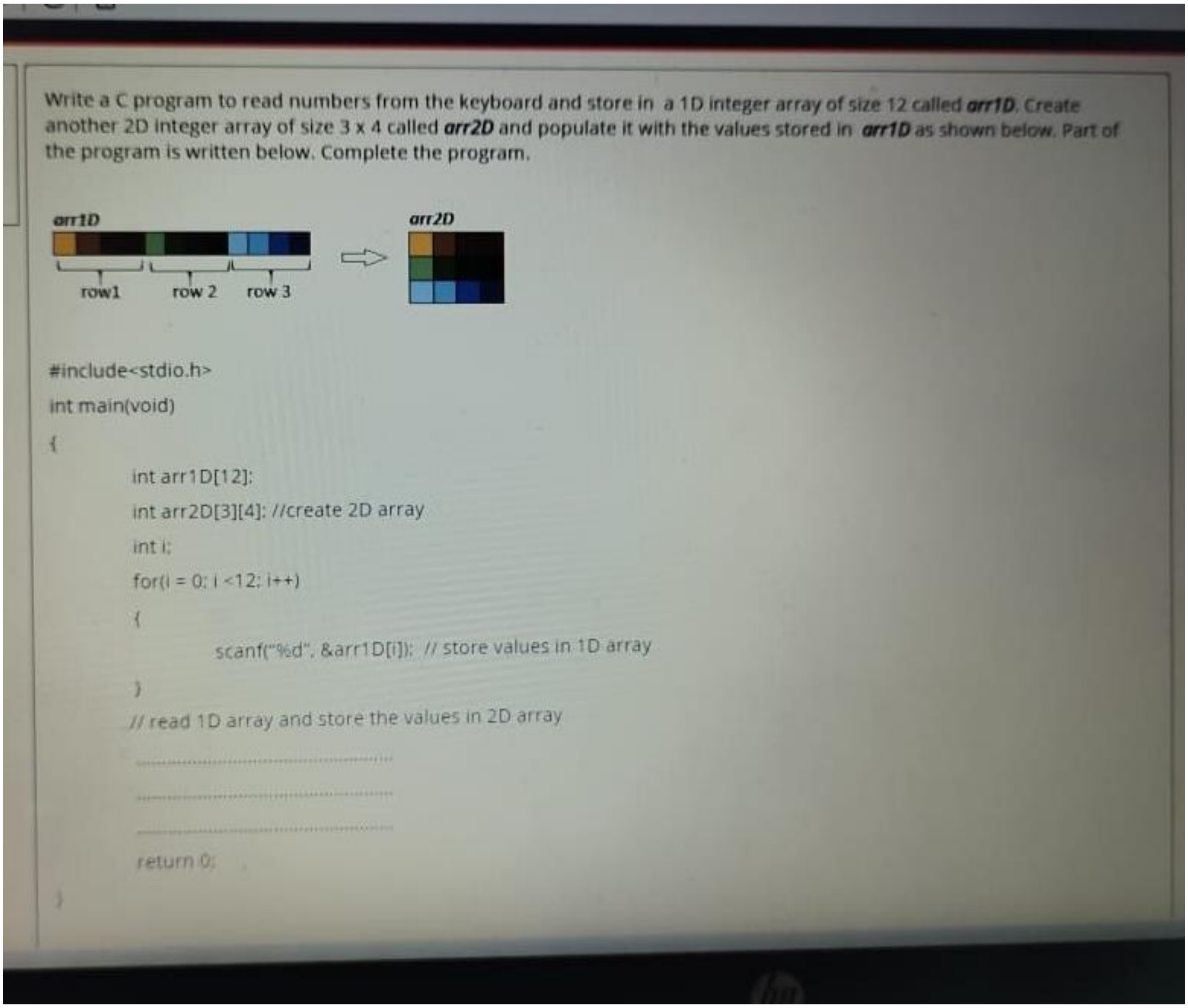


Write a C program to read numbers from the keyboard and store in a 1D integer array of size 12 called ***myArr1D***. Create another 2D integer array of size 4 x 3 called ***myArr2D*** and populate it with the values stored in ***myArr1D*** as shown below. Part of the program is written below. Complete the program.

```
#include<stdio.h>
int main(void)
{
        int myArr1D[12]; //create 1D array
        int myArr2D[4][3]; //create 2D array
        int i;
        for(i = 0; i <12; i++)
        {
                scanf("%d", &myArr1D[i]); // store values in 1D array
        }

        // read 1D array and store the values in 2D array
        ..................................
```

```
#include<stdio.h>
int main(void)
{
	int myArr1D[12];
	int myArr2D[4][3];
	int i,j,a=0;

	for(i=0;i<12;++i){
		scanf("%d",&myArr1D[i]);
	}
	for(j=0;j<3;++j){
		for(i=0;i<4;++i){
			myArr2D[i][j]=myArr1D[a];
			a++;
		}

	}
	printf("\n1D Array\n");
	for(i=0;i<12;i++){
```

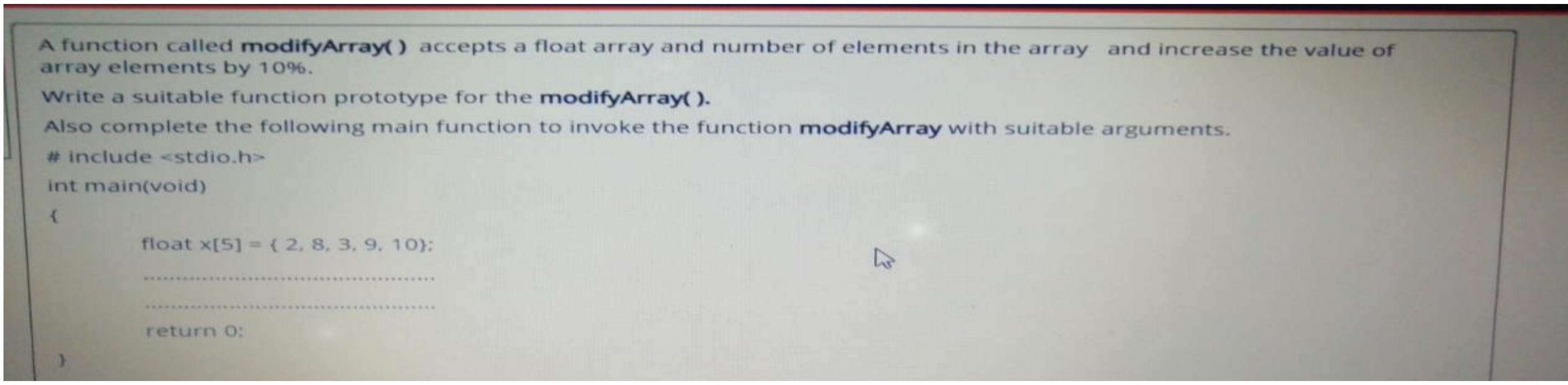
```
            printf("%d",myArr1D[i]);
        }
        printf("\n\n2D Array\n");
        for(i=0;i<4;i++){
            for(j=0;j<3;j++){
                printf("%d",myArr2D[i][j]);
            }
          printf("\n");
        }
        return 0;
}
```



Write a C program to read numbers from the keyboard and store in a 1D integer array of size 12 called ***arr1D***. Create another 2D integer array of size 3 x 4 called ***arr2D*** and populate it with the values stored in ***arr1D*** as shown below. Part of the program is written below. Complete the program.

```
#include<stdio.h>
int main(void)
{
        int arr1D[12];
        int arr2D[3][4]; //create 2D array
        int i;
        for(i = 0; i <12; i++)
        {
                scanf("%d", &arr1D[i]);  // store values in 1D array
        }
        // read 1D array and store the values in 2D array
        ..............................................
        ..............................................
        ..............................................
        return 0;
}
```

```
#include<stdio.h>
int main(void)
{
      int myArr1D[12];
      int myArr2D[3][4];
      int i,j,a=0;

      for(i=0;i<12;++i){
            scanf("%d",&myArr1D[i]);
      }
      for(i=0;i<3;++i){
            for(j=0;j<4;++j){
                  myArr2D[i][j]=myArr1D[a];
                  a++;
            }

      }
      printf("\n1D Array\n");
      for(i=0;i<12;i++){
            printf("%d",myArr1D[i]);
      }
      printf("\n\n2D Array\n");
      for(i=0;i<3;i++){
            for(j=0;j<4;j++){
                  printf("%d",myArr2D[i][j]);
            }
          printf("\n");
      }
      return 0;
}
```



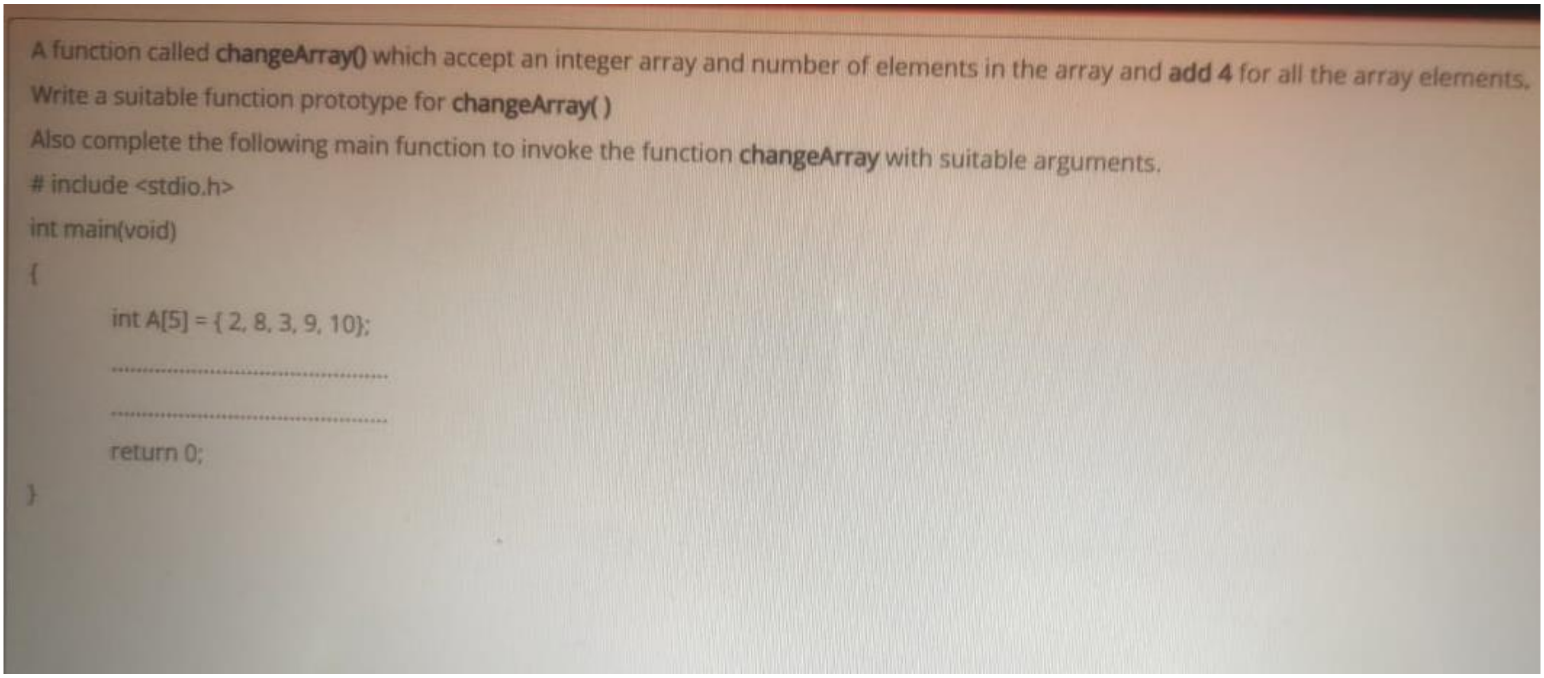
A function called **modifyArray( )** accepts a float array and number of elements in the array and increase the value of array elements by 10%.

Write a suitable function prototype for the **modifyArray( ).**

Also complete the following main function to invoke the function **modifyArray** with suitable arguments.

```
# include <stdio.h>
int main(void)
{
        float x[5] = { 2, 8, 3, 9, 10};
        ........................................
        ........................................
        return 0;
 }
```

```
#include<stdio.h>
void modifyArray(float arr[],int size);
int main(void)
{
      float x[5] = {2,8,3,9,10};

      modifyArray(x,5);

      return 0;
}
void modifyArray(float arr[],int size)
{
      int i;
      for(i=0;i<size;i++){
            arr[i] *= 110/100.0;
            printf("%.2f", arr[i]);
      }
}
```



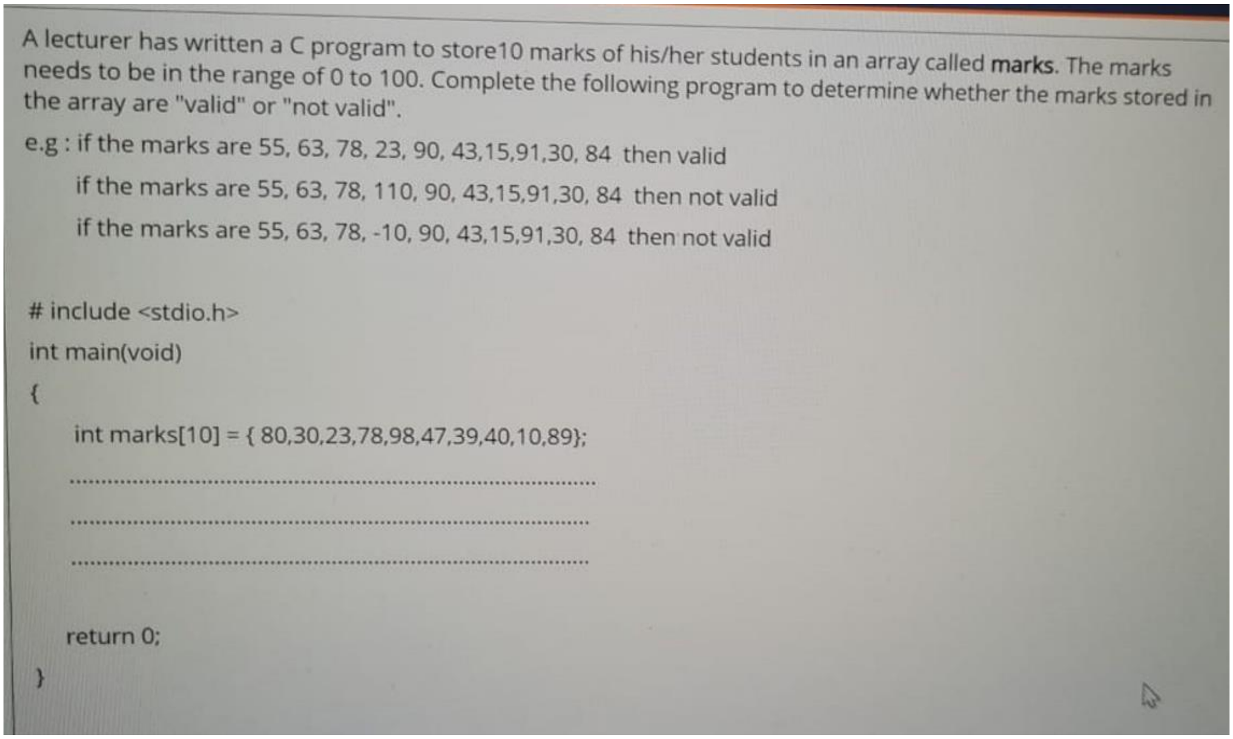
A function called **changeArray()** which accept an integer array and number of elements in the array and **add 4** for all the array elements.

Write a suitable function prototype for **changeArray( )**

Also complete the following main function to invoke the function **changeArray** with suitable arguments.

```
# include <stdio.h>
int main(void)
{
        int A[5] = { 2, 8, 3, 9, 10};
        ..............................
        ..............................
        return 0;
}
```

```
#include<stdio.h>
int changeArray(int A[],int size);
int main(void)
{
      int A[5]={2,8,3,9,10};
      int i;
      A[5]=changeArray(A,5);
      return 0;
}
int changeArray(int A[],int size)
{
      int i;
      for(i=0;i<size;i++){
            A[i]=A[i]+4;
            printf("%d",A[i]);
      }
}
```



A lecturer has written a C program to store10 marks of his/her students in an array called **marks**. The marks needs to be in the range of 0 to 100. Complete the following program to determine whether the marks stored in the array are "valid" or "not valid".

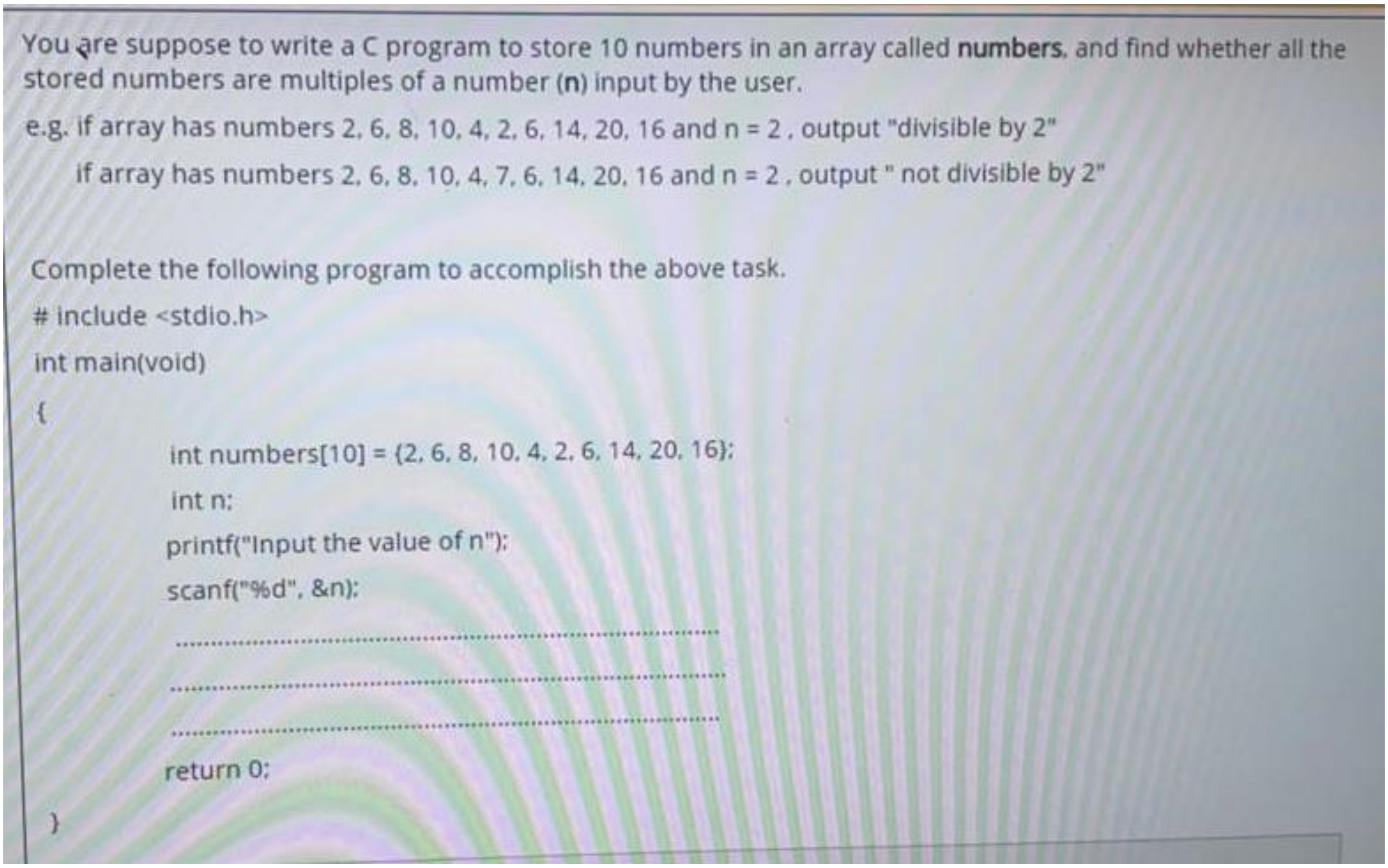
e.g : if the marks are 55, 63, 78, 23, 90, 43,15,91,30, 84 then valid

if the marks are 55, 63, 78, 110, 90, 43,15,91,30, 84 then not valid

if the marks are 55, 63, 78, -10, 90, 43,15,91,30, 84 then not valid

```
# include <stdio.h>
int main(void)
{
    int marks[10] = { 80,30,23,78,98,47,39,40,10,89};
    ..........................................................................
    ..........................................................................
    ..........................................................................

    return 0;
}
```

```
#include<stdio.h>

int main(void)
{
	int marks[10]={80,30,23,78,98,47,39,40,80,89};
	int i,flag;

	printf("if the marks are ");
	for(i=0; i<10; i++){
	if(marks[i]>=0 && marks[i]<=100){
		flag=1;
	}
	if(marks[i]<0 || marks[i]>100){
		flag=0;
		break;
	}
	}
	for(i=0; i<10; i++){
		printf("%d," ,marks[i]);
	}
	if(flag==0){
		printf(" then not valid");
	}
	else if (flag==1){
		printf(" then valid");
	}
}
```



You are suppose to write a C program to store 10 numbers in an array called **numbers**, and find whether all the stored numbers are multiples of a number (**n**) input by the user.

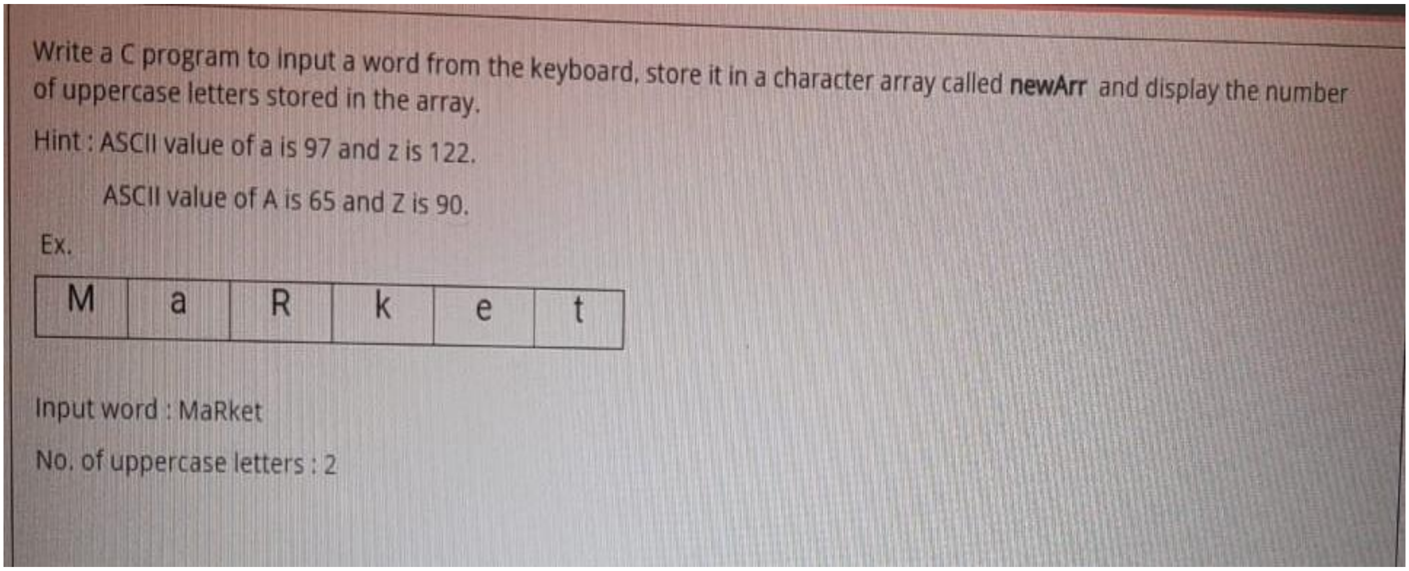
e.g. if array has numbers 2, 6, 8, 10, 4, 2, 6, 14, 20, 16 and n = 2 , output "divisible by 2"

if array has numbers 2, 6, 8, 10, 4, 7, 6, 14, 20, 16 and n = 2 , output " not divisible by 2"

Complete the following program to accomplish the above task.

```
# include <stdio.h>
int main(void)
{
          int numbers[10] = {2, 6, 8, 10, 4, 2, 6, 14, 20, 16};
          int n;
          printf("Input the value of n");
          scanf("%d", &n);
          ..........................................................
          ..........................................................
          ..........................................................
          return 0;
 }
```

```
#include<stdio.h>
int main()
{
      int numbers[10]={2,6,8,10,4,2,6,14,20,16};
      int n, i, check = 0;

      printf("Input the value of n: ");
      scanf("%d",&n);

      for(i=0;i<10;i++){
            if(numbers[i]==1){
                  check++;
            }

      }
      if(check==0){
            printf("Divisible by %d",n);
      }
      else {
            printf("Not divisible by %d",n);
      }


      return 0;
}
```



Write a C program to input a word from the keyboard, store it in a character array called **newArr** and display the number of uppercase letters stored in the array.

Hint : ASCII value of a is 97 and z is 122.

ASCII value of A is 65 and Z is 90.

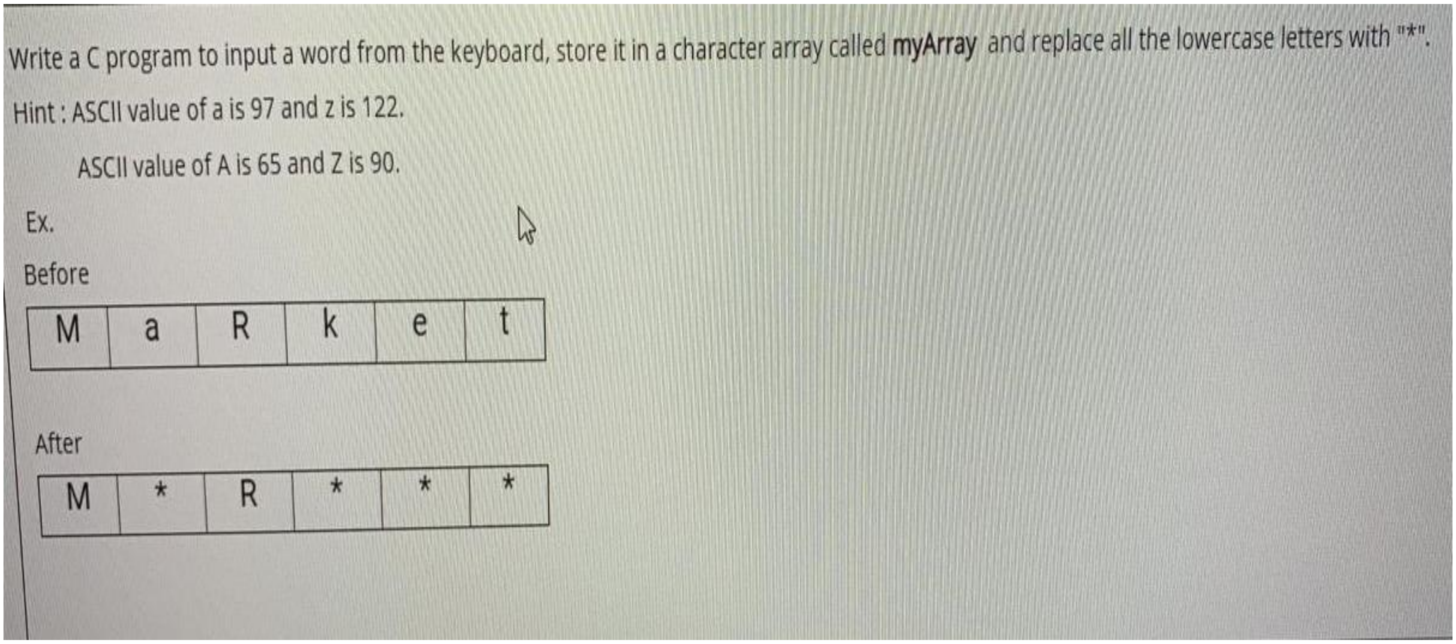
Ex.

M	a	R	k	e	t

Input word : MaRket

No. of uppercase letters : 2

```
#include<stdio.h>

#include<string.h>

int main(){

      char newArray[100];
      int i, count=0;

      printf("Enter the word :");
      scanf("%s", &newArray);

      for(i=0; i<strlen(newArray); i++){

            if(newArray[i]>=65 && newArray[i]<=90){
                  count++;
            }

      }

      printf("\n");
      printf("No. of uppercase letters : %d", count);

      return 0;
}
```



Write a C program to input a word from the keyboard, store it in a character array called **myArray** and replace all the lowercase letters with "*".

Hint : ASCII value of a is 97 and z is 122.

ASCII value of A is 65 and Z is 90.

Ex.

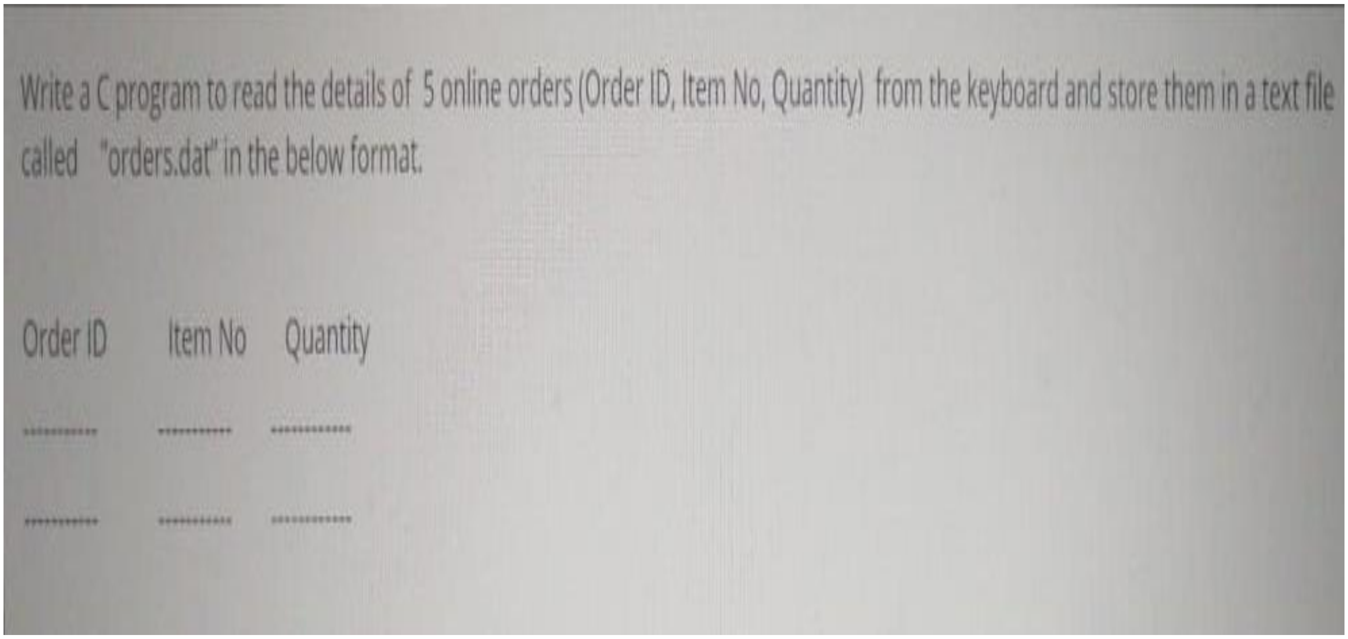
Before

M	a	R	k	e	t

After

M	*	R	*	*	*

```
#include<stdio.h>
#include<string.h>

int main(){

      char newArray[100];
      int i, count=0;

      printf("Enter the word : ");
      scanf("%s", &newArray);

      for(i=0; i<strlen(newArray); i++){

            if(newArray[i]>=97 && newArray[i]<=122){
                  newArray[i]= '*';
            }

      }

      printf("\n");
      printf("After : ");
      for(i=0; i<strlen(newArray); i++){

            printf("%c", newArray[i]);

      }


      return 0;
}
```



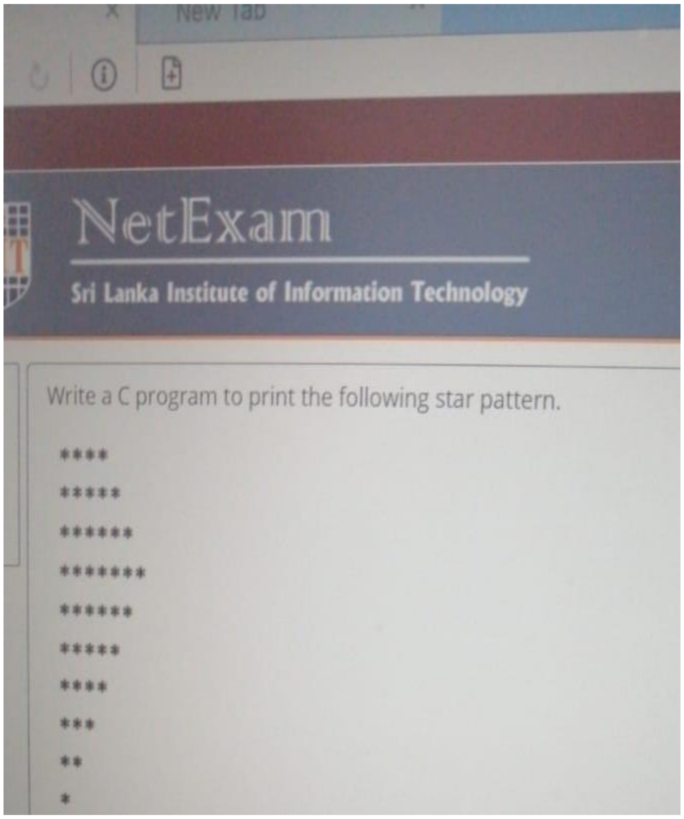
Write a C program to read the details of 5 online orders (Order ID, Item No, Quantity) from the keyboard and store them in a text file called "orders.dat" in the below format.

Order ID Item No Quantity

....

....

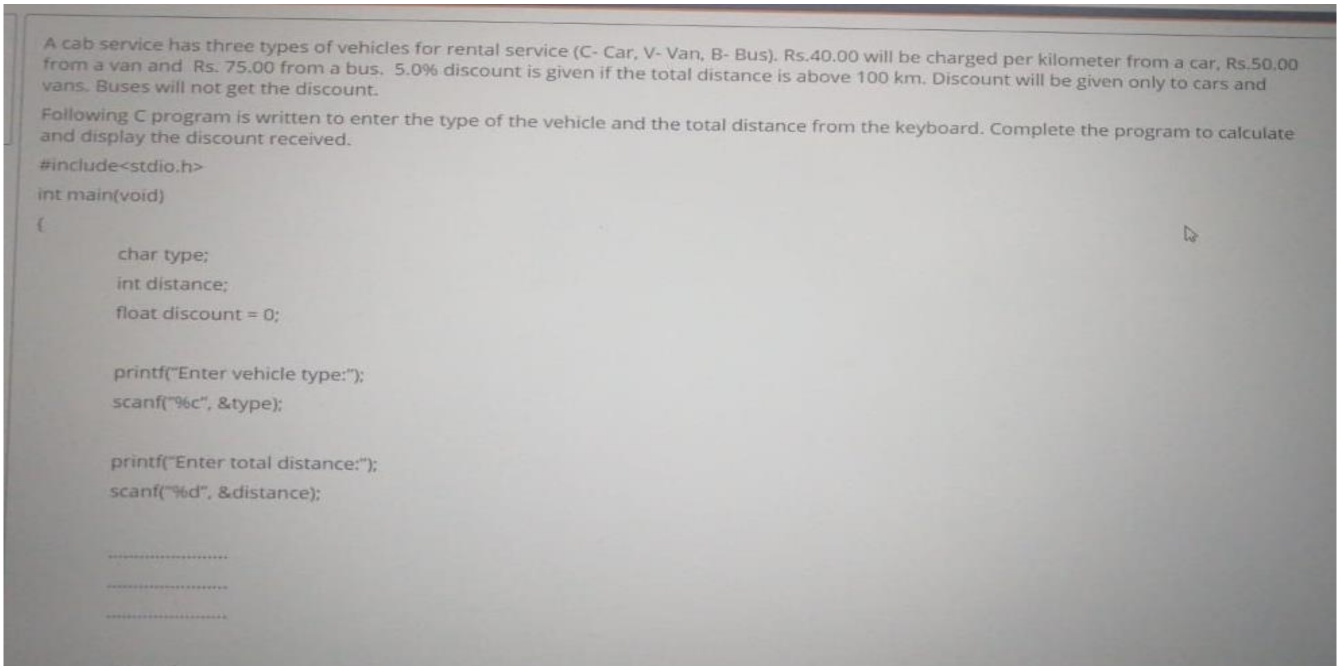
```
#include<stdio.h>
int main(void)
{
   FILE * ord;
   ord=fopen("orders.dat","W");
   int id , itmNo,qty;
   int i;

   for(i=0;i<5;i++)
   {
     printf("Order ID : ");
     scanf("%d",&id);
     printf("Enter item No : ");
     scanf("%d",&itmNo);
     printf("Enter Quantity : ");
     scanf("%d",&qty);

     fprintf(ord,"%d \t %d \t %d \n",id,itmNo,qty);
   }
   return 0;

}
```



Write a C program to print the following star pattern.

```
****
*****
******
*******
******
*****
****
***
**
*
```

```
#include<stdio.h>

int main(void)
{
      int i,j;

      for(i=4;i<=7;i++){
            for(j=1;j<=i;j++){
                printf("*");

            }
            printf("\n");
      }
      for(i=6;i>=1;i--){
            for(j=1;j<=i;j++){
                printf("*");

            }
            printf("\n");
      }


      return 0;
}
```

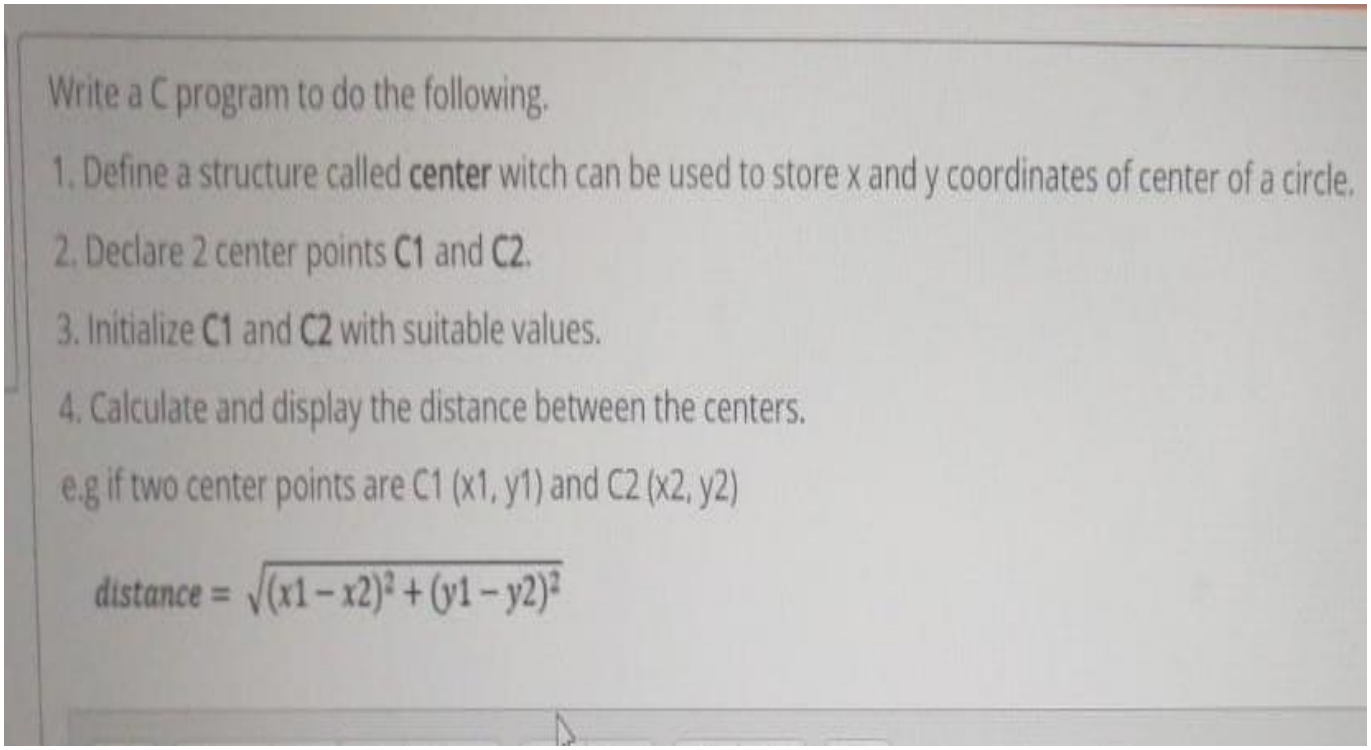


A cab service has three types of vehicles for rental service (C- Car, V- Van, B- Bus). Rs.40.00 will be charged per kilometer from a car, Rs.50.00 from a van and Rs. 75.00 from a bus. 5.0% discount is given if the total distance is above 100 km. Discount will be given only to cars and vans. Buses will not get the discount.

Following C program is written to enter the type of the vehicle and the total distance from the keyboard. Complete the program to calculate and display the discount received.

```
#include<stdio.h>
int main(void)
{
          char type;
          int distance;
          float discount = 0;

          printf("Enter vehicle type:");
          scanf("%c", &type);

          printf("Enter total distance:");
          scanf("%d", &distance);

          ......................
          ......................
          ......................
```

```
#include<stdio.h>
int main(void)
{
      char type;
      int distance;
      float discount=0;

      printf("Enter vehicle type : ");
      scanf("%c",&type);
      printf("Enter distance : ");
      scanf("%d",&distance);

      if((type=='C')&&(distance>=100)){
            discount=(40*distance)*5/100.0;
      }
      else if((type=='V')&&(distance>=100)){
            discount=(50*distance)*5/100.0;
      }
      else if(type=='B'){
            discount=0;
      }
      printf("\nDiscount is %.2f",discount);



      return 0;
}
```



Write a C program to do the following.

1. Define a structure called **center** witch can be used to store x and y coordinates of center of a circle.

2. Declare 2 center points **C1** and **C2**.

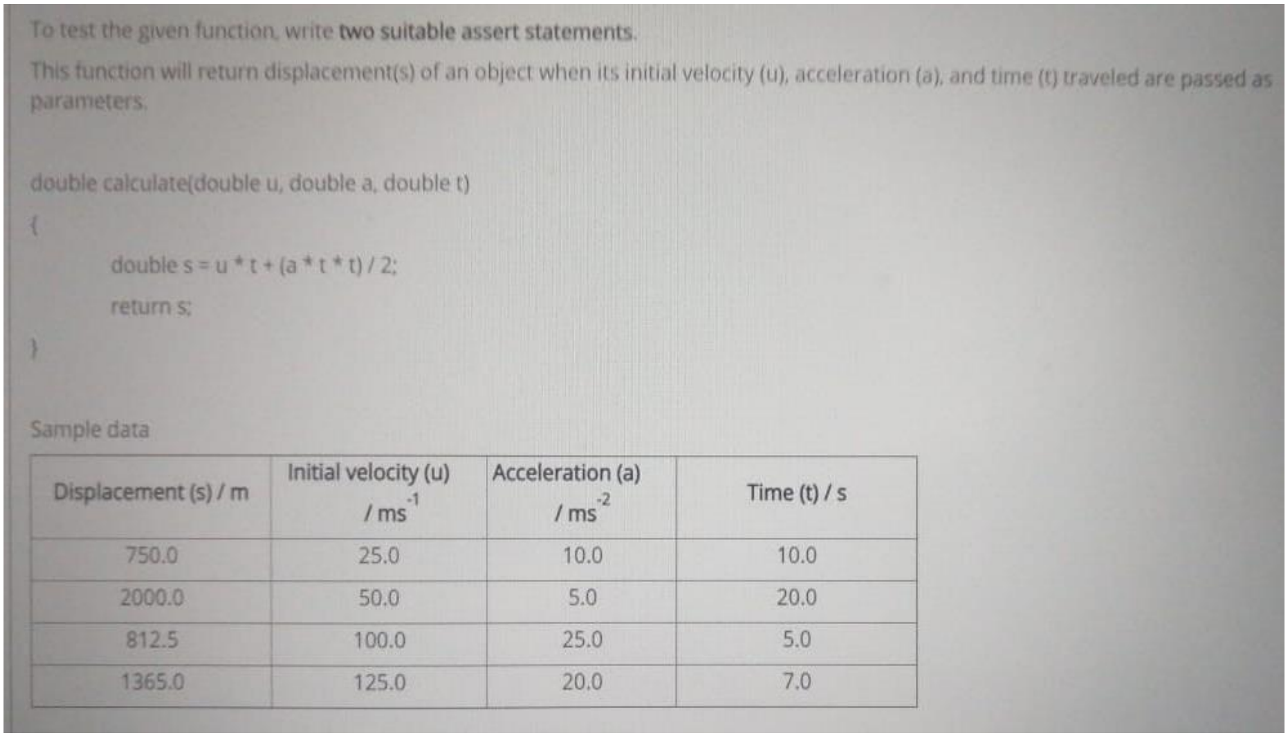
3. Initialize **C1** and **C2** with suitable values.

4. Calculate and display the distance between the centers.

e.g if two center points are C1 (x1, y1) and C2 (x2, y2)

$$\textit{distance} = \sqrt{(x1 - x2)^2 + (y1 - y2)^2}$$

```
#include<stdio.h>
#include<math.h>
struct point
{
float x;
float y;
}A,B;
int main (void)
{
      float distance;

      A.x = 2;
      A.y = 3;

      B.x = 3;
      B.y = 2;

      distance = sqrt(pow((A.x - B.x) , 2) + pow((A.y + B.y) , 2));

      printf("Distance is %.2f\n" , distance);

      return 0;
}
```



To test the given function, write **two suitable assert statements.**

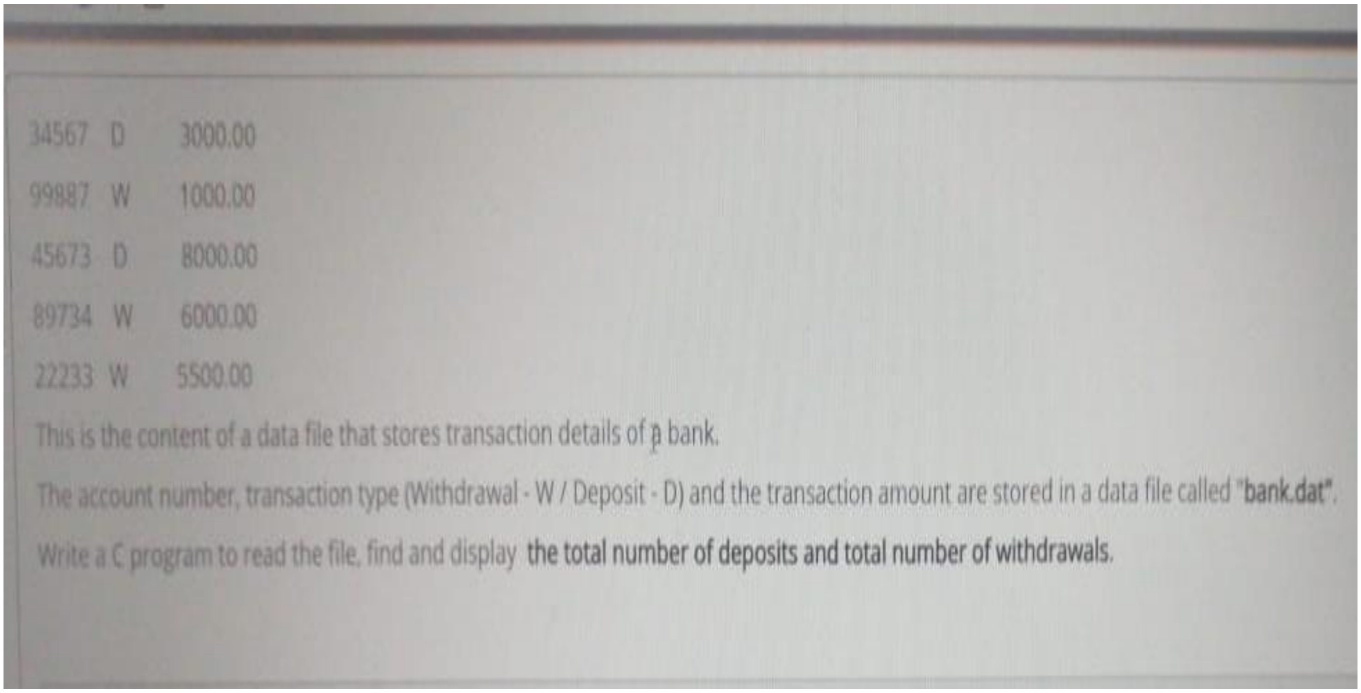
This function will return displacement(s) of an object when its initial velocity (u), acceleration (a), and time (t) traveled are passed as parameters.

```
double calculate(double u, double a, double t)
{
        double s = u * t + (a * t * t) / 2;
        return s;
}
```

Sample data

Displacement (s) / m	Initial velocity (u) / ms^{-1}	Acceleration (a) / ms^{-2}	Time (t) / s
750.0	25.0	10.0	10.0
2000.0	50.0	5.0	20.0
812.5	100.0	25.0	5.0
1365.0	125.0	20.0	7.0

```
assert(calculate(25.0, 10.0, 10.0)==750.0);
assert(calculate(50.0, 5.0, 20.0)==2000.0);
```



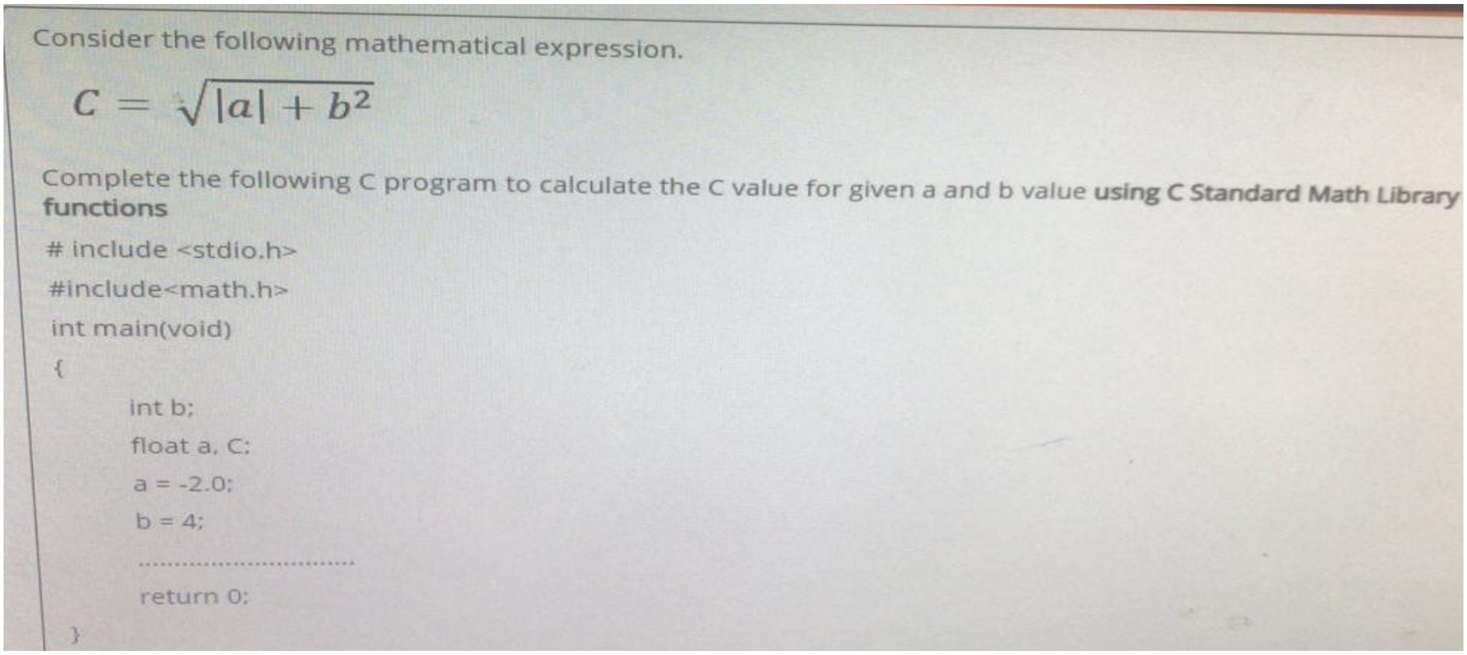
```
34567  D    3000.00
99887  W    1000.00
45673  D    8000.00
89734  W    6000.00
22233  W    5500.00
```

This is the content of a data file that stores transaction details of a bank.

The account number, transaction type (Withdrawal - W / Deposit - D) and the transaction amount are stored in a data file called "**bank.dat**".

Write a C program to read the file, find and display **the total number of deposits and total number of withdrawals.**

```
#include<stdio.h>

int main(){

      int accNo;
      char transType;
      float amount, deposits, withdraws;

      FILE*bank;
      bank = fopen("bank.dat", "r");

      if(bank==NULL){
            printf("Can't open the file");
            return -1;
      }

      fscanf(bank, "%d %s %f", accNo, transType, amount);
      while(!feof(bank)){

            if(transType=="D"){
                  deposits=amount + deposits;
            }
            else if(transType=="W"){
                  withdraws=amount + withdraws;
            }

            fscanf(bank, "%d %s %f", &accNo, &transType, &amount);
      }

      printf("Total withdraws : %f", withdraws);
      printf("Total deposits : %f", deposits);

      fclose(bank);
      return 0;
```



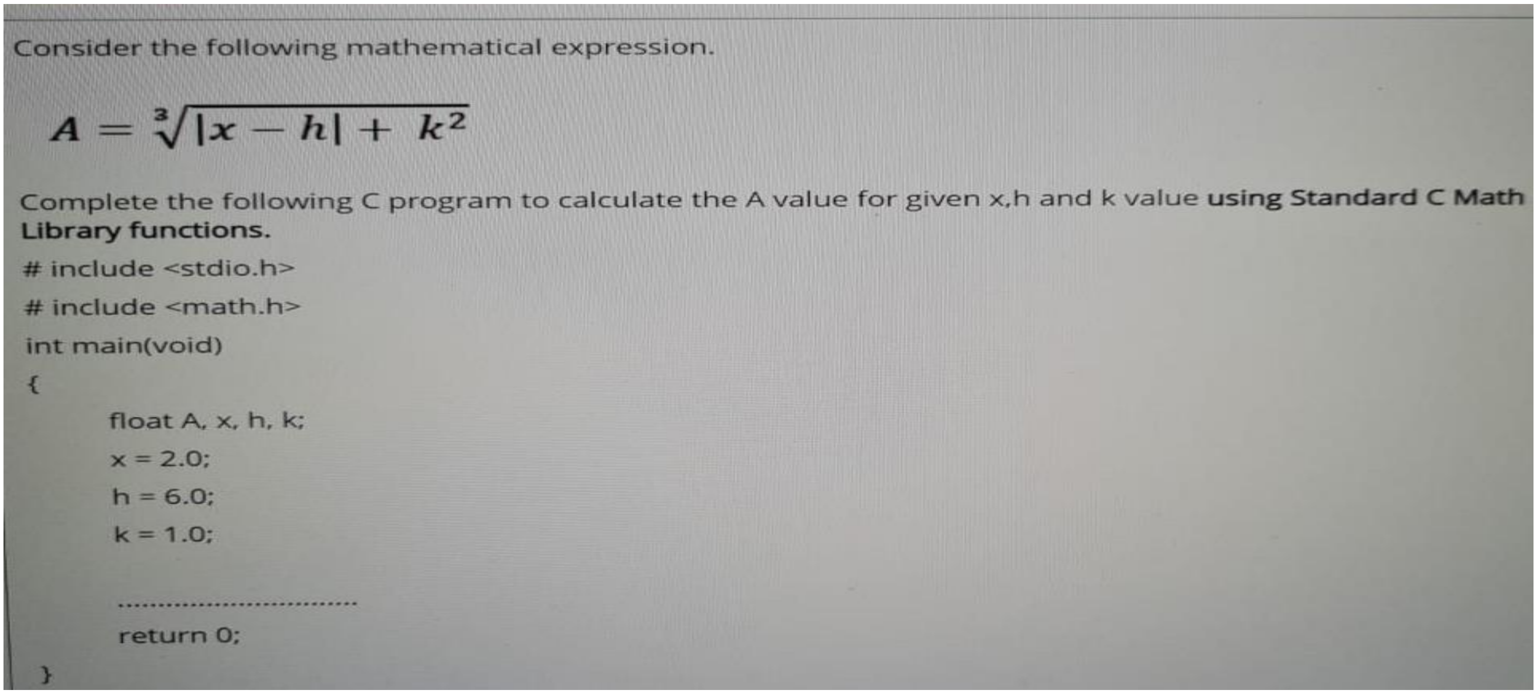
Consider the following mathematical expression.

$$C = \sqrt{|a| + b^2}$$

Complete the following C program to calculate the C value for given a and b value **using C Standard Math Library functions**

```
# include <stdio.h>
#include<math.h>
int main(void)
{
        int b;
        float a, C;
        a = -2.0;
        b = 4;
        ..............................
        return 0;
}
```

```
#include<stdio.h>

#include<math.h>
int main()
{
      int a ;
      float b,c;
      a=-2.0 ;
      b=4;
      c=sqrt(fabs(a) + pow(b,2));
      printf("%.2f" , c);
}
```



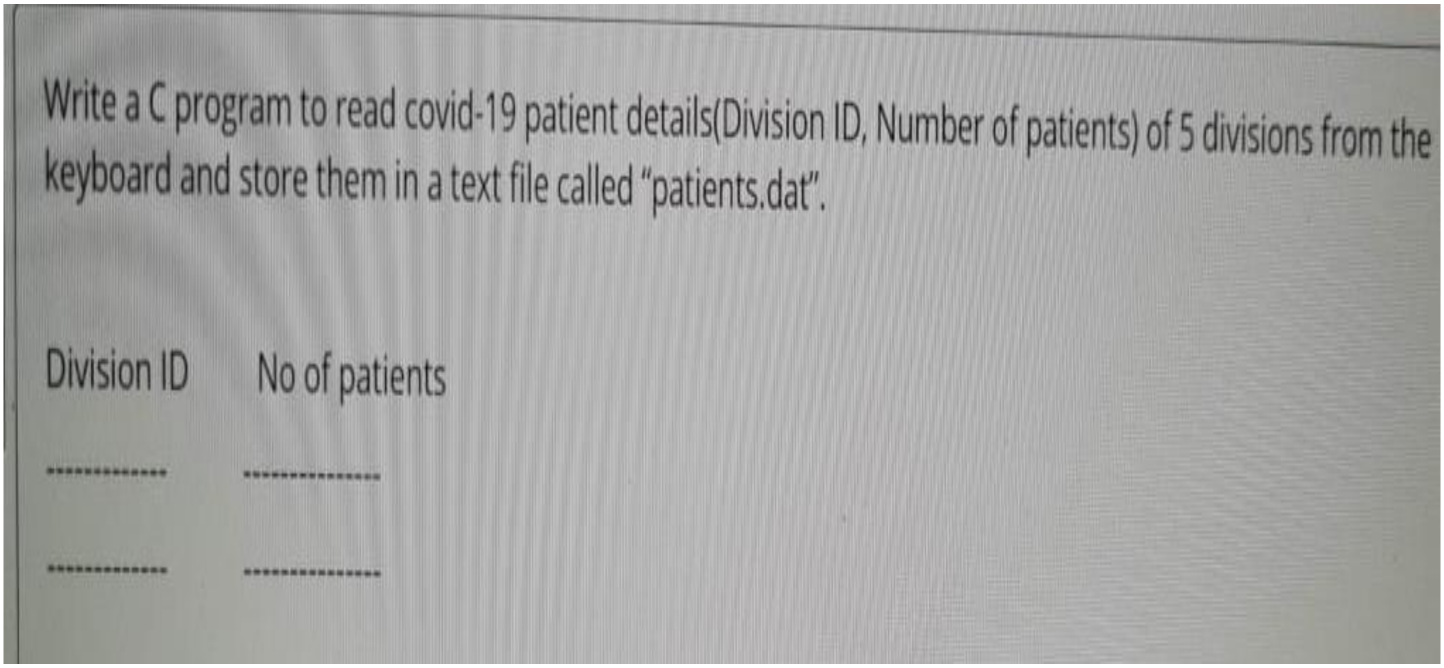
Consider the following mathematical expression.

$$A = \sqrt[3]{|x - h| + \ k^2}$$

Complete the following C program to calculate the A value for given x,h and k value **using Standard C Math Library functions.**

```
# include <stdio.h>
# include <math.h>
int main(void)
{
        float A, x, h, k;
        x = 2.0;
        h = 6.0;
        k = 1.0;

        ................................
        return 0;
 }
```

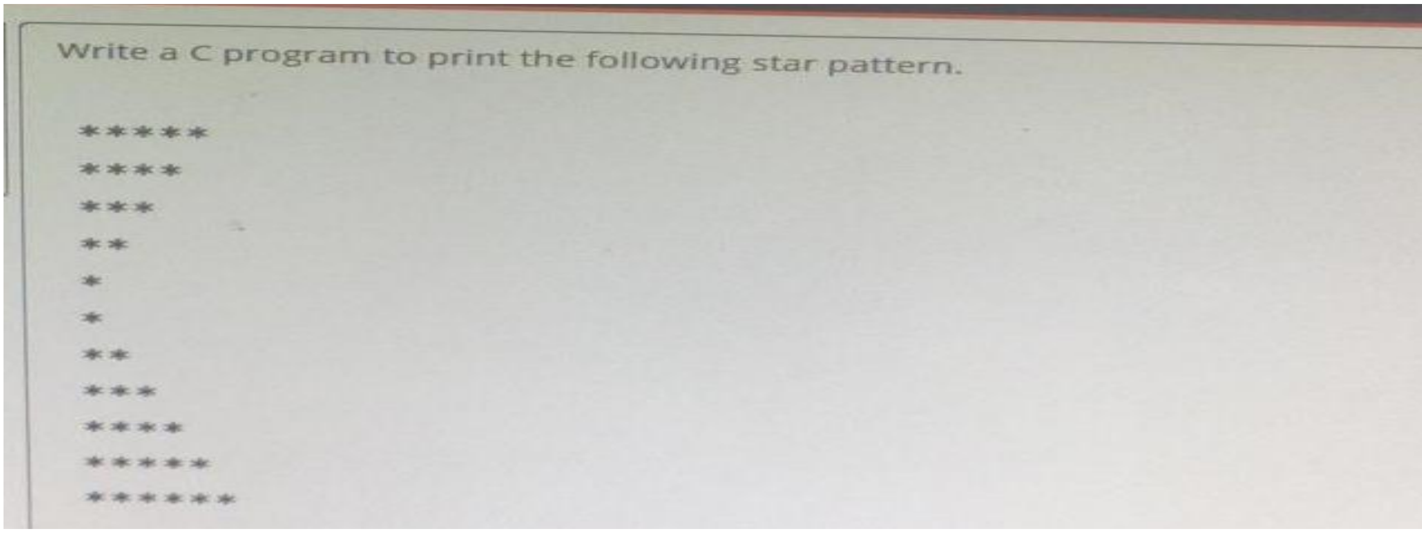
```
#include<stdio.h>
#include<math.h>
int main(void)
{
      float A,x,h,k;
      x = 2.0;
      h = 6.0;
      k = 1.0;

      A=pow(fabs(x-h)+pow(k,2),1/3.0);
      printf("%.2f",A);

}
```



Write a C program to read covid-19 patient details(Division ID, Number of patients) of 5 divisions from the keyboard and store them in a text file called “patients.dat”.

Division ID	No of patients
--------------	---------------
--------------	---------------

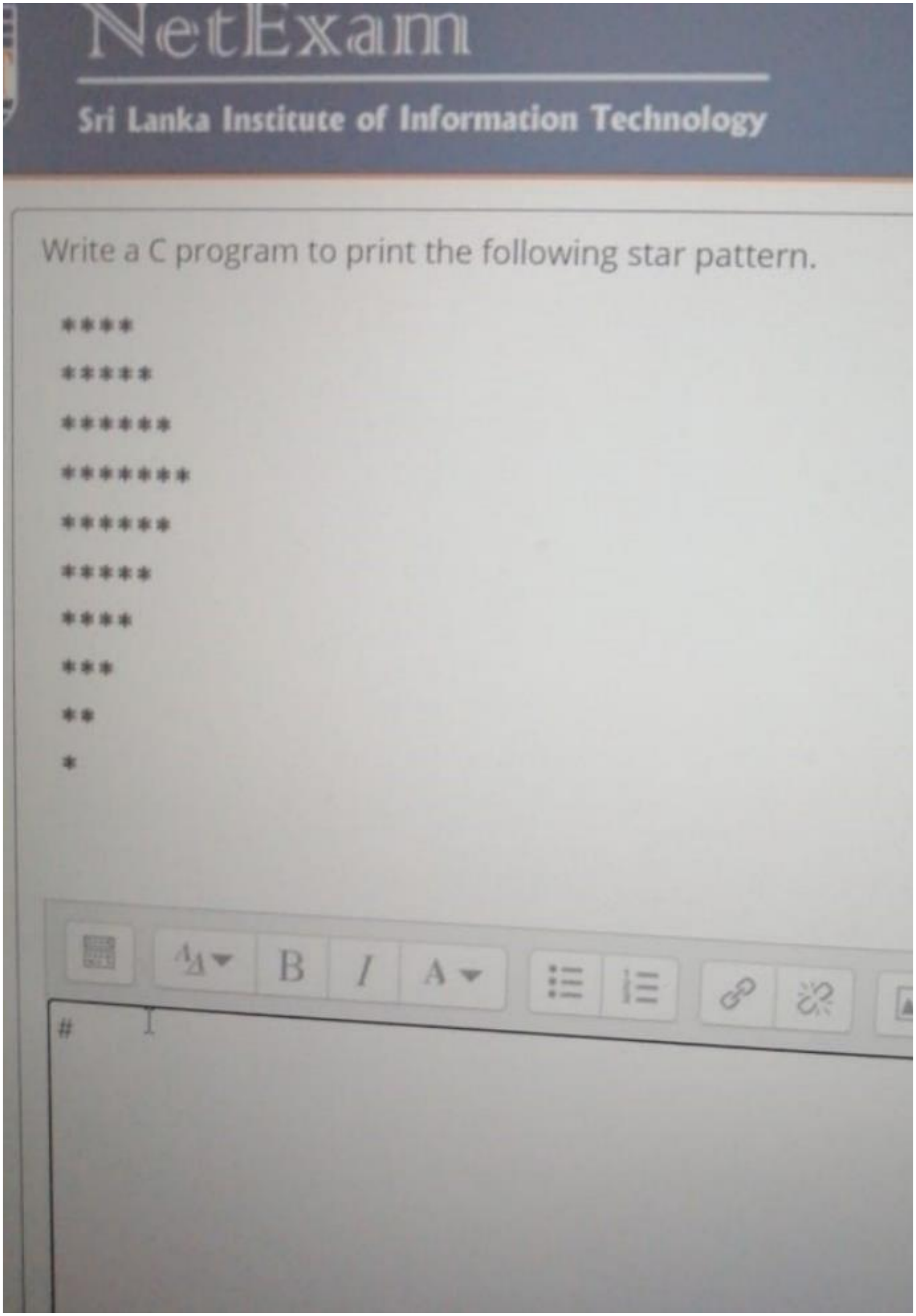
```
#include<stdio.h>
int main(void)
{
      int num, ID, i;

      FILE * cfPtr;
      cfPtr = fopen("patients.dat", "a");
      if(cfPtr == NULL)
      {
            printf("file cannot open\n");
            return -1;
      }
      fprintf(cfPtr, "%s\t%s\n", "Division ID", "No of patients");
      for(i=1; i<=5; i++)
      {
            printf("Division ID : ");
            scanf("%d", &ID);
            printf("No of patients : ");
            scanf("%d", &num);

            fprintf(cfPtr, "  %d\t\t%d\n", ID, num);
            puts("");
      }
      fclose(cfPtr);

      return 0;
}
```



Write a C program to print the following star pattern.

```
*****
****
***
**
*
*
**
***
****
*****
******
```

```
#include<stdio.h>
int main(void)
{
      int i,j;

      for(i=5;i>=1;i--){
           for(j=1;j<=i;j++){
               printf("*");

           }
           printf("\n");
      }
      for(i=1;i<=6;i++){
           for(j=1;j<=i;j++){
               printf("*");

           }
           printf("\n");
      }


      return 0;
}
```



Write a C program to print the following star pattern.

```
****
*****
******
*******
******
*****
****
***
**
*
```

```
#
```

```
#include<stdio.h>
```

```
Int main()
{
    Int I, j, N=7;

    For(i=4;i<=N;i++)
    {
        For(j=1; j<=I ; j++)
        {
            Printf("*");
        }

        Printf("\n");
    }
    For(i=6; i>1; i--)
    {
        For(j=0; j<I; j++)
        {
            Printf("*");
        }
        Printf("\n");
    }

    Return 0;
}
```