**Lab Exercise 3**

//1. WAP to insert new element at given index number in the array.

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//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include<iostream>

using namespace std;

int main(){

int r=0,e,in,arr[10]={1,3,5,6,8,9};

cin>>e>>in;

for(int i=0;i<10;i++){

if(i==in){

r=arr[i];

arr[i]=e;

}

if(r!=0){

arr[i+1]=arr[i+1]+r;

r=arr[i+1]-r;

arr[i+1]=arr[i+1]-r;

}

}

for(int i=0;i<10;i++){cout<<arr[i]<<" ";}

return 0;

}

/\*2. WAP to implement the linear search. Use function concept, if element is found then

return index number of element otherwise return -1;\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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#include<iostream>

using namespace std;

int ls(int n);

int arr[7]={6,3,5,1,9,4,8};

int main(){

int n;

cin>>n;

cout<<ls(n)<<endl;

}

int ls(int n){

for(int i=0;i<7;i++){

if(arr[i]==n)

return i;

}

return -1;

}

/\*3. WAP to delete an element from an array, use search algorithm to find the index number

of given number; if element to be deleted is not found then print �Error: element not found �. \*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include<iostream>

using namespace std;

int ls(int n);

int main(){

int i,e,f=0;

int arr[7]={6,3,5,1,9,4,8};

cin>>e;

for(i=0;i<7;i++){

if(arr[i]==e){

f=1;

}

if(f==1){

arr[i]=arr[i+1];

}

}

if(f==1){

arr[i-1]=0;

}

else{

cout<<"Error: element not found."<<endl;

}

for(int i=0;i<7;i++){

cout<<arr[i]<<" ";

}

}

/\*4. WAP for checking whether there are any duplicated elements in the array or not?\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

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#include<iostream>

using namespace std;

int main(){

int arr[7]={6,2,11,3,4,6,1};

int i,n;

for(int i=0;i<7;i++){

for(int j=i+1;j<7;j++){

if(arr[i]==arr[j]){

cout<<"Duplicate Element Found"<<endl;

return 0;

}

}

}

cout<<"No Duplicate Element Found."<<endl;

return 0;

}

**Lab Exercise 4**

//1.Write a C program to reverse the elementsof an array.

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

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#include <stdio.h>

#include <stdlib.h>

int main()

{

int num, \*arr, i,f,r;

scanf("%d", &num);

arr = (int\*) malloc(num \* sizeof(int));

for(i = 0; i < num; i++)

scanf("%d", arr + i);

r=num-1;

for(i=0;i<=num/2 && r>=num/2;i++,r--){

f=\*(arr+i);

\*(arr+i)=\*(arr+r);

\*(arr+r)=f;

}

for(i = 0; i < num; i++)

printf("%d ", \*(arr + i));

return 0;

}

//2.Write a C program to print the frequencyof the digits in given alphanumeric string

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include <stdio.h>

#include <string.h>

#include <math.h>

#include <stdlib.h>

int main() {

char str[1000];

int arr[10]={0,0,0,0,0,0,0,0,0,0};

scanf("%s",str);

for(int i=0;str[i]!='\0';i++){

if(\*(str+i)=='0'){arr[0]++;}

else if(\*(str+i)=='1'){arr[1]++;}

else if(\*(str+i)=='2'){arr[2]++;}

else if(\*(str+i)=='3'){arr[3]++;}

else if(\*(str+i)=='4'){arr[4]++;}

else if(\*(str+i)=='5'){arr[5]++;}

else if(\*(str+i)=='6'){arr[6]++;}

else if(\*(str+i)=='7'){arr[7]++;}

else if(\*(str+i)=='8'){arr[8]++;}

else if(\*(str+i)=='9'){arr[9]++;}

}

for(int i=0;i<10;i++){printf("%d ",arr[i]);}

return 0;

}

//3.Write C program to complete “Students Marks Sum’ as mentioned below:

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

int marks\_summation(int\* marks, int number\_of\_students, char gender) {

//Write your code here.

int sum=0,i;

i=gender=='b'?0:1;

for(;i<number\_of\_students;i+=2){

sum=sum+\*(marks+i);

}

return sum;

}

//4.Write a C/C++ program to left rotatean array of integers by dtimes

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

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vector<int> rotateLeft(int d,int n ,vector<int> arr) {

for(int i=0,j=0;i<d;i++){

int temp=arr[0];

for(j=0;j<n;j++){

arr[j]=arr[j+1];

}

arr[n-1]=temp;

}

return arr;

}

**Lab Exercise 5**

/\*1.Write a program to implement binary search algorithm. Assume user will enter the sorted array. \*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include <iostream>

using namespace std;

int main() {

int n,x,l=0,r,f=-1;

cin>>n;

int arr[n];

r=n-1;

for(int i=0;i<n;i++){cin>>arr[i];}

cin>>x;

while(l<=r){

int mid=(l+r)/2;

if(x==arr[mid]){

f=mid;

break;

}

else if(x<arr[mid])

r=mid-1;

else if(arr[mid]<x)

l=mid+1;

}

cout<<f<<endl;

return 0;

}

/\*2.Write a function which accepts an array of integers along with the size of it. The numbers are arranged in the

list in increasing order until a particular index and after that it is arranged in decreasing order.This

function should find and return the index position at which the increasing list starts decreasing.Call this

function from main function.\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include<iostream>

using namespace std;

int in\_dec(int arr[],int n);

int main(){

int n;

cin>>n;

int arr[n];

for(int i=0;i<n;i++){cin>>arr[i];}

cout<<in\_dec(arr,n)<<endl;

return 0;

}

int in\_dec(int arr[],int n){

int i=0;

while(arr[i]<arr[i+1]){i++;}

return i+1;

}

/\*3.Write a program to check whether given Matrix is sparse or not. We say a matrix as sparse when more

than 50% of total elements are zero. If matrix is sparse then represent it in triplet form with the help of array data

structure. Also print the number of bytes that are saved or wasted when you representinput matrix in the triplet form\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include<iostream>

using namespace std;

int main(){

int k=0,z=0,arr[6][6]={{15,0,0,22,0,-15},

{0,11,3,0,0,0},

{0,0,0,-6,0,0},

{0,0,0,0,0,0},

{91,0,0,0,0,0},

{0,0,28,0,0,0}};

int \*\*trip=new int \*[3];

for(int i=0;i<6;i++){

for(int j=0;j<6;j++){

if (arr[i][j]==0){z++;}

else{

trip[k]=new int(1);

trip[k][0]=i;

trip[k][1]=j;

trip[k][2]=arr[i][j];

k++;

}

}

}

if(z>6\*6/2){

cout<<"This matrix is a Sparse Matrix."<<endl;

}

else

cout<<"This is not a Sparse Matrix."<<endl;

for (int i = 0; i<k; i++){

for (int j = 0; j < 3; j++){cout<<trip[i][j]<<" ";}

cout<<endl;

}

cout<<"Memory Saved = "<<(6\*6)-(3\*k)<<" Bytes."<<endl;

}

/\*4.Write a time efficient program for finding the element which appears maximum number of times in the array.

Sample input:2, 4, 5, 6, 8, 9, 10, 13, 2, 3, 2 Sample output:2 [as 2 is coming three times]\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*This program is developed by Fanindra Saini(211B116)\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include<iostream>

using namespace std;

int main(){

int n;

cin>>n;

int arr[n];

for(int i=0,k=0;i<n;i++){cin>>arr[i];}

int e,m = 0;

for (int i=0;i<n;i++){

int c=0;

for (int j=0;j<n;j++) {

if (arr[i]==arr[j])

c++;

}

if(c>m){

m=c;

e=arr[i];

}

}

cout<<"Element Appeared Maximum nunber of times = "<<e<<endl;

}