Arrays and Functions

**1.**  Write a C++ program to find the largest element of a given array of integers.

#include <iostream>

using namespace std;

void getArray( int arr[], int size);

int maxArray(int arr[],int size);

int main()

{

int arr1[10];

getArray(arr1, 5);

cout<< maxArray(arr1,5)<<endl;

return 0;

}

void getArray( int arr[], int size)

{

for (int i=0; i<size; i++)

{

cout<<"Enter element "<< i+1<< ":";

cin>>arr[i];

}

}

int maxArray(int arr[],int size)

{

int max;

max= arr[0];

for (int i=0; i<size; i++)

{

if (arr[i]>max)

max= arr[i];

}

return max;

}

**Enter element 1:**2

**Enter element 2:**5

**Enter element 3:**99

**Enter element 4:**5

**Enter element 5:**0

**99**

**Program ended with exit code: 0**

2. Convert 24 hour time format to 12 hour time format.

#include <iostream>

#include <cmath>

void output( int hours, int minutes, char AMPM );

void input( int& hours24, int& minutes);

void convert( int& hours, char& AMPM );

using namespace std;

//Pattern

int main()

{

int hours24, minutes, choice;

char AMPM;

do{

input(hours24, minutes);

convert(hours24, AMPM);

output(hours24, minutes, AMPM);

cout<<"Would you like to enter another time? Press 1. for yes and 2. to exit:";

cin>>choice;

while (choice!=1 && choice!=2)

{

cout<<"Invalid choice. Try again!\nEnter choice:";

cin>>choice;

}

}while (choice==1);

return 0;

}

void input( int& hours24, int& minutes)

{

char c;

cout<<"Enter 24 hour time in HH:MM format:";

cin>> hours24>>c>>minutes;

if (hours24>23 || minutes>=60)

{

cout<<"Invalid time. Try again.\n";

input( hours24, minutes);

}

}

void convert( int& hours, char& AMPM )

{

if (hours<12)

{

AMPM= 'A';

}

else

{

AMPM= 'P';

}

hours= hours%12;

}

void output( int hours, int minutes, char AMPM )

{

cout<<"The time in 12 hour format is:\n";

cout<< hours<<":"<<minutes<<" "<<AMPM<<"M"<<endl;

}

3.  Write a C++ program to find the number of pairs of integers in a given array of integers whose sum is equal to a specified number.

#include <iostream>

#include <cmath>

void input( int arr[], int size);

int sum (int num1, int num2);

using namespace std;

int main()

{

int arr[100], size, sum1, arr1[100], k=0;

cout<<"Enter the size of array:";

cin>>size;

input(arr, size);

cout<<"What sum are you looking for?:";

cin>>sum1;

for (int i=0; i< size; i++)

{

for(int j=i+1; j<size; j++)

{

if (i==j);

else if (sum(arr[i],arr[j])== sum1)

{

cout<<arr[i]<<", "<<arr[j]<<endl;

}

}

}

return 0;

}

void input( int arr[], int size)

{

int i=0;

while (i<size)

{

cout<<"Enter element "<<i+1<<":";

cin>>arr[i];

i++;

}

}

int sum(int num1, int num2)

{

return num1+num2;

}

**Enter the size of array:**5

**Enter element 1:**1

**Enter element 2:**2

**Enter element 3:**3

**Enter element 4:**4

**Enter element 5:**5

**What sum are you looking for?:**5

**1, 4**

**2, 3**

**Program ended with exit code: 0**

4. Write a C++ program to find and print all unique elements of a given array of integers

#include <iostream>

#include <cmath>

using namespace std;

int main()

{

int arr[100], size, arr1[100]={},k=0;

cout<<"Enter the size of array:";

cin>>size;

int i=0;

while (i<size)

{

cout<<"Enter element "<<i+1<<":";

cin>>arr[i];

i++;

}

for (int i=0; i< size; i++)

{

int flag=1;

for(int j=0; j<k; j++)

{

if (arr[i]== arr1[j])

{

flag=0;break;

}

}

if (flag==1)

{

arr1[k]= arr[i];

k++;

}

}

cout<<endl;

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

cout<<arr1[i];

return 0;

}

**Enter the size of array:**5

**Enter element 1:**1

**Enter element 2:**2

**Enter element 3:**3

**Enter element 4:**2

**Enter element 5:**1

**123**

5. Write a C++ program to find and print all common elements in three sorted arrays of integers

#include <iostream>

#include <cmath>

using namespace std;

int main()

{

int arr1[100], arr2[100], arr3[100], arr4[100]= {},size1, size2, size3, m=0,flag=1;

cout<<"Enter the size of array1:";

cin>>size1;

cout<<"Enter the size of array2:";

cin>>size2;

cout<<"Enter the size of array3:";

cin>>size3;

cout<<"Enter elements of array1:";

for (int i=0; i<size1;i++)

{

cin>>arr1[i];

}

cout<<"Enter elements of array2:";

for (int i=0; i<size2; i++)

{

cin>>arr2[i];

}

cout<<"Enter elements of array3:";

for (int i=0; i<size3; i++)

{

cin>>arr3[i];

}

for (int i=0; i<size1; i++)

{

for (int j=0; j<size2; j++)

{

if(arr1[i]==arr2[j])

{

for (int k=0; k<size3; k++)

{

if(arr1[i]==arr3[k])

{

for (int l=0; l<m; l++)

{

flag=1;

if (arr4[l]==arr1[i])

{

flag=0;

break;

}

}

if (flag==1)

{

arr4[m]=arr1[i];

m++;

}

}

}

}

}

}

for (int p=0; p<m; p++)

cout<<arr4[p]<<" ";

cout<<endl;

return 0;

}

Output

**Enter the size of array1:**5

**Enter the size of array2:**6

**Enter the size of array3:**7

**Enter elements of array1:**

1 2 3 2 5

**Enter elements of array2:**

4 6 2 1 3 2

**Enter elements of array3:**

7 8 1 4 2 8 0

**1 2**

**Program ended with exit code: 0**

6. Write a C++ program to find the first repeating element in an array of integers.

#include <iostream>

#include <cmath>

using namespace std;

int main()

{

int arr[100], size, arr1[100]={},k=0;

cout<<"Enter the size of array:";

cin>>size;

int i=0;

while (i<size)

{

cout<<"Enter element "<<i+1<<":";

cin>>arr[i];

i++;

}

for (int i=0; i< size; i++)

{

int flag=1;

for(int j=i+1; j<size; j++)

{

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

{

cout<<arr[i]<<endl;

flag=0;

}

}

if (flag==0)

break;

}

return 0;

}

**Enter the size of array:**8

**Enter element 1:**1

**Enter element 2:**2

**Enter element 3:**3

**Enter element 4:**4

**Enter element 5:**2

**Enter element 6:**3

**Enter element 7:**3

**Enter element 8:**9

**2**

**Program ended with exit code: 0**

7. Write a C++ program to count the number of occurrences of each number in a sorted array of integers

#include <iostream>

#include <cmath>

using namespace std;

int main()

{

int arr[100], arruni[100], arrcount[100], cindex=0, flag=1;

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>arr[i];

}

for (int i=0; i<size; i++)

{

int count=0;

for (int j=0; j<size; j++)

{

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

{

count++;

}

}

for (int k=0; k<cindex; k++)

{

flag=1;

if (arr[i]== arruni[k])

{

flag=0;

break;

}

}

if (flag==1)

{

arruni[cindex]= arr[i];

arrcount[cindex]= count;

cindex++;

}

}

for (int m=0; m<cindex; m++)

{

cout<<arruni[m]<<" : "<<arrcount[m]<<endl;

}

return 0;

}

8. Find the first no that occurs odd no of times.

#include <iostream>

using namespace std;

int getOddOccurrence(int nums[], int n)

{

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

int ctr = 0;

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

{

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

ctr++;

}

if (ctr % 2 != 0)

return nums[i];

}

return -1;

}

int main()

{

int nums[] = {5, 7, 8, 8, 5, 8, 7, 7};

int n = sizeof(nums)/sizeof(nums[0]);

cout << "Original array: ";

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

cout << nums[i] <<" ";

cout << "\nNumber which occurs odd number of times: " << getOddOccurrence(nums, n);

return 0;

}

**Original array: 5 7 8 8 5 8 7 7**

**Number which occurs odd number of times: 7Program ended with exit code: 0**

9. Write a C++ program to move all negative elements of an array of integers to the end of the array without changing the order of positive element and negative element

#include <iostream>

using namespace std;

void shiftposneg(int nums[], int n)

{

int countpos=0, temp=0, arr[7];

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

{

if (nums[i]>=0)

countpos++;

}

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

{

if (nums[i]<0)

{

arr[countpos]= nums[i];

countpos++;

}

else

{

arr[temp]= nums[i];

temp++;

}

}

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

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

}

int main()

{

int nums[100];

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>nums[i];

}

shiftposneg(nums, size);

return 0;

}

**Enter size of array:**10

**Enter elements of the array:**

-1 2 3 -5 -6 7 8 9 -10 -6

**2 3 7 8 9 -1 -5 -6 -10 -6 Program ended with exit code: 0**

10. Sorting in descending order

#include <iostream>

using namespace std;

int main()

{

int nums[100], temp;

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>nums[i];

}

for (int i=0; i<size-1; i++)

{

for (int j=i+1; j<size; j++)

{

if(nums[j]>nums[i])

{

temp= nums[i];

nums[i]= nums[j];

nums[j]= temp;

}

}

}

for (int i=0; i<size; i++)

{

cout<<nums[i]<< " ";

}

return 0;

}

**Enter size of array:**5

**Enter elements of the array:**

3 1 4 5 2

**5 4 3 2 1 Program ended with exit code: 0**

11. Write a C++ program to sort a given array of 0s, 1s and 2s. In the final array put all 0s first, then all 1s and all 2s in last.

#include <iostream>

using namespace std;

int main()

{

int nums[100], temp=0, j=0;;

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>nums[i];

}

for (int i=0; i<size; i++)

{

if (nums[i]==0)

{

temp= nums[i];

nums[i]= nums[j];

nums[j]= temp;

j++;

}

}

for (int i=0; i<size; i++)

{

if (nums[i]==1)

{

temp= nums[i];

nums[i]= nums[j];

nums[j]= temp;

j++;

}

}

for (int i=0; i<size; i++)

{

if (nums[i]==2)

{

temp= nums[i];

nums[i]= nums[j];

nums[j]= temp;

j++;

}

}

for (int i=0; i<size; i++)

{

cout<<nums[i]<< " ";

}

return 0;

}

**Enter size of array:**10

**Enter elements of the array:**

1 2 0 0 2 1 2 2 1 0

**0 0 0 1 1 1 2 2 2 2 Program ended with exit code: 0**

12.  Write a C++ program to update every array element by multiplication of next and previous values of a given array of integers

#include <iostream>

using namespace std;

int main()

{

int arr[100], t1, t2, zero, last;

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>arr[i];

}

zero= arr[size-1] \* arr[1];

last= arr[size-2] \* arr[0];

t1= arr[0];

for (int i=1; i<size-1; i++)

{

t2= arr[i];

arr[i]= t1\* arr[i+1];

t1= t2;

}

arr[0]= zero;

arr[size-1]= last;

for (int i=0; i<size; i++)

{

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

}

return 0;

}

**Enter size of array:**5

**Enter elements of the array:**

1 2 3 4 5

**10 3 8 15 4 Program ended with exit code: 0**

13. Write a C++ program to find the most occurring element in an array of integers.

#include <iostream>

using namespace std;

//mode

int main()

{

int arr[100], count=0, arr1[100]={}, arr2[100],index=0;

cout<<"Enter size of array:";

int size;

cin>>size;

cout<<"Enter elements of the array:\n";

for (int i=0; i<size; i++)

{

cin>>arr[i];

}

for ( int i=0; i<size; i++)

{

count=0;

for (int j=0; j<size; j++)

{

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

{

count++;

}

}

int flag=1;

for (int k=0; k< index; k++)

{

if (arr[i]== arr1[k])

{

flag=0;

break;

}

}

if (flag==1)

{

arr1[index]= arr[i];

arr2[index]= count;

index++;

}

}

int maxindex, max= arr2[0];

for ( int i=1; i<index; i++)

{

if (arr2[i]> max)

{

max= arr2[i];

maxindex=i;

}

}

cout<< "The mode(s) is/are: ";

for (int k=0; k< index; k++)

{

if( arr2[k]==max)

cout<<arr1[k]<<endl;

}

return 0;

}

**Enter size of array:**5

**Enter elements of the array:**

1 1 2 3 2

**The mode(s) is/are: 1**

**2**

**Program ended with exit code: 0**

14. WAP to find the largest three elements from an array.

#include <iostream>

using namespace std;

int main()

{

int arr[100], max, secmax, thirdmax,size, min;

cout<<"Enter the number of elements in the array:\n";

cin>> size;

cout<<"Enter the elements in the array:\n";

for(int i=0; i<size; i++)

cin>>arr[i];

min=arr[0];

for(int i=0; i<size; i++)

{

if (arr[i]<min)

min=arr[i];

}

max= min;

secmax= min;

thirdmax= min;

for(int i=0; i< size; i++)

{

if(arr[i] >max)

{

thirdmax= secmax;

secmax= max;

max= arr[i];

}

else if(arr[i]> secmax)

{

thirdmax= secmax;

secmax= arr[i];

}

else if(arr[i]> thirdmax)

{

thirdmax= arr[i];

}

}

cout<<"Maximum element: "<<max<<endl;

cout<<"Second Maximum element: "<<secmax<<endl;

cout<<"Third Maximum element: "<<thirdmax<<endl;

return 0;

}

**Enter the number of elements in the array:**

5

**Enter the elements in the array:**

1 4 3 2 5

**Maximum element: 5**

**Second Maximum element: 4**

**Third Maximum element: 3**

**Program ended with exit code: 0**

**Enter the number of elements in the array:**

10

**Enter the elements in the array:**

8 6 4 2 1 3 5 7 9 2

**Maximum element: 9**

**Second Maximum element: 8**

**Third Maximum element: 7**

**Program ended with exit code: 0**