

C++ ARRAY-1

Lecture-11

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Today's checklist

- 1) Introduction to Arrays
- 2) Syntax, accessing elements of Arrays
- 3) Printing Output and Taking Input
- 4) Types of Arrays
- 5) Size operator
- 6) Memory allocation in array, address of array elements
- 7) Linear search
- 8) Basic problems



What is an array? -> list -> Collection of similar data types

Data Structure - storage to store data

int x;
char ch;

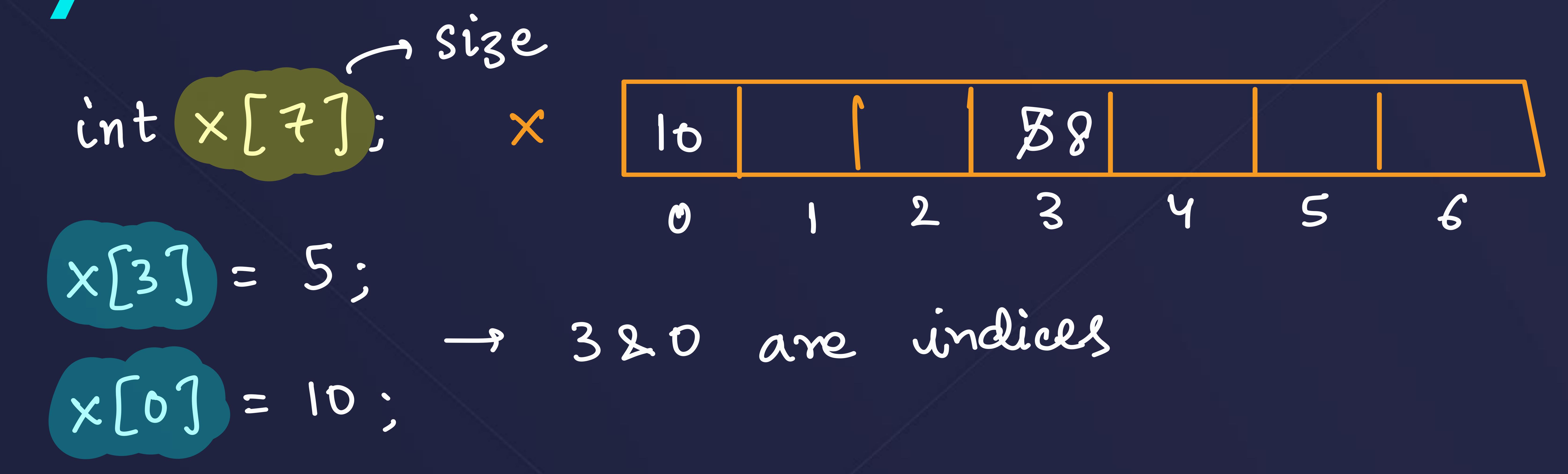
class XII - A -> 100 bacche

percentage

float $n1 \cdot = 99.8$ float x2 = 90.1

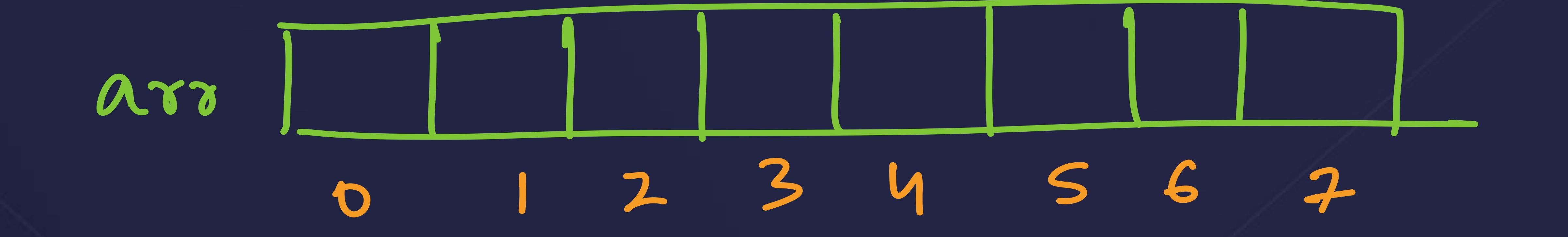


Syntax and Declaration





How to access Elements in Array?







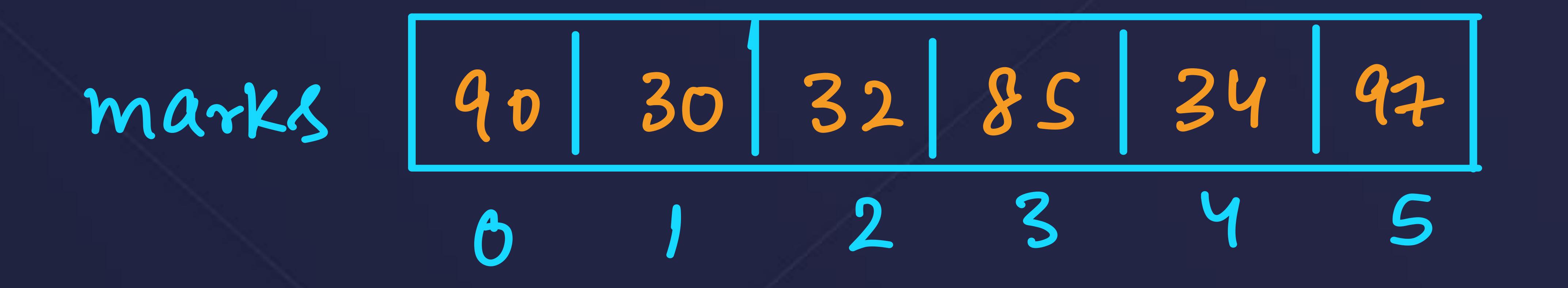
Printing Output and Taking Input

For Loop - output & input using indices:





Ques: Given an array of marks of students, if the marks of any student is less than 35 print its roll number. [roll number here refers to the index of the array.]



```
SKILLS
```

```
int n;
 cout<<"enter no of students : ";</pre>
 cin>>n;
int marks[n]; // 0 to n-1
cout<<"Enter the marks : ";
for(int i=0;i<=n<sup>3</sup>1;i++){
    cin>>marks[i];
for(int i=0;i<=n-1;i++){
      if(marks[i]<35) cout<<i<";
```

```
Output Anput
                 · Enter no. of students: 4
marks : 31 31 36 90 23 Enter the marks : 31
                 36 90 23
```

Ques: Are the following array declarations correct?

```
int a (25); wrong - int a [25];
 int size = 10, b [size]; Correct
                                   int size = 10;
                                    int b[size];
 intc = \{0,1,2\}; woong
          int c[] = \{0, 1, 2\};
```



Ques: Which element of the array does this expression reference?

num [4] - yth index - 5th element



Types of Arrays

- 1) One dimensional Array
- 2) Two dimensional Array matrix



Size and size of operator (How can we use it to find the Length of array?)

```
int arr[] = \{2, 3, 4, 1, 2, 9, 10, 11, 100, 17, 19, 18, 163;
int n = size of (arr) / size of (arr[0]);
```



*Memory Allocation in Arrays

Cout 44 arr;

```
Continuous memory allocation.
int arr [4] = {1,2,3,5};

| 1 | 2 | 3 | 5
 2 3 5
                        arr[0] arr[1] arr[2] arr[3]
Cout LL Larr;
-> address -> first dement -sears [0]
```



Memory Allocation in Arrays

```
int arr[5];
cout<<&arr[0]<<endl;
cout<&arr[1]<<endl;
cout<&arr[2]<<endl;
cout<<&arr[3]<<endl;
cout<&arr[4]<<endl;
// 0x16cfab3d4 a.
// 0x16cfab3d8 08
// 0x16cfab3dc ac
// 0x16cfab3e0
 // 0x16cfab3e4
```

```
0123456789abcdef
```



Address of Array Elements

Continuous





Predict the output:

```
main
/int num[26], temp;
 /num[0] = 100;
 num 25] = 200;
 temp = num [25];
 num [25] = num [0];
  num[0] = temp;
  cout < endl< < num [0] < < " " < < num [25];
```

```
200
temb 200 100
```

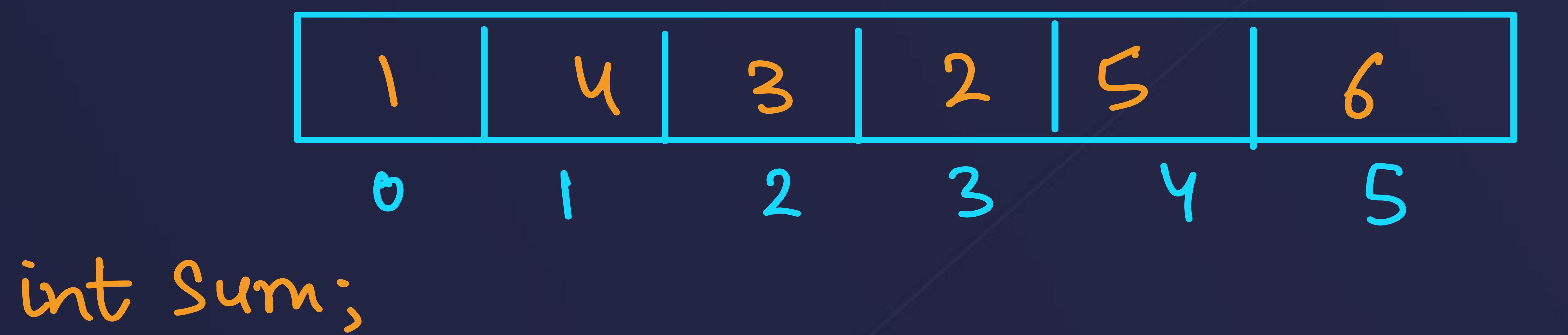


Point out the errors (if any) in the following code:

```
Output/4mbut
                    y arr
int main() {
 /intsize;
                     9120
 cin>>size;
 int arr size;
 /for (i = 1; i <= size; i++) {</pre>
      cin>>arr[i];
      cout< arr [i];
   return 0;
    Undeclared identifier
```



Ques: Calculate the sum of all the elements in the given array.





Linear search

Ques: Find the element x in the array. Take array and x as input.

int n;

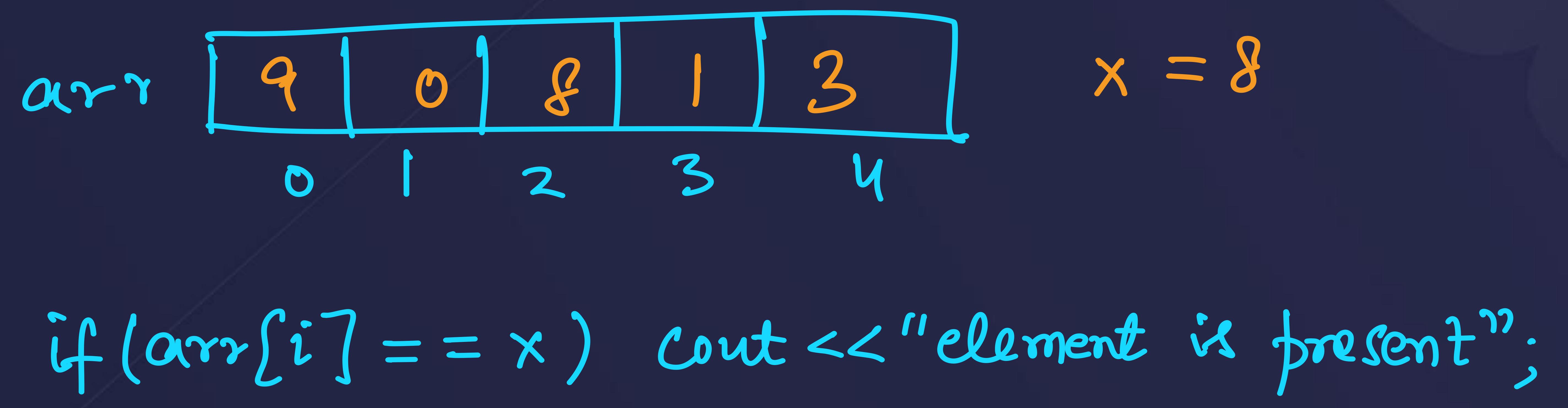
cin >> n;

int arosn;

// input

int x;

cun >> n;





Ques: Find the maximum value out of all the elements in the array.

```
int \max = \operatorname{arr}[0]; // \max = \operatorname{INT_MIN}

for lint i=1; i <= n-1; i+1) {

i \neq (\max < \operatorname{arr}[i]) \max = \operatorname{arr}[i];

i \neq (\max < \operatorname{arr}[i]) \max = \operatorname{arr}[i];

i \neq (\max < \operatorname{arr}[i]) \max = \operatorname{arr}[i];
```



*Ques: Find the second largest element in the given Array.

Step-1: Find largest, max=18

Step-2: traverse through the array, if (smax <arrs[i] As arrs[i]!=max)

```
int max = INT_MIN; if (max < arr [i]) max = arr[i]
int smax = INT_MIN;
```



Ques: Find the second largest element in the given

```
AITCIV.
                   max = INT-MIN 1218
                   i = p/234867012
int max = INT_MIN;
for(int i=0; i<=n-1; i++){
    if(max<arr[i]) max = arr[i];</pre>
                           SMAX = INTIM 1269
int smax = INT_MIN;
for(int i=0; i<=n-1; i++){
    if(arr[i]!=max && smax<arr[i]) smax = arr[i];</pre>
cout<<max<endl;
```

```
arr 1 2 18 6 9 18 4
6 1 2 3 4 5 6
```



MCQ: What is the difference between the 5's in these two expressions?

```
int num[5];
num[5] = 11;
sth index be 11 dool do
```

- 1. first is particular element, second is type
- 2. first is array size, second is particular element
- 3. first is particular element, second is array size
- 4. both specify array size



MCQ: What would happen if you assign a value to an element of an array whose subscript exceeds the size of the array? Int arr [5];

```
arr [8] = 2; error
```

- 1. the element will be set to 0
- 2. nothing, it's done all the time
- 3. other data may be overwritten
- 4. error message from the compiler



State TRUE or FALSE:

- 1. The array int num[26] has twenty-six elements. T
- 2. The expression num[1] designates the first element in the array F
- 3. It is necessary to initialize the array at the time of declaration. F
- 4. The expression num[27] designates the twenty-eighth element in the array.



Ques: Count the number of elements in given array greater than a given number x.

```
int count = 0;

for (int i=0; i <= n-1; i++) {
    if (arr[i] > x) count ++;
}

cont << count;
```



THANKYOU