

DSA through C++

Array Data Structure



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Agenda

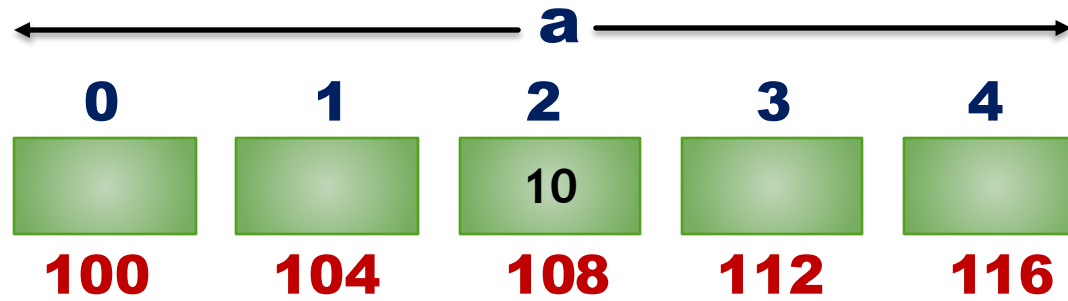
- **About Arrays**
- **When to use Arrays ?**
- **Discuss approach to solve a problem**
- **Conclusion**
- **Abstract Data Type**

About Arrays

- **Array is a linear collection of similar elements.**
- **Array elements are indexed.**
- **The name of the array is treated as a constant which represents address of the first byte of the array.**
- **[] is called subscript operator**

a==100

int a[5];



**Total number
of variable**

Index

a[0]

a[1]

a[2]

a[3]

a[4]

a[2]

operand

***(a+2)**

***(100+2)**

***(108) = 10**

- **Accessing Array elements is fast.**
- **It takes constant time to access any item of the array if index is known.**

```
int a[ 100000 ];
```



a[99999] → ***(a+99999)**

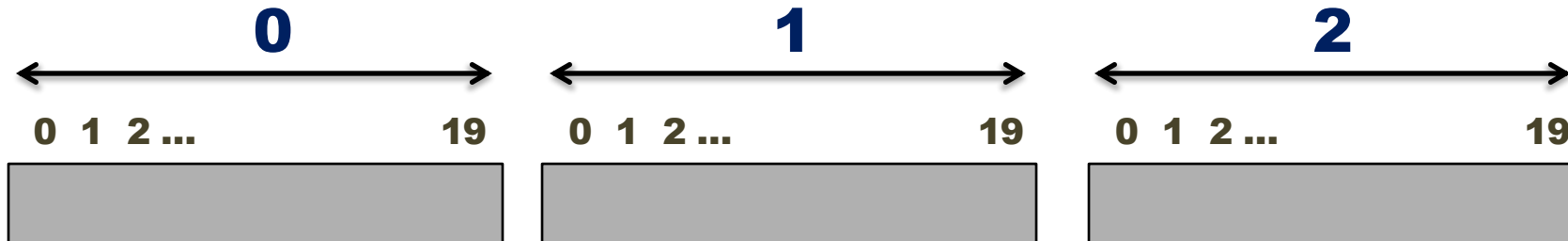
a[10] → ***(a+10)**

a[0] → ***a(a+0)**

When to use Arrays ?

- whenever group of related data is need to be stored.
- when data is in a group of groups.

```
int a[3][20];
```



- **To solve a programming problem,**
- **You have to store data of 100 students.**
- **How can you implement it?**

- **Suppose you have created an array as :**
int a[100];
- **And assume that you have stored some out of 100 data in this array.**

Now answer following questions :

- 1. How many elements are stored in the array ?**
- 2. If suppose 10 elements are stored and then I want to store one more element at index 2.
Can we do it as **a[2] = data ;****
- 3. How to guard against overflow or underflow ?**
- 4. How to know that whether a value at a given index is valid or garbage ?**
- 5. How to delete an element ?**

Conclusion

- **Array में left to right data store करना है**
- **Overflow को check करने के लिए एक Capacity variable की जरूरत होगी |**
- एक **Last_Index variable** की जरूरत है की कितना **filled elements array में है**
- **We need to create an array data structure in C++.**
- **Define a class Array with appropriate number of variables and functions**

Abstract Data Type

Properties :-

1. Capacity
2. Last_Index
3. ptr

Array should be
created dynamically
ptr = new int[size];

Method :-

1. Create_Array()
2. append()
3. insert()
4. del()
5. edit()
6. search();
7. Constructor
8. Destructor