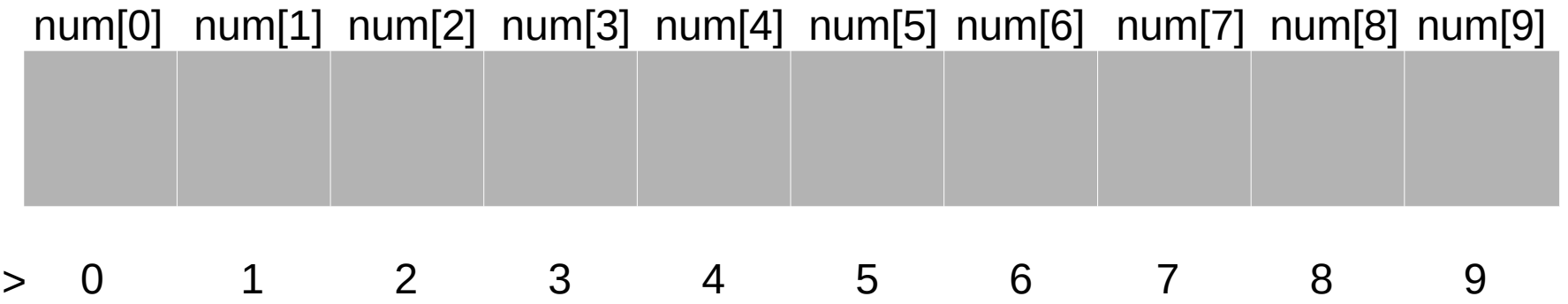
Chapter 2
Arrays

What is an array?

- An array is a collection of elements of the same type placed in contiguous memory locations.
- Arrays are used to store a set of values of the same type under a single variable name.
- Each element in an array can be accessed using its position in the list, called index number or subscript.
- Eg: int num[10];

Array Declaration

```
int num[10];
```



How to declare an array (array declaration)?

- Syntax:
  data_type array_name[size];
- **data_type** is the type of data that the array variable can store
- **array_name** is an identifier for naming the array and the size is a positive integer number that specifies the number of elements in the array.
- Eg: int num[10];

- 1) How to declare integer array?
- int num[10];
- 2) How to declare float array?
- float num[10];
- 3) How to declare character array?
- char name[10];

Array Initialization

```
int num[10]={ 2, 3, 5, 7, 11, 13, 17, 19, 23, 29};
```

num[0]	num[1]	num[2]	num[3]	num[4]	num[5]	num[6]	num[7]	num[8]	num[9]
2	3	5	7	11	13	17	19	23	29

```
cout<<num[6];
cout<<num[0]
cout<<num[5];
```

OUTPUT

```
17
2
13
```

What is array initialization?

- Giving values to the array elements at the time of array declaration is known as **array initialization.**
- Eg:
- int score[5] = {98, 87, 92, 79, 85};
- char code[6] = {‘s’, ‘a’, ‘m’, ‘p’, ‘l’, ‘e’};
- float wgpa[7] = {9.60, 6.43, 8.50, 8.65, 5.89, 7.56, 8.22};

- Q1) How we can initialize an integer array ?Give an example.
- int score[5] = {98, 87, 92, 79, 85};
- Q2) How we can initialize a character array ?Give an example.
- char code[6] = {‘s’, ‘a’, ‘m’, ‘p’, ‘l’, ‘e’};
- Q3) How we can initialize a float array ?Give an example.
- float wgpa[7] = {9.60, 6.43, 8.50, 8.65, 5.89, 7.56, 8.22};

Memory Allocation for Arrays

Name	Description	Size
char	Character	1 byte
int	Integer	4 bytes
float	Floating point number	4 bytes
double	Double precision floating point number	8 bytes
void	Null data	Empty set

Data Type and its size

- The memory space allocated for an array can be computed using the following formula:

total_bytes = sizeof(array_type) × size_of_array

Eg: float a[10];

total_bytes = 4 x 10
= 40 bytes

- Q1) Find out the space allotted for char name[5]
- total_bytes= 1 x 5 =5 bytes
- Q2) Find out the space alloted for int num[10]
- total_bytes= 4 x 10 = 40 bytes
- Q3) Find out the space alloted for double num[10]
- total_bytes= 8 x 10 = 80 bytes

Accessing elements of arrays

- The process of accessing each element of an array is called **Array Traversal**.
- Any element can be accessed by giving the array's name and the element's position. This position is called the index or subscript value.

String handling using arrays

- A character array can be used to store a string.
- A string is an array or sequence of characters enclosed by a pair of double quotes. Eg: “hello”
- Null character \0 is stored at the end of a string

```
#include <iostream>
#include <cstdio>
using namespace std;
int main()
{
    char my_name[10];
    cout << "Enter your name: ";
    gets(name);
    cout << "Hello " << my_name;
    return 0;
}
```

Disadvantage of using cin

If we try to enter a name like “**Sachin Tendulkar**”, only the name Sachin will be saved.

To overcome this problem, we use **gets()**

gets() function

- gets() function is used to accept a string of characters including whitespace from a standard input device(eg. Keyboard) and store it in a character array.
- **cstdio** header file is required.
- Syntax:
  gets(String_data)
- Eg:

```
gets(str);
```

puts() function

- puts() function is used to display a string data on a standard output device(eg. Monitor)
- **cstdio** header file is required.
- **Syntax:**
  puts(String_data)
- **Eg:**
  puts(“ Hello “);

Previous Questions

- Q1) An array element is accessed using _____.
- Index value or Subscript value
- Q2) Printing all the elements of an array is an example for _____ operation.
- Array traversal
- Q3) A string can be considered as an array of ------.
- Characters.
- Q4) A ---------- is stored at the end of the string.
- null character '\0'
- Q5) Which header file in C++ is need for gets() and puts() function?
- cstdio

Previous Questions

- Q6) Define an array.Give an example of an integer array declaration.
- Q7) Consider the following C++ code
  char text[20];
  cin»text;
  cout«text;
  If the input string is “Computer Programming”; what will be the output ? justify your answer.
- Computer

Previous Questions

- Q8) What is the differences in string handling using cin and gets() in C++ programs?
- cin cant read white space. gets() can read white space.
- Q9) i) Write C++ statement to declare a character array of size 20
- char text[20];
- ii) Write C++ statement to store the string “welcome” in the same array
- char text[20]=”welcome”;
- Q10) Initialize an integer array with 5 elements
- int num[5]={2,3,5,7,11};
- Q11) Write a program in C++ to accept a string with white space like “good morning” from the keyboard and display the same string