

Lecture 13

Arrays



QUIZ

قَالَ رَبِّ اشْرَحْ لِي صَدْرِي ۝
﴿٢٥﴾

[فَالَّذِي نَسِيَ كَهُولَ دَعَى رَبَّهُ أَشْرَحَ لَهُ مَنْ يَرَى لِي صَدْرِي مِيرَا سِينَهُ]

وَيَسِّرْ لِي آمْرِي ۝
﴿٢٦﴾

[وَيَسِّرْ لَهُ آسَانَ كَهُولَ دَعَى لَيْهُ مَنْ يَرَى لِي آمْرِي مِيرَا كَامَ]

وَاحْلُلْ عُقْدَةً مِنْ لَسَانِي ۝
﴿٢٧﴾

[وَاحْلُلْ لَهُ كَهُولَ دَعَى عُقْدَةً گَرَهُ مِنْ سَيِّدِي سَيِّدِي زَبَانَ]

يَفْقَهُوا قَوْلِي ۝
﴿٢٨﴾

[يَفْقَهُوا وَهُوَ سَمْجَه سَكِينَ [قَوْلِي مِيرِي بَاتَ]

4 QUESTIONS / FEEDBACK / CONCERNS



INFORMATION
TECHNOLOGY
UNIVERSITY

SE SECA SLIDE OF FAME

5



NO ONE
WEEK - 1



Muhammad Daniyal
Hammad (BSSE23046)
WEEK - 2



Syed Hashim Abbas
(BSSE23084)
WEEK - 3



Umar Ahmad
(BSSE23032)
WEEK - 4



Umar Ahmad
(BSSE23032)
WEEK - 5



YOUR NAME
WEEK - 6



YOUR NAME
WEEK - 7



YOUR NAME
WEEK - 8



YOUR NAME
WEEK - 9



YOUR NAME
WEEK - 10



YOUR NAME
MIDTERM



YOUR NAME
WEEK - 11



YOUR NAME
WEEK - 12



YOUR NAME
WEEK - 13



YOUR NAME
WEEK - 14



YOUR NAME
WEEK - 15

SE SEC B SLIDE OF FAME

6



Muhammad Mukarram
BSSE23029
WEEK - 1



Muhammad Abdullah
(BSSE23087)
WEEK - 2



Muhammad Abdullah
(BSSE23087)
WEEK - 3



Fasiha Rohail
(BSSE23041)
WEEK - 4



Muhammad Abdullah
(BSSE23087)
WEEK - 5



YOUR NAME
WEEK - 6



YOUR NAME
WEEK - 7



YOUR NAME
WEEK - 8



YOUR NAME
WEEK - 9



YOUR NAME
WEEK - 10



YOUR NAME
MIDTERM



YOUR NAME
WEEK - 11



YOUR NAME
WEEK - 12



YOUR NAME
WEEK - 13



YOUR NAME
WEEK - 14



YOUR NAME
WEEK - 15

RECAP

GitHub

Tools (Cygwin, IDE, GitHub)

Approach towards a word problem

Flowcharts

Flowcharts Advantages & Disadvantages

Algorithms

Pseudocode

Numbers Systems (Decimal, Binary, Octal & Hexadecimal)

Ten's Complement

Twos Complement

main function

Stream in and stream out operators

if else

Functions

Data Types

Arithmetic Operators

Relational Operators

Loops (While, for , do while)

Nested Loops

Switch cases

RECAP

Function Overloading

Scope of variables

Function Prototype and Definition

Default Value in parameters of functions

Parameters by value vs Parameters by Reference

Recursion

Arrays

How to store words or sentences ?

How to store words or sentences ?

```
char str[] = "C++";
```

Alternate ways of doing the same thing

```
char str[4] = "C++";
```

```
char str[] = {'C', '+', '+', '\0'};
```

```
char str[4] = {'C', '+', '+', '\0'};
```

Bigger arrays are fine too

```
char str[100] = "C++";
```

```
#include <iostream>
using namespace std;

int main()
{
    char str[100];

    cout << "Enter a string: ";
    cin >> str;
    cout << "You entered: " << str << endl;

    cout << "\nEnter another string: ";
    cin >> str;
    cout << "You entered: "<<str<<endl;

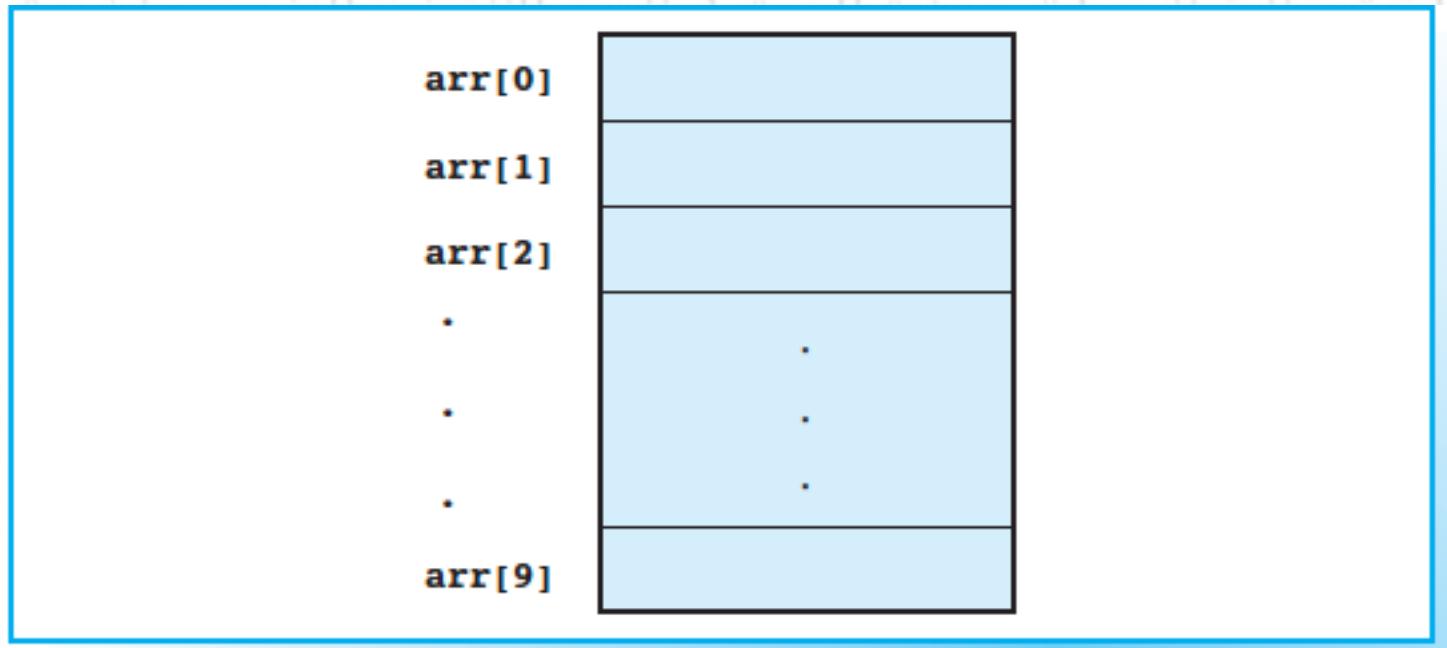
    return 0;
}
```

```
#include <iostream>
using namespace std;

int main()
{
    char str[100];
    cout << "Enter a string: ";
    cin.get(str, 100);

    cout << "You entered: " << str << endl;
    return 0;
}
```

ARRAYS



ARRAYS

```
// array.cpp
// To input numbers into an array and output after.
// -----
#include <iostream>
#include <iomanip>
using namespace std;

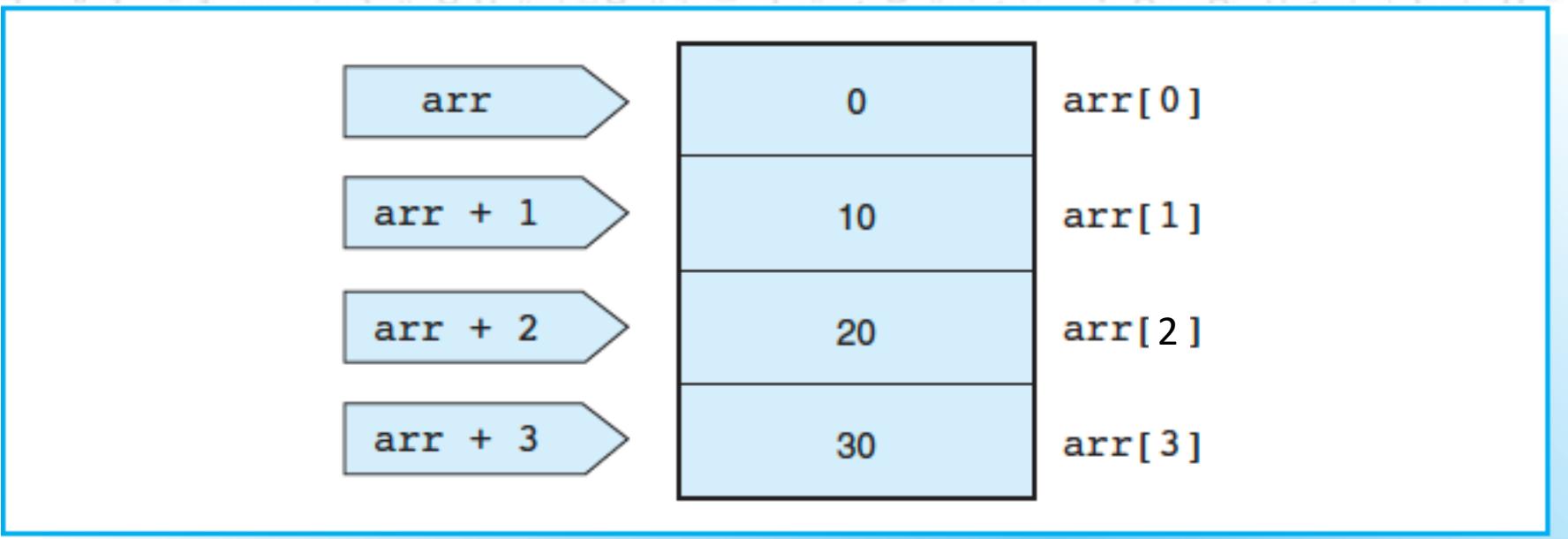
int main()
{
    const int MAXCNT = 10;           // Constant
    float arr[MAXCNT], x;          // Array, temp. variable
    int i, cnt;                    // Index, quantity

    cout << "Enter up to 10 numbers \n"
        << "(Quit with a letter):" << endl;
    for( i = 0; i < MAXCNT && cin >> x; ++i)
        arr[i] = x;
    cnt = i;
    cout << "The given numbers:\n" << endl;
    for( i = 0; i < cnt; ++i)
        cout << setw(10) << arr[i];
    cout << endl;
    return 0;
}
```

ARRAYS

```
// C-string.cpp : Using C strings.  
// -----  
#include <iostream>  
#include <iomanip>  
#include <cstring>  
using namespace std;  
char header[] = "\n    ***  C Strings  ***\n\n";  
int main()  
{  
    char hello[30] = "Hello ", name[20], message[80];  
  
    cout << header << "Your first name: ";  
    cin >> setw(20) >> name; // Enter a word.  
    strcat( hello, name); // Append the name.  
    cout << hello << endl;  
    cin.sync(); // No previous input.  
    cout << "\nWhat is the message for today?"  
        << endl;  
    cin.getline( message, 80); // Enter a line with a  
                           // max of 79 characters.  
    if( strlen( message) > 0) // If string length is  
    { // longer than 0.  
        for( int i=0; message[i] != '\0'; ++i)  
            cout << message[i] << ' '; // Output with  
            cout << endl; // white spaces.  
    }  
    return 0;  
}
```

ARRAYS



Integer Arrays

```
int age[5] = {19, 18, 21, 20, 17};
```

```
int age[] = {19, 18, 21, 20, 17};
```

```
age[3] = 20;
```

Integer Arrays

```
#include <iostream>
using namespace std;

int main()
{
    int age[5] = { 19, 18, 21, 20, 17 };
    for (int x = 0; x < 5; x++)
    {
        cout << age[x] << "\n";
    }
}
```

2D Arrays

```
int a[3][4] = {  
    {0, 2, 1, 19} , /* row at index 0 */  
    {4, 3, 7, 10} , /* row at index 1 */  
    {9, 8, 6, 12} , /* row at index 2 */  
};
```

	Column 0	Column 1	Column 2	Column 3
Row 0	a[0][0]	a[0][1]	a[0][2]	a[0][3]
Row 1	a[1][0]	a[1][1]	a[1][2]	a[1][3]
Row 2	a[2][0]	a[2][1]	a[2][2]	a[2][3]

2D Arrays

```
int a[2][3] = {  
    {0, 2, 1}, /* row at index 0 */  
    {4, 3, 7}, /* row at index 1 */  
};  
  
int a[2][3] = {0, 2, 1, 4, 3, 7};
```

2D Arrays

```
int a[2][3] = {  
    {0, 2, 1}, /* row at index 0 */  
    {4, 3, 7}, /* row at index 1 */  
};  
  
int a[2][3] = {0, 2, 1, 4, 3, 7};
```

```
#include <iostream>
using namespace std;
int main()
{
    // a 2x3 array
    int a[3][2] = { {0, 2}, {1, 4}, {3, 7} };

    // traverse array elements

    for (int i=0; i<3; i++)
        for (int j=0; j<2; j++)

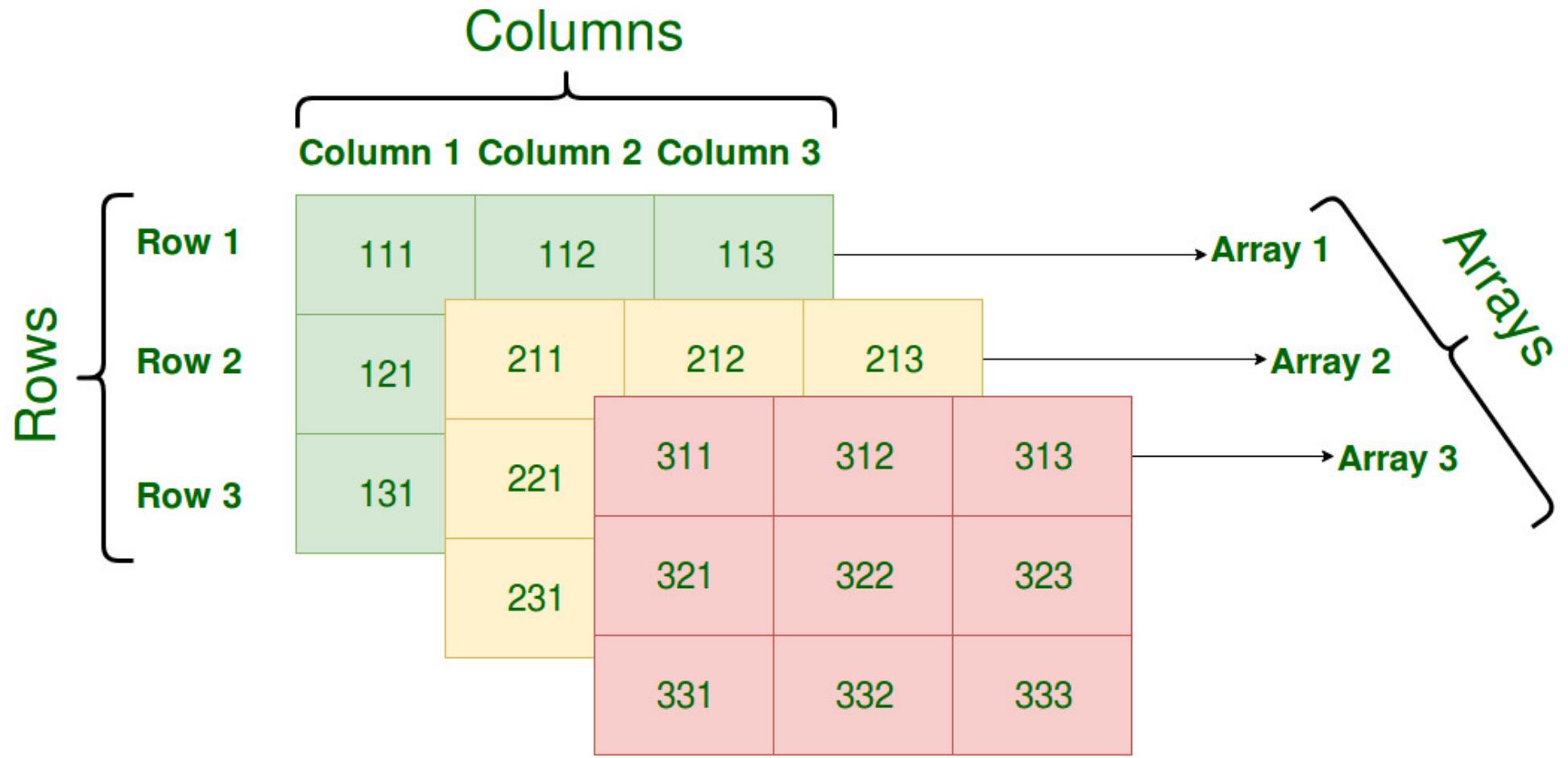
    {
        cout << "a[ " <<i<< " ][ " <<j<< " ]: ";
        cout << a[i][j] << endl;
    }
    return 0;
}
```

```
#include <iostream>
using namespace std;

int main () {
    // an array with 5 rows and 2 columns.
    int a[5][2] = { {0,0}, {1,2}, {2,4}, {3,6}, {4,8} };

    // output each array element's value
    for ( int i = 0; i < 5; i++ )
        for ( int j = 0; j < 2; j++ ) {
            cout << "a[ " << i << "][" << j << "]: ";
            cout << a[i][j]<< endl;
        }

    return 0;
}
```



```
#include<iostream>
using namespace std;
void main()
{
    int a[2][3][2] = {{{{4, 8},{2, 4},{1, 6}}, {{3, 6},{5, 4},{9, 3}}}};
    cout << "a[0][1][0] = " << a[0][1][0] << "\n";
    cout << "a[0][1][1] = " << a[0][1][1] << "\n";
}
```

```
#include<iostream.h>
#include<conio.h>

main()
{
    char cmatrix [ 5 ][15];
    for ( int q1=0 ; q1<5 ; q1++)
    {
        cout<<"Enter name :";
        cin>>cmatrix [q1];

    }
    cout<<endl;

    for ( int q1=0 ; q1<5 ; q1++)
    {
        cout<<"Your Enterd Names are :";
        cout<<cmatrix [q1]<<endl;
    }
    getch();
}
```

Write a menu driven C++ program to do following operation on two dimensional array A of size $m \times n$. You should use user-defined functions which accept 2-D array A, and its size m and n as arguments.

- To input elements into matrix of size $m \times n$
- To display elements of matrix of size $m \times n$
- Sum of all elements of matrix of size $m \times n$
- To display row-wise sum of matrix of size $m \times n$
- To display column-wise sum of matrix of size $m \times n$
- To create transpose of matrix B of size $n \times m$

Where both m and n can be 5