


[Programming in 'C'


Arrays & Strings



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[Objectives

- To understand what Arrays are
- Why they are important to programming
- How they are used in C
- How to use arrays for string handling



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[Arrays

- So far used single occurrence of variables
- Need for groups of same type
 - e.g. sampling a range of 100 temperatures:

```
int Temp1;  
int Temp2;  
int Tempn;  
int Temp100;
```

OR

```
int Temp[100];
```



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Array Syntax



- Declaration of array is the same and single element variable with the number in the array in square brackets

Data type Identifier[number in array]
`int Windspeed[1440];`

- Array index starts at zero
- C does not bound arrays – access beyond maximum can cause problems

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Understanding Arrays



Problem: Write a program to display the marks given to 15 students.

```
void main(void)
{
    int Stu01, Stu02, Stu03, Stu04 ..... Stu15;

    printf("\nStudent 1 marks are %d",Stu01);
    printf("\nStudent 2 marks are %d",Stu02);
    ....
    ....
    ....
}
```

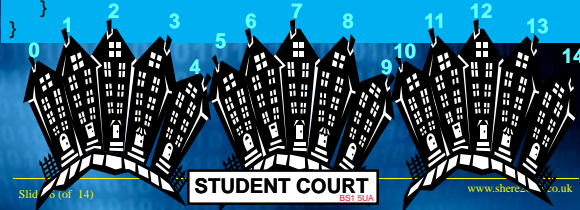
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Understanding Arrays



```
void main(void)
{
    int Student[15];
    int i;

    for(i=0;i<15;i++)
    {
        printf("\nStudent %d marks are %d",i, Student[i]);
    }
}
```



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STUDENT COURT

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Understanding Arrays



```
void main(void){
    int Student[15];
    int i;

    for(i=0;i<15;i++){
        printf("\nStudent %d marks are %d",i, Student[i]);
    }
}
```

Index or subscript

Variable Name

STUDENT	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	10101010	
Data	56	74	37	63	48	59	81	42	62	51	64	55	83	96	64
Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

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Initialising Arrays



- Arrays can be initialised at the start of a program or function.

```
void main(void)
{
    int i, Xyz = 0;
    int Xarray[5] = {3,6,8,2,7};

    clrscr();
    for(i=0;i<5; i++){
        printf("Value of index is %d ",i);
        printf("Value of Xarray is %d\n",Xarray[i]);
        delay(300);
    }
    getch();
}
```

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2 Dimensional Arrays



- A 2 Dimensional Arrays consist of Rows and Columns.
- Rows take the first index, Columns the second.
- Two dimensional array table or matrix or grid

eg: two dimensional array,
name league_table
length 3x3

index	0	1	2
0	1	3	5
1	2	4	6
2	7	8	9

This location is league_table[1][2]

```
int league_table[3][3] = {1,3,5,2,4,6,7,8,9};
```

[n Dimensional Arrays

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- Can have n dimensional arrays
eg: three dimensional array, name rubic, size 3 x 3 x 3

3 Dimensional Array

4 Dimensional Array

5 Dimensional Array

rubic[3][2][1]

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[Strings in C

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- Unlike other languages C does not have a string data type
- Instead arrays of characters are used e.g.
`char my_name[12];`
- Inputting a string with scanf
`scanf("%s", my_name);`
- Printing a string with printf
`printf("My name is %s and not a lot of people know that", my_name);`

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[Strings & white space

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- When entering a string or character array with scanf, the data is accepted to the first white space character or [enter]
- You can not use scanf to accept 'Ian Shere'
- To accept white space the gets() function is used, e.g.
`printf("Enter your name: ");`
`gets(myname);`

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Printing your name backwards



```
#include <stdio.h>
#include <string.h>
#include <conio.h>

void main(void){
int i;
int LenName;
char MyName[20];

printf("\tEnter your name: ");
gets(MyName);
LenName = strlen(MyName);
for (i = LenName; i >= 0; i--)
{
printf("%c", MyName[i]);
}
}
```

Std

uk
