```
//  Array Fundamentals

#include <stdio.h>
int main()
{
    int a[10]={12,23,34,56,67,92}; //array declaration with
initialization
    int n=6; // Size of an array   (no of elements)
    int i, *p;

    // pointer points to an array
    p=a;    //a array name  => first cell address


    for(i=0;i<n;i++)
       printf("%5d", a[i]);  //print array values
    printf("\n");

    for(i=0;i<n;i++)
       printf("%5d", *(a+i));     // a[i] = *(a+i) = *(i+a) =  i[a]
    printf("\n");

    for(i=0;i<n;i++)
       printf("%5d", *(i+a));
    printf("\n");

    for(i=0;i<n;i++)
       printf("%5d", i[a]);
    printf("\n");

  // using pointer variable
    for(i=0;i<n;i++)
    {
        printf("%5d", *p);     // printing values
        p++;            // pointing to next value
    }
    printf("\n");

    i=0;    // using pointer var 2nd e.g.
    p=a;   //pointing to base address of an array
    while(i<n)
    {
        printf("%5d", *(p+i));     // printing values
        i++;
    }
    printf("\n");
    return 0;
}
```

```
// ARRAY Insertion, Deletion, Traverse, Linear Search and MOdified Linear
Search [DONE]
// Array with Pointer

//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Traversing Array Elements || Without Functions

#include<stdio.h>
int main()
{
    int a[10]={12,23,34,56,67,92};
    int *p, *q;
    p=&a[1];
    q=&a[4];

    printf("%d\t", *q-*p);   //outputs a value of 67-23
    printf("%ld", q-p);   //output:  3 cells holds an interger data
}

//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Traversing Array Elements || Without Functions

#include <stdio.h>
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       printf("%4d",i);
    return 0;
}
//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Traversing Array Elements using function || with Functions

#include <stdio.h>
void display();
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    display();
    return 0;
}
void display()
{
    int i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       printf("%4d",i);
}
//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Passing Array Elements to a function || Call by Value

#include <stdio.h>
void display(int);   // function prototype
```

```
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       display(marks[i]);
    return 0;
}
void display(int x)   // function definition
{
    printf("%4d",x);
}
//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Passing Array Elements to a function || Call by Reference

#include <stdio.h>
void display(int *);     // function prototype
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       display(&marks[i]);
    return 0;
}
void display(int *vi)  // function definition
{
    printf("%4d",*vi);
}
//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// Passing Array Elements to a function || Call by Reference || Example 2

#include <stdio.h>
void display(int *);     // function prototype
void show(int **);
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       display(&marks[i]);
    return 0;
}
void display(int *vi)  // function definition
{
    show(&vi);
}

void show(int **p)
{
    printf("%4d",**p);
}

//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

```
// Passing Array Elements to a function || Call by Reference || Example 3

#include <stdio.h>
void display(int *);     // function prototype
void show(int **);
void disp(int ***);
int main()
{
    int marks[5]={1,2,3,4,5}, i;
    printf("Array Values are as follows\t");
    for(i=0;i<5;i++)
       display(&marks[i]);
    return 0;
}
void display(int *vi)  // function definition
{
    show(&vi);
}
void show(int **p)
{
    disp(&p);
}
void disp(int ***t)
{
    printf("%4d",***t);
}
```

```
// Two Dimensional Array Glimpse

#include <stdio.h>
int main()
{
    int a[10][10]={{12,23},{34,56},{67,92}}; //2D array declaration with
initialization
    int r=3, c=2, i, j;
    for(i=0;i<r;i++)                    // for each row
    {
        for(j=0;j<c;j++)                        // for each column
           printf("%5d",a[i][j]);                   // printing each
elements
        printf("\n");
    }
    return 0;
}
//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
// 2D Array Initialization
int a[10][10]={{12,23},{34,56},{67,92}};   // Acceptable
int a[][10]={{12,23},{34,56},{67,92}};     // Acceptable
int a[10][]={{12,23},{34,56},{67,92}};    //  ERROR: 2nd Dimension is
very crucial
int a[][]={{12,23},{34,56},{67,92}};      // Acceptable or Not ???

//~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

```
// 2D Array Initialization
#include <stdio.h>
int main()
{
    int a[10][10]={{12,23},{34,56},{67,92}}; //2D array declaration with
initialization
    int r=3, c=2, i, j;

    printf("Normal Print\n");
    for(i=0;i<r;i++)                    // for each row
    {
        for(j=0;j<c;j++)                        // for each column
           printf("%5d",a[i][j]);                   // printing each
elements
        printf("\n");
    }

    printf("Print Data using one Dimensional Pointer\n");
    for(i=0;i<r;i++)                    // for each row
    {
        for(j=0;j<c;j++)                        // for each column
           printf("%5d",*(a[i]+j));                 // printing each
elements
        printf("\n");
    }

    printf("Print Data using Double Dimensional Pointer\n");
    for(i=0;i<r;i++)                    // for each row
    {
        for(j=0;j<c;j++)                        // for each column
           printf("%5d",*(*(a+i)+j));                 // printing each
elements
        printf("\n");
    }
    return 0;
}
```

```
// 2D Array Initialization
#include <stdio.h>
// Getting each elements ||  *(Base Address * Row Number * No of Columns
+ Column Number)

void display2d(int *a, int r, int c)
{
    int i, j;
    for(i=0;i<r;i++)                    // for each row
    {
        for(j=0;j<c;j++)                        // for each column
           printf("%5d",*(a+i*c+j));          // printing each elements
        printf("\n");
    }
}

void show2d(int (*a)[2], int r, int c)        // Column value is
important
{
    int i, j, *p;
    for(i=0;i<r;i++)
    {
        p=a+i;                              // pointing each row
        for(j=0;j<c;j++)                    // accessing each column
           printf("%5d",*(p+j));
        printf("\n");
    }
}

void print2d(int a[][2], int r, int c)        // Column value is
important
{
    int i, j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
           printf("%5d",a[i][j]);
        printf("\n");
    }
}

int main()
{
    int a[10][10]={12,23,34,56,67,92}; //2D array declaration with
initialization
    int r=3, c=2, i, j;

    printf("Print Data using function | Call by reference\n");
    display2d(a,r,c);

    printf("Print Data using function | Call by reference\n");
    show2d(a,r,c);

    printf("Print Data using function | Call by reference\n");
```

```
    print2d(a,r,c);
    return 0;
}
```