Basic Programming Lab

— — 0x0c

Array & Pointer

```
#include <stdio.h>
int main()
{
    int i, arr[6], sum = 0;
    int *ptr;
    ptr = arr;
    printf("Enter 6 numbers: ");
    for (i = 0; i < 6; ++i)
    {
        printf("\nEnter Element: ");
        scanf("%d", &arr[i]);
    }
    for (i = 0; i < 6; ++i)
    {
        printf("\nElement %d: %d", i + 1, *ptr);
        ptr++;
    }

    return 0;
}
```

Few Things to Remember

1. All the following four expressions are the same when their addresses are considered.

```
a[i]
*(a + i)
*(i + a)
i[a]
```

2. &a[i] is equivalent to a+i

```
#include <stdio.h>
int main()
{
	int arr[] = {1, 2, 3, 4, 5};
	int  *ptr;
	ptr = arr; //ptr = &arr[0]
	for (int i = 0; i < 5; i++)
	{
		printf("\n %d", arr[i]); //Check below
	}

	return 0;
}

/*
	printf("\n %d", i[arr]);
	printf("\n %d", ptr[i]);
	printf("\n %d", i[ptr]);
	printf("\n %d", *(arr + i));
	printf("\n %d", *(i + arr));
	printf("\n %d", *(ptr + i));
	printf("\n %d", *(i + ptr));
*/
```

Passing 1D array to function

```
#include <stdio.h>
int Sum_of_Array_Elements(int brr[])
{
	int sum = 0;
	for (int i = 0; i < 5; ++i)
		sum = sum + brr[i];
	return sum;
}
int main()
{
	int arr[] = {2, 4, 6, 8, 10};
	int sum = 0;
	sum = Sum_of_Array_Elements(arr);
	printf("Sum = %d\n", sum);
	return 0;
}
```

```
#include <stdio.h>
int Sum_of_Array_Elements(int *ptr)
{
	int sum = 0;
	for (int i = 0; i < 5; ++i)
		sum = sum + ptr[i];
	return sum;
}
int main()
{
	int arr[] = {2, 4, 6, 8, 10};
	int sum = 0;
	sum = Sum_of_Array_Elements(arr);
	printf("Sum = %d\n", sum);
	return 0;
}
```

Passing 2D array to function

```
#include <stdio.h>
void display_func(int arr[][2])
{
        printf("Elements are:\n");
        for (int i = 0; i < 2; i++)
        {
                for (int j = 0; j < 2; j++)
                {
                        printf("%d ", arr[i][j]);
                }
                printf("\n");
        }
}

int main()
{
        int arr[2][2];
        printf("Enter Elements:\n");
        for (int i = 0; i < 2; i++)
                for (int j = 0; j < 2; j++)
                        scanf("%d", &arr[i][j]);
        display_func(arr);
        return 0;
}
```

Return an array from function

```
#include <stdio.h>
int * fun(int brr[])
{
        for (int i = 0; i < 5; ++i)
        {
                brr[i] =  brr[i] + 1;
        }
        return brr;
}
int main()
{
        int arr[] = {2, 4, 6, 8, 10};
        int *ptr;
        ptr = fun(arr);
        for (int i = 0; i < 5; ++i)
        {
                printf("\n%d", arr[i]);
        }
        return 0;
}
```

Assignment

//0x12

//Use scanf for input in Every Program

1. Write a program to **sort** an array.
(Pass the array to function)

2. Write a program for **binary search** in an unsorted array.
(Pass the array to function using pointer)
(Use your own sorting function to sort)

Points to Remember

1. Filetype: .c

2. Naming Convention for Directory: Assignment_X
   where X = Lab No
   example: Assignment_1

3. Naming Convention for File: RollNo_Q_Y.c
   where Y = Question No in that Assignment
   example: 123XXX4567_Q_1.c

Commands:

	Command	Example
Create Directory	mkdir <directory_name>	mkdir test_directory
Create File	vi <filename>	vi test.c
Compile a C Program	gcc <filename>	gcc test.c
Run a C Program	./a.out	

4. Write your details in every program

```
/*
 ------------------------------------------------
|Author : Your_Name                              |
|Roll No: Your_Roll_No                           |
|Department: Your_Department                     |
 ------------------------------------------------
*/
```

5. Take string input with spaces type this:

```
char str[100];
scanf("%[^\n]s",str);
```