

**C-Programming Lab Sheet**  
**I Year / I Part**  
**Faculty: Computer/Electrical/Civil**

**Labsheet#7**

**Objectives:**

1. To familiarized with pointer.
2. To understand the relationship between array and pointer.
3. To demonstrate the call by value and call by reference.
4. Concept of dynamic memory allocation.

**Objectives #1**

1.1

```
#include<stdio.h>
#include<conio.h>
void main(){
    int a, *pa;
    clrscr();
    printf("\n The address of a=%u",&a);
    printf("\n The address of pa=%u",&pa);
    pa=&pa;
    printf("\n The address of a using pointer variable is %u",pa);
    pa++;
    printf("\n The address of a after increment of pointer = %u",pa);
    printf("\n Enter the number to be store in variable a");
    scanf("%d",&a);
    printf("\n The value of a=%d",a);
    printf("\n The value of a using & operator is = %d",&a);
    printf("\n The value of a using pointer variable=%d",*pa);
    getch();
}
```

Assignment 1.1. Note the output of the above program and discuss how the ‘&’ operator is used to access the value of the variable.

Assignment 1.2. Write a program to perform different arithmetic operation as addition, subtraction, and multiplication of two number using pointers.

**Objectives #2****Pointer with one dimensional array**

2.1

#include&lt;stdio.h&gt;

#include&lt;conio.h&gt;

```

void main(){
    int a[5]={2,4,7,3,6};
    printf("\nElements no    value    Address of elements");
    for(i=0;i<=4;i++){
        printf("\n a[%d]=\t %8d%9u",i,*(a+i), a+i);
    }
    getch();
}

```

Assignment 2.1: Note the output of the above program and modify the program to input the five number from the user and display the contents of array in two different ways.

- i. Using the name of the array itself as a pointer
- ii. Using pointer variable

Assignment 2.2: Modify the assignment 2.1 using pointer variable.

**Objective #3**

3.1

#include&lt;stdio.h&gt;

#include&lt;conio.h&gt;

```

void swap(int x, int y);           /* function prototype */

```

```

void main(){
    int a=2, b=3;
    printf("the value of a and b before swapping %d \t %d\n", a,b);
    swap(a,b);                     /* calling function */
    printf("the value of a and b after swapping %d \t %d", a, b);
    getch();
}

```

```

void swap(int a, int b){           /*called function */
    int t;
    t=a;
    a=b;
    b=t;
}

```

3.2

```
#include<stdio.h>
#include<conio.h>
void swap(int *, int *); //Function prototype

void main(){
    int a=2, b=3;
    printf("the value of a and b before swaping %d \t %d\n",a,b);
    swap(&a, &b);
    printf("the value of a and b after swaping %d\t %d",a,b);
    getch();
}

void swap(int *x, int *y) {                /*called function */
    int t;
    t=*x;
    *x=*y;
    *y=t;
}
```

Assignment 3.1: Run the program 3.1 and 3.2 and document the output and discuss the difference between them.

Assignment 3.2: Write a program to input 3\*3 matrix using pointer and pass them to a function matrix using called by reference and find the largest element of the matrix.

## **Objective #4**

### **Dynamic memory allocation**

4.1

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

void main(){
    int *p;
    int n=5;
    p=(int*)malloc(sizeof(int)*n);
    printf("enter five numbers");

    for(i=0;i<=4;i++){
        scanf("%d",(p+i));
    }

    for(i=0;i<=4;i++){
        printf("%d\t",*(p+i));
    }
    getch();
}
```

Assignment 4.1: Note the output of the above program and make the comments.

Assignment 4.2: Write a program to input n number from the user and find the sum and average of number using the technique of dynamic memory allocation.