## Pointers

1. Write a function to swap values of two in variables of calling function. (TSRS)

```c
#include <stdio.h>
void swap(int *, int *);
int main()
{
    int x, y;
    printf("Enter two numbers : ");
    scanf("%d%d", &x, &y);
    printf("Before Swapping\n");
    printf("x   =   %d\ny   =   %d", x, y);
    swap(&x, &y);
    printf("\nAfter swapping\n");
    printf("x   =   %d\ny   =   %d", x, y);
    return 0;
}
// below function is swap function to swap values of two valiabe by passing
reference
void swap(int *a, int *b)
{
    int temp;
    temp = *a;
    *a = *b;
    *b = temp;
}
```

```
================================================================================
Output:
Enter two numbers : 100 50
Before Swapping
x   =   100
y   =   50
After swapping
x   =   50
y   =   100
```

2. Write a function to swap strings of two char arrays of calling functions. (TSRS)

```c
#include <stdio.h>
#include<string.h>
void swap(char **x, char **y);
int main()
{
    char *a[50], *b[50];
    printf("Enter first string : ");
    fgets(a, 50, stdin);
    printf("Enter second string : ");
    fgets(b, 50, stdin);
    printf("\nBefore swapping\n");
    printf("String1     =   %sString2     =   %s", a, b);
    swap(a, b);
    printf("\nAfter swapping\n");
    printf("String1     =   %sString2     =   %s", a, b);
    return 0;
}

// below function is swap function to swap values of two valiabe by passing
reference
void swap(char **x, char **y)
{
    char *temp = NULL;
    temp = *x;
    *x = *y;
```

```
    *y = temp;
}
```

```
Output:
Enter first string : shekh
Enter second string : akhtar

Before swapping
String1     =   shekh
String2     =   akhtar

After swapping
String1     =   akhtar
String2     =   shekh
```

3. Write a function to sort an array of int type values. [ void sort(int *ptr,int size); ]

```
#include<stdio.h>
void sort(int*, int);
int main()
{
    int num[15] = {0}, size;
    printf("Enter number of elements to store in array (Max 15 number) : ");
    scanf("%d", &size);
    sort(num, size);

    return 0;
}
// below function is for sorting elements of an array
void sort(int *ptr, int size)
{
    int i, j, temp;
    printf("Enter %d numbers : ", size);

    // Input from the user
    for (i = 0; i < size; i++)
        scanf("%d", ptr+i);

    printf("Sorted Array\n");

    for (i = 0; i < size - 1; i++)
    {
        for (j = i + 1; j < size; j++)
        {
            if (ptr[i] > ptr[j])
            {
                temp = ptr[j];
                ptr[j] = ptr[i];
                ptr[i] = temp;
            }
        }
    }
    for (i = 0; i < size; i++)
        printf("%d ", *(ptr + i));
}
```

```
Output:
Enter number of elements to store in array (Max 15 number) : 7
Enter 7 numbers : 66 55 22 48 94 21 3
Sorted Array
3 21 22 48 55 66 94
```

4. Write a program in C to demonstrate how to handle the pointers in the program.

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

```c
int main()
{
    int a = 50, *x, **y, ***z;
    x = &a;
    y = &x;
    z = &y;
    printf("%d %d %d %d\n", a, *x, **y, ***z);
    printf("%d %d %d %d\n", &a, x, *y, **z);
    printf("%d %d %d\n", &x, y, *z);
    printf("%d %d\n", &y, z);
    printf("%d", &z);

    return 0;
}
```

```
Output:
50 50 50 50
1468005420 1468005420 1468005420 1468005420
1468005408 1468005408 1468005408
1468005400 1468005400
1468005392
```

5. Write a program to find the maximum number between two numbers using a pointer

```c
#include <stdio.h>
// int findMax(int *, int *);
int main()
{
    int first, second, a[20], i, size, start = 0, end = 0, max, *p = NULL;
    p = a;
    printf("Enter number of element to store in arry : ");
    scanf("%d", &size);

    printf("Enter %d numbers\n", size);
    for (i = 0; i < size; i++)
        scanf("%d", p + i);

    printf("Enter 2 numbers which are in the above list to find the largest
number between those two numbers : ");
    scanf("%d%d", &first, &second);

    for (i = 0; i < size; i++)
    {
        if (*(p+i) == first)
            start = i;
        if (*(p+i) == second)
            end = i;
    }

    if (start < end)
        for (i = start + 1; i < end; i++)
            *(p + i + 1) = (*(p+i) > *(p + i + 1)) ? *(p+i) : *(p + i + 1);
    else
        for (i = end + 1; i < start; i++)
            *(p + i + 1) = (*(p+i) > *(p + i + 1)) ? *(p+i) : *(p + i + 1);

    printf("The maximum number between %d and %d is %d", first, second, *(p +
i - 1));

    return 0;
}
```

```
Output:
Enter number of element to store in arry : 8
Enter 8 numbers
```

```
89 52 47 54 56 82 98 100
Enter 2 numbers which are in the above list to find the largest number
between those two numbers : 47 82
The maximum number between 47 and 82 is 56
```

6. Write a program to calculate the length of the string using a pointer

```c
#include <stdio.h>
int lengthStr(char *);
int main()
{
    char a[50], l;
    printf("Enter any string to calculate length : ");
    fgets(a, 50, stdin);
    l = lengthStr(a);
    printf("Length of string is %d", l);
    return 0;
}

int lengthStr(char *p)
{
    int i;
    for (i = 0; *(p + i); i++)
        ;
    return (i - 1);
}
```

```
================================================================================
Output:
Enter any string to calculate length : shekh akhtar quraishi
Length of string is 21
```

7. Write a program to count the number of vowels and consonants in a string using a pointer.

```c
#include <stdio.h>
int main()
{
    char a[50], *p = NULL;
    int i, vowels = 0, consonant = 0;
    p = a;
    printf("Enter any string : ");
    fgets(a, 50, stdin);
    for (i = 0; *(p + i); i++)
    {
        if (*(p + i) == 'a' || *(p + i) == 'e' || *(p + i) == 'i' || *(p + i)
== 'o' || *(p + i) == 'u' || *(p + i) == 'A' || *(p + i) == 'E' || *(p + i)
== 'I' || *(p + i) == 'O' || *(p + i) == 'U')
            vowels++;
        else if (*(p + i) != ' ' && *(p + i) != 10)
            consonant++;
    }
    printf("Vowels = %d and Consonants = %d", vowels, consonant);
    return 0;
}
```

```
================================================================================
Output:
Enter any string : Mukesh And Gautam
Vowels = 6 and Consonants = 9
```

8. Write a program to compute the sum of all elements in an array using pointers.

```c
#include<stdio.h>
int sum(int *, int n);
int main()
{
    int a[30], size, result;
```

```
    printf("Enter number of elements to store in array (Max 30 numbers) : ");
    scanf("%d", &size);

    result =  sum(a, size);

    printf("The sum of all elements in an array is %d", result);
    return 0;
}

int sum(int *p, int n)
{
    int i, sum = 0;
    printf("Enter %d numbers :\n", n);
    for(i = 0; i < n; i++)
        scanf("%d", p + i);

    for(i = 0; i < n; i++)
        sum = sum + *(p + i);

    return (sum);
}
```

```
Output:
Enter number of elements to store in array (Max 30 numbers) : 10
Enter 10 numbers :
10 20 30 40 50 60 70 80 90 100
The sum of all elements in an array is 550
```

9. Write a program to print the elements of an array in reverse order.

```
#include<stdio.h>
void reverse(int *, int);
int main()
{
    int a[30], size;

    printf("Enter number of elements to store in array : ");
    scanf("%d", &size);

    reverse(a, size);
    return 0;
}

void reverse(int *p, int n)
{
    int i;
    printf("Enter %d numbers\n", n);
    for(i = 0; i < n; i++)
        scanf("%d", p + i);
    for(i = n - 1; i >= 0; i--)
        printf("%d ", *(p + i));
}
```

```
Output:
Enter number of elements to store in array : 10
Enter 10 numbers
5 6 9 8 41 25 68 46 1 25
25 1 46 68 25 41 8 9 6 5
```

10. Write a program to print a string in reverse using a pointer

```
#include <stdio.h>
#include <string.h>
int main()
{
```

```
    char a[30], *ptr = NULL, temp;
    int i, length;
    ptr = a;
    printf("Enter any string : ");
    fgets(a, 30, stdin);
    for (i = 0; *(ptr + i); i++)
        ;
    length = i - 2;

    i = 0;
    while (i <= length)
    {
        temp = *(ptr + i);
        *(ptr + i) = *(ptr + length);
        *(ptr + length) = temp;
        i++;
        length--;
    }
    printf("Reversed string : %s", ptr);
    return 0;
}
```

==========

```
Output:
Enter any string : quraishi
Reversed string : ihsiaruq
```