# DAA ASSSIGNMENT – 1

1. Write a program to find the sum of first n natural numbers using user defined function

   Program:

```c
#include <stdio.h>

int sum(int n) {
    int s = 0;
    for(int i = 1; i <= n; i++) {
        s = s + i;
    }
    return s;
}

int main() {
    int n;
    printf("Enter n value until which the sum should be: ");
    scanf("%d", &n);
    printf("The sum is: %d\n", sum(n));

    return 0;
}
```

   Output:

```
Enter n value until which the sum should be: 4
The sum is: 10
```

   The space complexity is O(n)

2. Write a program to find the sum of square first n natural numbers using user defined function

   Program:

```c
#include <stdio.h>

int sumOfSquares(int n) {
    int sum = 0;
    for (int i = 1; i <= n; i++) {
        sum += i * i;   // square of i
    }
    return sum;
}

int main() {
    int n;
    printf("Enter the value of n: ");
    scanf("%d", &n);

    int result = sumOfSquares(n);
    printf("Sum of squares of first %d natural numbers = %d\n", n, result);

    return 0;
}
```

Output:

```
Enter the value of n: 3
Sum of squares of first 3 natural numbers = 14
```

Space complexity is O(n)

3. Write a program to find the sum of cube first n natural numbers using user defined function

   Program:

```c
#include <stdio.h>

int sumOfSquares(int n) {
    int sum = 0;
    for (int i = 1; i <= n; i++) {
        sum += i * i* i;
    }
    return sum;
}

int main() {
    int n;
    printf("Enter the value of n: ");
    scanf("%d", &n);

    int result = sumOfSquares(n);
    printf("Sum of squares of first %d natural numbers = %d\n", n, result);

    return 0;
}
```

   Output:

```
Enter the value of n: 5
Sum of squares of first 5 natural numbers = 225
```

   Space complexity is O(n)

4. Write a program to find the factorial of a natural numbers using recursive function.

   Program:

```c
#include <stdio.h>

int factorial(int n) {
    if (n == 0 || n == 1) {
        return 1;
    }
    return n * factorial(n - 1);
}

int main() {
    int n;
    printf("Enter a natural number: ");
    scanf("%d", &n);

    if (n < 0) {
        printf("Factorial of negative numbers does not exist.\n");
    } else {
        printf("Factorial of %d is %d\n", n, factorial(n));
    }

    return 0;
}
```

Output:

```
Enter a natural number: 4
Factorial of 4 is 24
```

The space complexity is O(n)

5. Write a program to transpose a 3x3 matrix.

   Program:

```c
#include <stdio.h>

int main() {
    int r, c;

    printf("Enter number of rows: ");
    scanf("%d", &r);
    printf("Enter number of columns: ");
    scanf("%d", &c);
    int a[r][c], trans[c][r];
    printf("\nEnter the elements of the matrix:\n");
    for (int i = 0; i < r; i++) {
        for (int j = 0; j < c; j++) {
            scanf("%d", &a[i][j]);
        }
    }
    for (int i = 0; i < r; i++) {
        for (int j = 0; j < c; j++) {
            trans[j][i] = a[i][j];
        }
    }
    printf("\nTranspose of the matrix:\n");
    for (int i = 0; i < c; i++) {
        for (int j = 0; j < r; j++) {
            printf("%d ", trans[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Output:

```
Enter number of rows: 2
Enter number of columns: 2

Enter the elements of the matrix:
3
4
6
5

Transpose of the matrix:
3 6
4 5
```

6.write a program to print Fibonacci serial up to given number using user defined function

Program:

```c
#include <stdio.h>

void fibonacci(int n) {
    int a = 0, b = 1, c;

    if (n >= 0)
        printf("%d ", a);
    if (n >= 1)
        printf("%d ", b);

    c = a + b;
    while (c <= n) {
        printf("%d ", c);
        a = b;
        b = c;
        c = a + b;
    }
}

int main() {
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);

    printf("Fibonacci series up to %d:\n", n);
    fibonacci(n);

    return 0;
}
```

Output:

```
Enter a number: 4
Fibonacci series up to 4:
0 1 1
 2
 3
```