# Data Structure and Algorithm (UCS2004)
# B. Tech -2nd Semester
# Assignment -1

1. Define data structure and also describe the difference between primitive and non primitive data structure.
2. Discuss the importances of abstract data type (**ADT**) in programming?
3. Write a C program for insertion of an element in an Array?
4. Consider the linear arrays **AAA[5:50],BBB[-5:10]** and **CCC[1:8]**

   **a)** Find the number of elements in each array?

   **b)** Suppose base **(AAA) =300 and w=4** words per memory cell for AAA. Find the address of **AAA[15],AAA[35] and AAA[55].**
5. What is sparse matrix? Explain. Write the applications of sparse matrix?
6. Demonstrate and convert the infix expression **(((A+B)*(C-D))/E)-(F*(G+H)/I+J*K)** to postfix expression using stack.
7. Write a C program to implement insertion of element at beginning, end and specific node in linked list.
8. Write algorithm to convert a postfix expression into an infix expression. Consider the following arithmetic expression in postfix notation:

   **752+* 4 1 5- /-**

   (i) Find the value of the expression.

   (ii) Find the equivalent prefix form of the above expression.

9. Provide a C program that implements these operations (**Push, Pop, Peek, and IsEmpty**. )using an **array-based stack.**

10. What is a **Priority Queue**? How does it differ from a regular queue?Write a C program to implement a priority queue using an array.

11. Discuss the implementation of single-linked list. Write C function to implement following operations on singly-linked list.
    a. To count number of nodes
    b. To reverse the direction of links.
    c. To delete alternate nodes that is first, third, fifth and so on.

12. Write an algorithm to convert a valid arithmetic infix expression into its equivalent postfix expression.