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| **Sem: 3rd** | **Subject code: BCS304** | **Subject: Data structure and applications** |

**Assignment-1**

1. Define data structure. Explain the classification of data structures.
2. What are the differences between structures and unions? Explain with an example.
3. Explain string handling functions supported by ‘C’ with syntax and an example for each.
4. Explain the dynamic memory allocation functions supported by ‘C’ with syntax and an example for each.
5. Consider the pattern P=ababab. Construct the table and labeled directed graph used in the fast or second pattern matching algorithm. Trace it for the input text T=abaabababba.
6. Define a stack. Explain the different operations that can be performed on stack with a suitable ‘C’ function and example.
7. What are polynomials? Explain how polynomials are represented?
8. Design an algorithm to add 2 polynomials using ADT polynomial.
9. Define sparse matrix. Write an ADT sparse matrix.
10. Write a function to read the sparse matrix using triplet.
11. Write a function to find the transpose of a given sparse matrix.
12. How to represent a sparse matrix into 1D array with triples as well as transform it into a transpose matrix.(Assume matrix elements)
13. Convert the following infix expression into postfix expression using stack.

*((A + B) – C \* (D / E)) + F*

1. Develop a C recursive program for the following
2. Factorial of n numbers
3. Fibonacci series
4. GCD and LCM of n numbers
5. Tower of Hanoi for 3 discs
6. Explain representation of linear arrays in memory. Also, consider the linear arrays AAA=(5:50) and BBB=(-5:10).
7. Find the number of elements in each array.
8. Suppose BASE(AAA)=300, BASE(BBB)=500 and 4 words per memory cell for AAA, 2 words per memory cell for BBB, find the address of AAA[15], AAA[55], BBB[8], BBB[0].