

## MTech (AI&DS) Assignments

**For every implementation ensure to check all validations required in your code.**

1. Implement following algorithms of *Polish-Notation* conversions-
  - (i) Infix expression to Prefix and Postfix expression and vice-versa.
  - (ii) Direct Postfix expression to Prefix expression and vice-versa.
2. Multiplication and addition of polynomials
3. Implement and compare *BST*, *Hash-Table* and *Simple Array* on the same **set** of keys for search, delete and insert operations.
4. Implement any two algorithms other than *Merge-Sort*, *Quick-Sort*, and *Binary-Search* algorithms based on *Divide-and-Conquer* design method.
5. Implement graph traversal algorithms and compare them.
6. Implement MST algorithms discussed in lecture and explore other MST algorithms.
7. Design and implement an efficient algorithm that checks if there is a pair of numbers  $a_i$  &  $a_j$  that sum to  $M$  in a list of  $n$  integers:  $a_1, a_2, a_3, \dots a_n$ , sorted in descending order.
8. Prepare a comparative statement of DFS and BFS algorithms.
9. Let there is an undirected connected graph with integer edge labels where each vertex is of degree exactly 2. Find the time complexity of an MST computed for such graph and justify it. Find time complexity of your algorithm.
10. Discuss all the operations in Red Black Tree- Insertion, Deletion, Searching of an element.