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B.Tech. Computer Science and Engineering (AI)  
Fourth Semester  
**22AIE212 Design and Analysis of Algorithms**

**Lab Sheet 5**

1. Given a graph  $G$  as input, identify all the strongly connected components in  $G$ .
2. Given a dependency graph  $G$ , which is a DAG, find a linear order using topological sorting
3. Given a string  $S$  of distinct character of size  $N$  and their corresponding frequency  $f[i]$  i.e. character  $S[i]$  has  $f[i]$  frequency. Your task is to build the Huffman tree print all the huffman codes in preorder traversal of the tree
4. Given a set of  $N$  items, each with a weight and a value, represented by the array  $w$  and  $val$  respectively. Also, a knapsack with weight limit  $W$ . The task is to fill the knapsack in such a way that we can get the maximum profit. Return the maximum profit.