

Assignment 1:

The Fibonacci sequence is a series of numbers in which each number is the sum of the two preceding ones, starting from 0 and 1.

The recursive formula for the Fibonacci sequence is:
 $F(n) = F(n-1) + F(n-2)$

Assignment 2:

Huffman coding is a lossless data compression algorithm that assigns variable-length codes to characters based on their frequency of occurrence. This means that characters that appear more often are assigned shorter codes, while characters that appear less often are assigned longer codes. This results in a compressed representation of the data that is smaller than the original representation.

The Huffman coding algorithm is a greedy algorithm, which means that it makes the locally optimal choice at each step without considering the global consequences. The algorithm does this by always merging the two nodes with the lowest frequencies. This greedy approach is what allows the algorithm to construct the Huffman tree in an efficient manner.

Assignment 3:

The fractional knapsack problem is a combinatorial optimization problem where you have a knapsack or bag with a certain weight capacity and a set of items, each with a weight and a value. The goal is to fill the knapsack with items in a way that maximizes the total value of the items without exceeding the weight capacity.

This is different from the 0-1 knapsack problem, where you can only take an item or leave it out entirely.

Item	Weight (kg)	Value
A	10	60
B	20	100
C	30	120

Assignment 4:

The 0-1 knapsack problem is a combinatorial optimization problem where you have a knapsack or bag with a certain weight capacity and a set of items, each with a weight and a value. The goal is to fill the knapsack with items in a way that maximizes the total value of the items without exceeding the weight capacity.

In the 0-1 knapsack problem, you can only take an item or leave it out entirely. You cannot take a fraction of an item. This is different from the fractional knapsack problem, where you are allowed to take fractions of items.

The branch and bound method is a general algorithm design paradigm for solving combinatorial optimization problems. It works by recursively partitioning the problem into smaller subproblems until a solution is found. At each step, the algorithm also calculates a lower bound on the value of the optimal solution for each subproblem. This lower bound is used to prune subproblems that cannot possibly contain an optimal solution, which can significantly reduce the number of subproblems that need to be explored.

Enter capacity : 10

Enter Items : 4

Maximum Profit Earned: 19

Assignment 5: