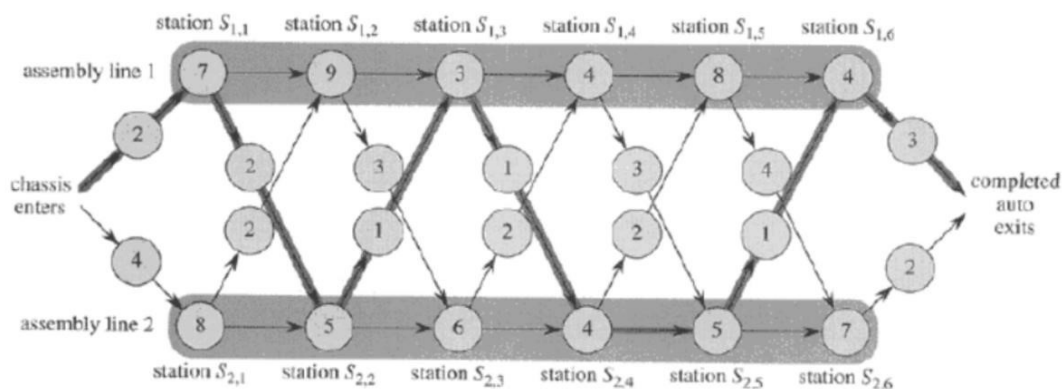


Programming Assignment 7: Dynamic Programming

Question 1: Implement assembly line scheduling problem by taking all the required parameters from the user and produces the minimum amount of time taken and the path followed. Let's say the number of states in assembly line scheduling is n . Implement the brute force technique as well, which looks for all the paths possible. Compare the time taken by both the algorithms and verify that the dynamic approach in fact produces the optimal answer. [10 Marks]

For example, suppose you want to find the shortest path for the following assembly line:



Then, your program should take input as the following:

Enter number of stations: 6

Enter entry time for assembly line 1 and assembly line 2 respectively: 2 4

Enter exit time for assembly line 1 and assembly line 2 respectively: 3 2

Enter the processing time at stations for assembly line 1: 7 9 3 4 8 4

Enter the processing time at stations for assembly line 2: 8 5 6 4 5 7

Enter Transfer times from assembly 1 to assembly 2: 2 3 1 3 4

Enter Transfer times from assembly 2 to assembly 1: 2 1 2 2 1

Output:

Optimal path value from brute force and via DP are: 38 and 38

Time taken by brute force: 4 mins

Time taken by DP: 20 sec

Optimal Path: 1, 2, 1, 2, 2, 1

Question 2:

Implement matrix chain multiplication problem that takes the array p from the user and produces the optimal parenthesis. [10 Marks]

Input: Enter number of matrices to be multiplied: 6

Enter the dimensions of the matrices i.e. array p: 30 35 15 5 10 20 25

Output: Optimal parenthesis cost is: 15125

Optimal parenthesis sequence is: (A_1 (A_2 A_3))((A_4 A_5) A_6)

Question 3:

Implement longest common subsequence problem which takes two strings from the user and produces the longest common subsequence amongst the two input strings. [10 Marks]

Input: Enter the first string: ABCBDAB

Enter the second string: BDCABA

Output: The longest subsequence is: BCBA