DESIGN & ANALYSIS OF ALGORITHMS

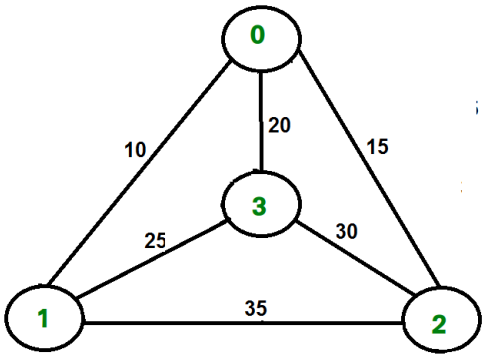
Day – 4 Assignment

OCTOBER 22, 2020

SRI RAMACHANDRA ENGINEERING & TECHNOLOGY
M.SATHISHKUMAR

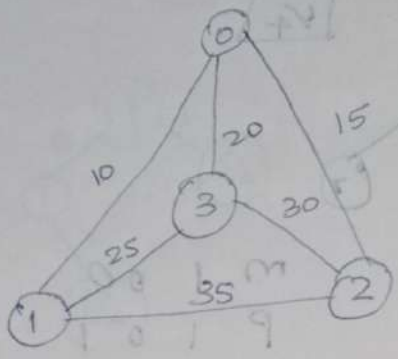
Day-4: 22-10-2020 ASSIGNMENT - 1

1. Design a branch and bound strategy to solve the Travelling sales problem shown in the figure given below.



2. Design a optimal substructure to find longest common subsequence between the two sequences given below
   Sequence 1: algorithm
   Sequence 2: alignment
   One of its LCS is algm.
   Form the memorization table and write algorithm for memorization table and backtracking steps to reach the output

1.



	0	1	2	3
0	0	10	15	20
1	10	0	35	25
2	15	35	0	30
3	20	25	30	0

$S = \phi$

$Cost(1, \phi, 0) = d[1,0] = 10$

$Cost(2, \phi, 0) = d[2,0] = 15$

$Cost(3, \phi, 0) = d[3,0] = 20$

$S = 1$

$Cost(1, \{2\}, 0) = d[1,2] + Cost(2, \phi, \phi)$

$= 35 + 15 = 50$

$Cost(1, \{3\}, 0) = d[1,3] + cost(3, \phi, 0)$

$= 25 + 20 = 45$

$Cost(2, \{1\}, 0) = d[2,1] + cost(1, \phi, 0)$

$= 35 + 10 = 45$

$cost(2, \{3\}, 0) = d[2,3] + cost(3, \phi, 0)$

$= 30 + 20 = 50$

$cost(3, \{1\}, 0) = d[3,1] + cost(1, \phi, 0)$

$= 25 + 10 = 35$

$cost(3, \{2\}, 0) = d[3,2] + cost(2, \phi, 0)$

$= 30 + 15 = 45.$

$S = 2$

$cost(1, \{2,3\}, 0)$

$\Rightarrow d[1,2] + cost(2, \{3\}, 0) = 35 + 50 = 85$

$\Rightarrow d[1,3] + cost(3, \{2\}, 0) = 25 + 45 = 70.$

$cost(2, \{1,3\}, 0)$

$\Rightarrow d[2,1] + cost(1, \{3\}, 0) = 35 + 45 = 80$

$\Rightarrow d[2,3] + cost(3, \{1\}, 0) = 30 + 35 = 65.$

$cost(3, \{1,2\}, 0)$

$\Rightarrow d[3,1] + cost(1, \{2\}, 0) = 25 + 50 = 75.$

$\Rightarrow d[3,2] + cost(2, \{1\}, 0) = 30 + 45 = 75.$

$S = 3$

$cost(0, \{1,2,3\}, 0)$ ~~$= d[0,1]$~~

$\Rightarrow d[0,1] + cost(1, \{2,3\}, 0)$

$= 10 + 70 = 80$

$\Rightarrow d[0,2] + cost(2, \{1,3\}, 0)$

$= 15 + 65 = 80.$

$\Rightarrow d[0,3] + cost(3, \{1,2\}, 0)$

$= 20 + 75 = 95.$

$\Rightarrow$ Minimum cost path = 80

2. algorithm, alignment.

		jo	1	2	3	4	5	6	7	8	9
i			a	l	i	g	n	m	e	n	t
0	0	0	0	0	0	0	0	0	0	0	0
1	a	0	↖1	←1	←1	←1	←1	←1	←1	←1	←1
2	l	0	↑1	↖2	←2	←2	←2	←2	←2	←2	←2
3	g	0	↑1	↑2	↑2	↖3	←3	←3	←3	←3	←3
4	o	0	↑1	↑2	↑2	↑3	↑3	↑3	↑3	↑3	↑3
5	r	0	↑1	↑2	↑2	↑3	↑3	↑3	↑3	↑3	↑3
6	i	0	↑1	↑2	↖3	↑3	↑3	↑3	↑3	↑3	↑3
7	t	0	↑1	↑2	↑3	↑3	↑3	↑3	↑3	↑3	↖4
8	h	0	↑1	↑2	↑3	↑3	↑3	↑3	↑3	↑3	↑4
9	m	0	↑1	↑2	↑3	↑3	↑3	↖4	←4	←4	↑4

a l g t

LCS - algt

Recoverable Signature

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M.Sathishkumar
Student@Sri Ramachandra Engineering & Tec...
Signed by: 69097380-d90a-4c4d-9ad0-9a1a3b909ff2