

STAMFORD UNIVERSITY BANGLADESH

Name : Abdullah Al Monayem

ID : CSE 071 08128

Subject: Algorithms (CSI - 231)

Batch : 71 - A

Email: almonayem2019@gmail.com

Contact No.: 01747-534818

Am. the. Q.No: 1

Given, 1909 + [2,5]m+ [1,1]m = [2,1]m

0066= (1EX 25 X50) +0+0=

 $M_{1}(25 \times 56) = P_{0} \times P_{1}$

M2 (56 X 71) = P1 X P2

= P2 X P3

 M_4 (19X71) = $P_3 \times P_4$ 98994 [P.P] M_4 [6.8] M_5

E D + D + (+1×19×96)= 129509

 $m[i,j] = \{0, if i=j \}$ $\min_{k=1,j} \{m[i,k] + m[k+1,j] + P_{i-1} P_k P_k \},$ if i < j

i < K < j

Length 1=1, m[i,i] = 0 = m[i,i] = 0

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Time

Ano. the B. Moi A Length l=2,

Sub:

della

m[1,2] = m[1,1] + m[2,2] + PoP1P2

= 0+0+ (25×56×71) = 99400

M, (25 X 56)

m[2,3] = m[2,2] + m[3,3] + P, P2P3

= 0+0+ (56×71×19)=75599

m[3,4] = m[3,3] + m[4,4] + P2 P3 P4

= 0 + 0 + (71 × 19 × 96) = 12950 4

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Length 1=3,

$$m[1,3] = min$$
 $m[1,1] + m[2,3] + P_0P_1P_3$
 $= 0 + 75549 + (25 \times 56 \times 19) = 102144$
 $m[1,2] + m[3,3] + P_0P_2P_3$
 $= 99400 + 0 + (25 \times 71 \times 19) = 133125$

= 102144

$$m[2,4] = min \begin{cases} m[2,2] + m[3,4] + P_1P_2P_4 \\ = 0 + 129504 + [56x71x96] = 511200 \\ m[2,3] + m[4,4] + P_1P_3P_4 \\ = 75594 + 0 + (56x19x96) = 177688 \end{cases}$$

= 177688

$$m = \{3,5\} = min$$
 $\{m = \{3,4\}\} + m = \{4,5\} + P_2 P_3 P_5$ $= m = \{3,4\} + m = \{5,5\} + P_2 P_4 P_5$ $= P_3 T_5$

Day Sat Sun Mon Tue Wed Thu Fri

Length 1=4

m [3,6] = min [m[3,3] +m [4,6] +8,8,8 E

m[1,4] = min [m[1,1] +m[2,4] +PoP, P4

= 0+177688 + (25x56x96) = 312088

m[1,2] + m[3,4] + Po P2 P4

= 99400 + 129504+ (25×71×96)=399304

m [-1,3] +m [9,4] + Po P3 P4 -- 102194+0+ (25×19×96)=

147744

147799

m[2,5/= min

m[2,2] >

[2,3] + m [4/5] + P, P3 P5

[2,47 7 m [5,5] + P, P4 P5

Shohid

Day Sat Sun Mon Tue Wed Thu Fri
Time: Date: / /

Optimal solutions

7	1	2	3	4			
1	0	99400	102144	147744		ii,	
2	0	0	7-5544	177688	M	, M	6
3	0		0	120504			
4	0	May	(8	0	M	M	7 1

9°;

	2	2	4		
/1/M	11/1	1 d M	3	I MA	A
2		2	3		
3			3		
4					

Parenthesizing the Matrices;

(i) M, M2 M3 M4

(1) (M, M2 M3) (My)

(III) ((M, M2) (M3)) (M4)

Optimal solution:

(i) ((M, M2) (M3)) (M4)

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Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri
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(9.9) B. Am. the . Q. No! 2

5 22+18

min & 22+12), (5+20 B

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Day Sat Sun Mon Tue Wed Thu Fri

Sub:

9 (4, 223) = 042+9 (2,9)

= 2+19 (0,1) 8

= 27

g (2, 233) = c23+3(3,9)

= 22+18

(P,P) 8+ po 3 = 190 = (113 (0) B

g (3,423) = c32+3(2,4)

(9 10) 6 T = 2 7 F 19 (8 1 P) B

2 8 7 26

 $g(2, 3, 4) = min \{c_{23} + g(3, 34)\},$ $c_{24} + g(9, 33)\}$ $= min \{(22 + 12), (5 + 29)\} = 3[$

Day Sat Sun Mon Tue Wed Thu Fri

 $\frac{3}{3}(3,(2,43)) = \min\{(2,2+3)(2,443), (2,443)\}$ $\frac{2}{3}(4,423)^{3}$ $= \min\{(7+14),(3+27)\}$ = 21

 $g'(4,42,33) = min \left\{ \frac{e42}{c42} + g'(2,433), c_{42} + g'(3,423) \right\}$ $= min \left\{ (8+40), (8+26) \right\}$ = 34

g(1, 92, 3, 43) = min (2,2+3(2,3)) $e_{13} + g(3, 92, 93)$; $e_{14} + g(9,92,33)$ = 28

Page 10 Day Sat Sun Mon Tue Wed Sub: Path, A -> C -> B -> D -> A Cog + 3 (40 823) 4 = min & (7+119) (3+27) 8 (4,52,33) = min & see + 10 (4,53). C43 # 2 (32 129) mins (8+40), (8 +26) 8(1, 52, 2, 93) = min & co + 3(3) 839) 3+3(3) \$2.43); (14+3) (14.42)

Day Sat Sun Mon Tue Wed Thu Fri

Am. the . a . No:3

The Steps of Dynamic

Programming algorithm is —

- (i) Characterize optimal substructure
- (ii) Recurrively define the value of an optimal notution
- (iii) compute the value bottom up
- (iv) (if) needed construct an optimal solution.



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Given 9, 9 69 4 [2,2] m + [1,1] m = [2,1] m

00666 = (12×99×33) +0+0 =

$$M_{1}(25 \times 56) = P_{0} \times P_{1}$$

$$M_4 \left(19 \times 71\right) = P_3 \times P_4$$

= 0 + 0 + (+1×19×96)= 129509

$$m[i,j] = \{0, if i=j \}$$

$$\min_{k=1,j} + \min_{k=1,j} + p_{i-1} p_k p_k \},$$

$$if i < j$$

i < K < j

Length 1=1, m[i,i] = 0 = m[i,i] = 0

Time

Ano, the BINOIL Length 1=2,

Sub:

a colo

m[1,2] = m[1,1] + m[2,2] + PoP1P2

 $= 0+0+(25\times 56\times 71)=99400$

M, (25 X 56)

m[2,3] = m[2,2] + m[3,3] + P, P2 P3

= 0+0+ (56×71×19)=75599

m[3,4] = m[3,3] + m[4,4] + P2 P3 P4

= 0 + 0 + (71 × 19 × 96) = 12950 4

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Day	Sat	Sun	Mon	Tue	Wed	Thu	Fr
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Length 1=3,

$$m[1,3] = min$$
 $m[1,1] + m[2,3] + P_0P_1P_3$
 $= 0 + 75549 + (25 \times 56 \times 19) = 102144$
 $m[1,2] + m[3,3] + P_0P_2P_3$
 $= 99400 + 0 + (25 \times 71 \times 19) = 133125$

= 102144

$$m[2,4] = min \begin{cases} m[2,2] + m[3,4] + P_1P_2P_4 \\ = 0 + 129504 + [56x71x96] = 511200 \\ m[2,3] + m[4,4] + P_1P_3P_4 \\ = 75594 + 0 + (56x19x96) = 177688 \end{cases}$$

= 177688

$$m = \{3, 5\} = min$$
 $\{m = \{3, 3\} + m = \{4, 5\} + P_2 P_3 P_5 \}$ $= \{m = \{3, 4\} + m = \{5, 5\} + P_2 P_4 P_5 \}$ $= \{p = 1, 0\}$

1207 174							
Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri
Time			Date:	1		1	

Length 1=4

m [3,6] = min - [m[3,3] +m [4,6] +818 Pc

m[1,4] = min [m[1,1] +m[2,4] +PoP,P4

= 0+177688 + (25x56x96)=312088

m[1,2] + m[3,4] + Po P2 P4

= 99400 + 129504+ (25×71×96)=399304

m [1,3] +m [4,4] + Po P3 P4 - 102194+0+ (25×19×96)=

147744

= 147799

m[2,5 /= min

m[2,2] 7

m[2,3] + m[4/5]+ P, P3 P5

m [2,47 7 m [5,5] + P, P4 P5

Shohid

Optimal solutions

(i) ((M, Mg

m:		· as sin !	· M
	1	2	3
. 1	0	99400	IAGLAL

			3	4	
. 1	0	99400	102144	147744	
2	0	0	75544	177688	M M
3	0		0	129504	
4	0	May	(8	0	COTM, M.
	LIM	111	N 1	(a M	103 17 1113
				(3, 1	

9%

/1/M	1//	a M	3
			100 - 1 - 1 - 1 - 1
2		2	3
3			3
4			

Day [Sat	Sun	Mon	Tue	Wed
Time			Date:	1	

Parenthesizing the Matrices;

(i) M, M2 M3 M4

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(III) ((M, M2) (M3)) (M4)

Optimal solution:

(i) ((M, M2) (M3)) (M4)

Sub: Page - 7

Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri
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Am.the.Q.No:2

$$g(2, 0) = c_{21} = 19$$

21+32 2

my 11 3 (22 + 12), (5+20 p.

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Day Sat Sun Mon Tue Wed Thu Fri

Sub:

$$g(2,63,47) = min \{c_{23} + g(3,49),$$

 $c_{24} + g(9,339)\}$
 $= min \{(22+12), (5+29)\} = 3[$

Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri

Time: Date: /

 $g'(4,42,33) = min \left\{ \frac{e442}{c_{42}} + g'(2,433), c_{43} + g'(3,423) \right\}$ $= min \left\{ (8+40), (8+26) \right\}$ = 34

g (1, \(\frac{2}{3}\), \(\frac{4}{3}\) = min\(\frac{1}{3}\) \(\frac{12}{3}\)\\
e_{13} + g(3, \(\frac{2}{3}\), \(\frac{4}{3}\)\), \(\frac{14}{3}\)\\
- 28

Page 10 Day Sat Sun Mon Tue Wed Sub: Path, A -> C -> B -> D -> A J. (234 + 8 (4 22 3) A = min { (7117) (3+2) 8 (9,52,33) = min & cus + 10 (4.53). (12 f 2) (5 f 29) (8+40), (8+26) 3 (1, 42, 2, 2, 93) = min & co + 3 (8) 1899) 5+3(3) {2,43); (4+36(4) 2,39)}

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The steps of Dynamic

Programming algorithm is —

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