Student Name: ______________________________ J#: ________________

CSC 323 Algorithm Design and Analysis, Spring 2016

Instructor: Dr. Natarajan Meghanathan

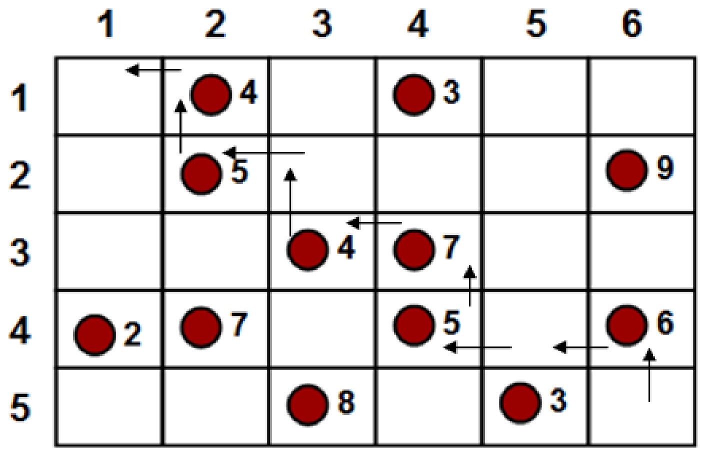
Quiz 6 (March 29, 2016) Max. Points: 25 Max. Time: 15 min.

1) (12 pts) Consider the Coin Collection Problem in which a robot can either move one cell down or one cell to the right during each move. The robot starts from cell (1, 1) and has to reach cell (5, 6): Find the maximum value of the coins that the robot could collect when it reaches cell (5, 6) and also trace the path.

	1	2	3	4	5	6
1		● 4		● 3		
2		● 5				● 9
3			● 4	● 7		
4	● 2	● 7		● 5		● 6
5			● 8		● 3	

Maximum value of the coins collected is 31.

	1	2	3	4	5	6
1	0	4	4	7	7	7
2	0	9	9	9	9	18
3	0	9	13	20	20	20
4	2	16	16	25	25	31
5	2	16	24	25	28	31



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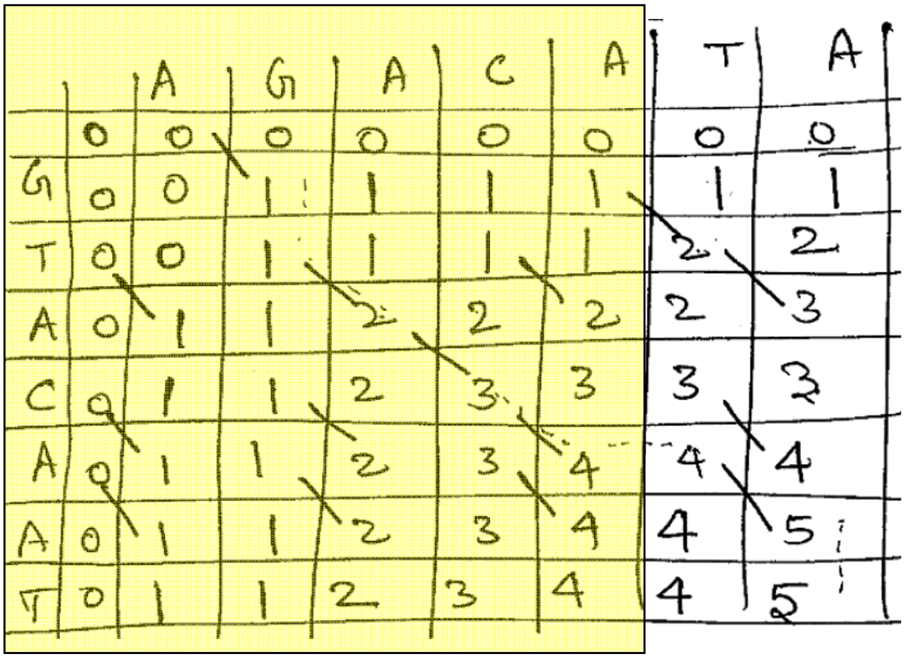
2) (13 pts) Use a dynamic programming algorithm to find the Longest Common Subsequence between the two sequences:

X = AGACATA
Y = GTACAAT

Also, use the dynamic programming table determined for the above two sequences to determine the Longest Common Subsequence for

X ' = AGACA
Y ' = GTACAAT



		A	G	A	C	A	T	A
	0	0	0	0	0	0	0	0
G	0	0	1	1	1	1	1	1
T	0	0	1	1	1	1	2	2
A	0	1	1	2	2	2	2	3
C	0	1	1	2	3	3	3	3
A	0	1	1	2	3	4	4	4
A	0	1	1	2	3	4	4	5
T	0	1	1	2	3	4	4	5

The alignment between X and Y is as shown below:

A G – A C A T A –
_ G T A C A – A T

GACAA of length 5 is the longest common sub sequence.

The alignment between X ' and Y ' is as shown below.

A G – A C – A –
_ G T A C A A T

GACA of length 4 is the longest common subsequence. We use the only highlighted part of the table above to determine this.