Programming Assignment 1

(Due on September 15, 2018 by 11:59pm)

I. Questions (20%):

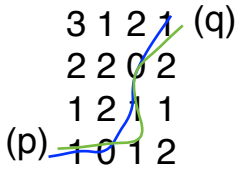
(1) (as 2.11) (4%) Consider the two image subsets, S1 and S2, shown in the following figure. For V = {1}, determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent, or (c) m-adjacent.

	S1				S2				
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1	1	0	0	0
0	0	1	1	1	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1

A) No
B) Yes
C) Yes

(2) (as 2.15) (4%) Consider the image segment shown

(a) Let V= {0,1} and compute the lengths of the shortest 4-, 8-, and m-path between p and q. If a particular path does not exist between these two points, explain why.

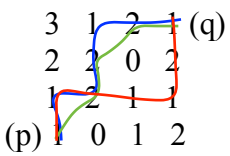


4) DNE — theres no way to get to 1 from p to q

8) 5

m) 6

(b) Repeat for V = {1,2}.



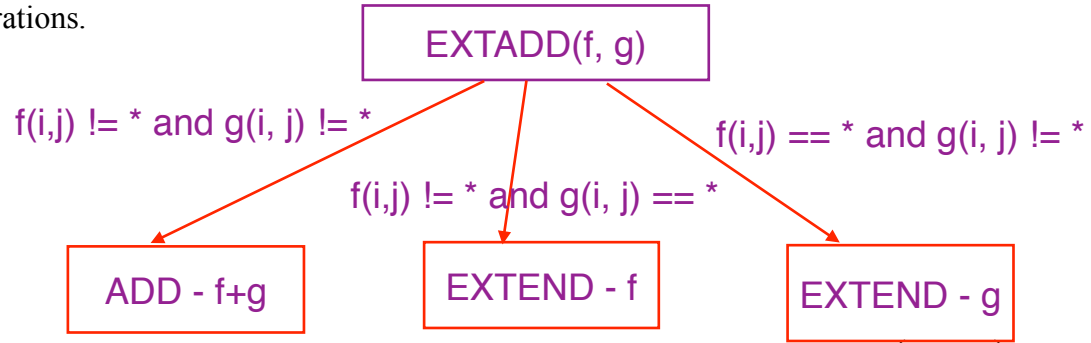
4) 7 length

8) 5 length

m) 7 length

(3) Based on the definition of EXTADD(f, g),

(a) (2%) Design a block diagram to realize the EXTADD(f, g) operation using ADD and EXTEND operations.

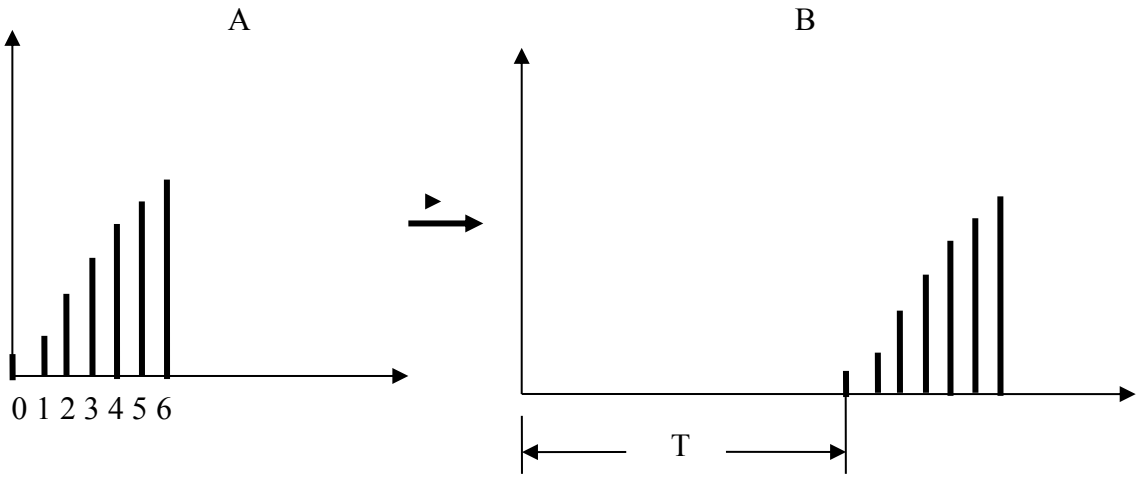


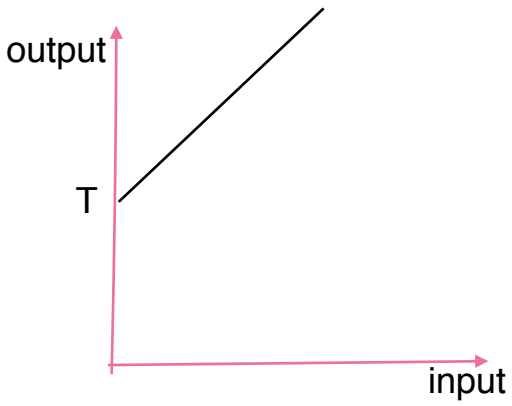
(b) (2%) Compute the EXTADD(f, g), where $f = \begin{pmatrix} 3 & 5 & -2 \\ * & 0 & * \end{pmatrix}_{1,2}$; $g = \begin{pmatrix} 2 & 4 \\ 3 & 9 \\ -2 & * \end{pmatrix}_{2,2}$

EXTADD(f, g) = $\begin{matrix} 5 & 9 & -2 \\ 3 & 9 & * \\ -2 & * & * \end{matrix}$

(4) 4%

Given the following histogram (A), after a shifting by T, the histogram becomes (B).
Write a transformation function and plot the transformation curve for such a shifting transformation.





$B = A(x-T)$

(5) 4%

Give the histogram (A), after applying the transformation (C), plot the new histogram after the transformation.