**Quiz I – CS A**

**CSC331 Digital Image Processing**

**Instructions: There is only 1 problem in this exam. You can use your notes and books in**

**this exam.**

Problem 1: A given image *f* has been equalized to produce *G*. Given below are *gk* and *G*(image)

after equalization:

,

0.25

0.75

1

*gk*

1 2 3 4

(a): From *gk,* produce the pdf and histogram of *f.*

0.25+0.75+0.75+1 = 2.75

= [ 0.25/2.75 0.75/2.75 0.75/2.75 1/2.75 ]

= [ 0.08 0.27 0.27 0.36 ]

= [ a b c d]

Row sum = [ a+b c+d]

Column sum = [a+c b+d]

Normalized row sum = [ a/(a+b) b/(a+b) c/(c+d) d/(c+d)]

Normalized col sum = [ a/(a+c) b/(b+d) c/(a+c) d/(b+d)]

Substituting values

Normalized row sum = [ 0.25 0.75 0.75 1]

Normalized col sum = [ 0.5 0.5 0.75 0.25]

Inverse CDF

[ 0.25 0.75 0.75 1]

Map values of original matrix to inverse cdf

[ 0.25 0.75 0.75 1] -> [ 0.25 0.75 0.75 1]

[ 0.25 0.75 0.75 1] X (a+b+c+d)

[ 0.25 0.75 0.75 1] X 1.75

= [ 0.43 1.31 1.31 1.75]

(b): Draw the original image *f*

Inverse CDF (cumulative distribution function):

[ a/(a+b) b/(a+b) c/(a+c) d/(a+c) ]