**Mean of matrix**

(sum of all elements of matrix) / (total elements of matrix)

Note that this definition doesn't require matrix to be sorted and works for all matrices.

**Matrix A GLCM**

Sum of elements = 0+0+0+1+0+0+1+0+0+0+0+0+0+1+3+0+0+1+0+1+0+0+0+0+0+2+1+3+2+2+1+0+1+0+0+0+0+1+3+0+3+1+0+1+0+0+0+0+1+1+0+2+1+2+2+0+1+0+0+0+1+0+2+0+2+1+0+3+1+0+0+0+0+0+2+0+0+0+0+0+1+0+1+0+0+1+0+1+1+2+0+0+1+0+0+0+0+0+1+2+1+1+1+1+3+0+1+1+0+0+0+0+0+0+1+1+1+0+1+0+0+0+0+0+0+0+0+0+3+1+0+0+0+0+0+0+0+0+0+0+0+0+1+1 = 82.0

No of elements in matrix A = 144

Mean of A = 82/144 = 0.56

**Matrix B GLCM**

Sum of elements = 0+3+2+0+0+0+2+10+8+4+0+0+3+6+6+6+1+0+1+2+5+2+2+2+0+2+1+4+3+1+0+0+0+1+2+2 = 79

No of elements in matrix B = 36

Mean of B = 79/36 = 2.25

**Variance** **of a** **matrix**:  
First mean should be calculated by adding sum of each elements of the matrix. After calculating mean, it should be subtracted from each element of the matrix. Then square each term and find out the variance by dividing sum with total elements.

**Variance of A GLCM**

Sum of elements difference / No of elements = ((0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(3-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(2-0.57)2+(1-0.57)2+(3-0.57)2+(2-0.57)2+(2-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(3-0.57)2+(0-0.57)2+(3-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(1-0.57)2+(0-0.57)2+(2-0.57)2+(1-0.57)2+(2-0.57)2+(2-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(2-0.57)2+(0-0.57)2+(2-0.57)2+(1-0.57)2+(0-0.57)2+(3-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(2-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(1-0.57)2+(2-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(2-0.57)2+(1-0.57)2+(1-0.57)2+(1-0.57)2+(1-0.57)2+(3-0.57)2+(0-0.57)2+(1-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(1-0.57)2+(1-0.57)2+(0-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(3-0.57)2+(1-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(0-0.57)2+(1-0.57)2+(1-0.57)2)/144) = **0.69**

**Variance of B GLCM**

Sum of elements difference / No of elements = ((0-2.25)2+(3-2.25)2+(2-2.25)2+(0-2.25)2+(0-2.25)2+(0-2.25)2+(2-2.25)2+(10-2.25)2+(8-2.25)2+(4-2.25)2+(0-2.25)2+(0-2.25)2+(3-2.25)2+(6-2.25)2+(6-2.25)2+(6-2.25)2+(1-2.25)2+(0-2.25)2+(1-2.25)2+(2-2.25)2+(5-2.25)2+(2-2.25)2+(2-2.25)2+(2-2.25)2+(0-2.25)2+(2-2.25)2+(1-2.25)2+(4-2.25)2+(3-2.25)2+(1-2.25)2+(0-2.25)2+(0-2.25)2+(0-2.25)2+(1-2.25)2+(2-2.25)2+(2-2.25)2)/36 = **5.97**

**Discussion of Results**

The mean and variance of A shows the general element value distribution. The mode of A is 0 and the mean is 0.56 higher but the variance appears to be closer to the mode.

The mean and variance of B also shows the general element value distribution. The mode of B is 0 and the mean is 2.25 higher but the variance is way off.

Hence the mean and variance of A has a better relationship with the mode than that of B.