Lab 05 - Report - Lakshya Kohli - 210123077

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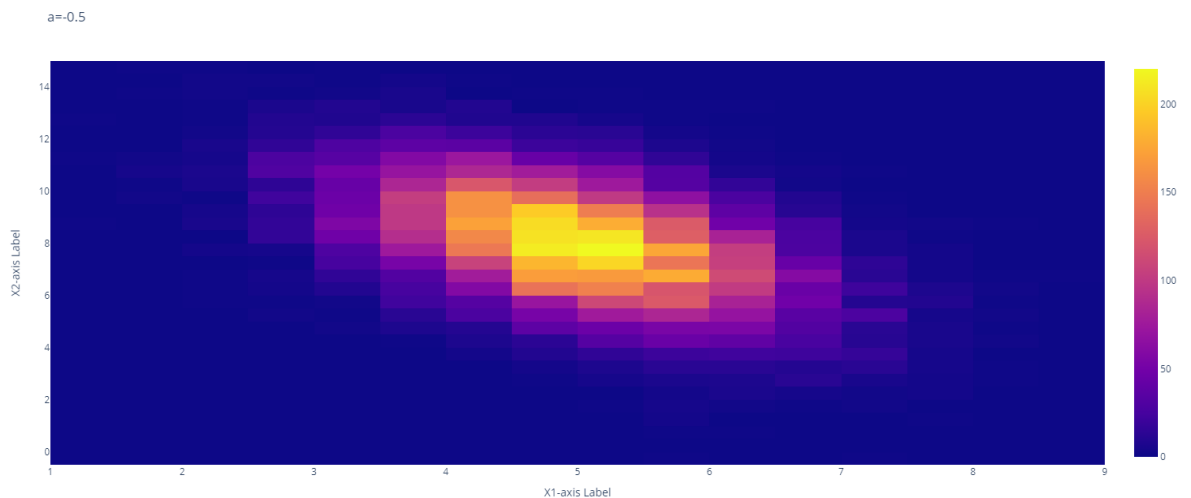
Answer 1.b

The 2-dimensional histogram based on the values generated in part a are as follows:

1. a = -0.5
   For this value of a the two random variables are negatively correlated as the correlation coefficient is negative, thus we can see that the spread of the values is in the direction parallel to the line x+y = 0 (on the X-Y plane).

2. a = 0.0
   For this value of a the two random variables are not
   correlated as the correlation coefficient is zero, thus we can
   see that the spread of the values is uniform, not in a
   particular direction like the case for a = -0.5.

a=0
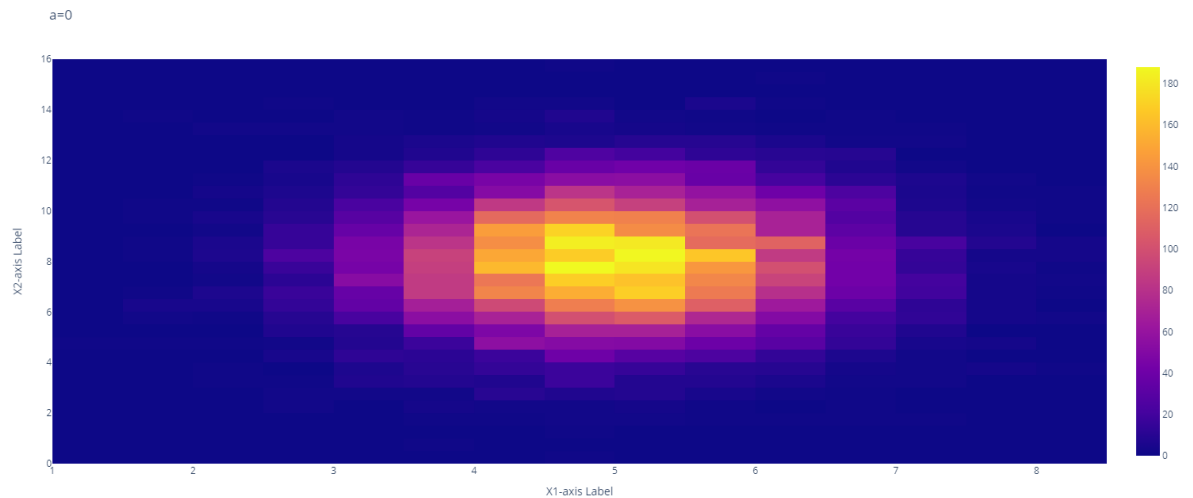
3. a = 0.5
   For this value of a the two random variables are positively
   correlated as the correlation coefficient is positive, thus we
   can see that the spread of the values is in the direction
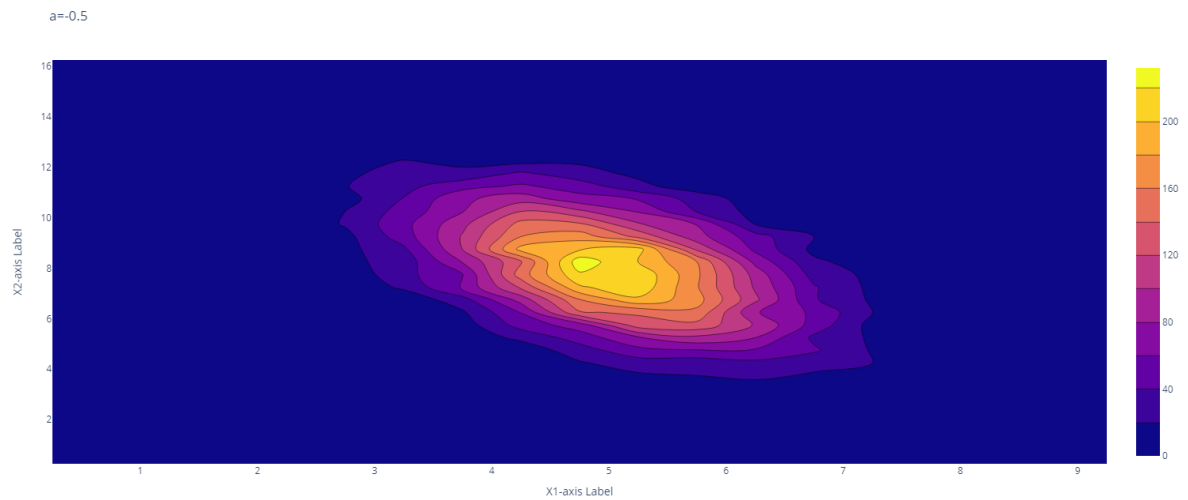   parallel to the line x-y = 0 (on the X-Y plane).

a=0.5
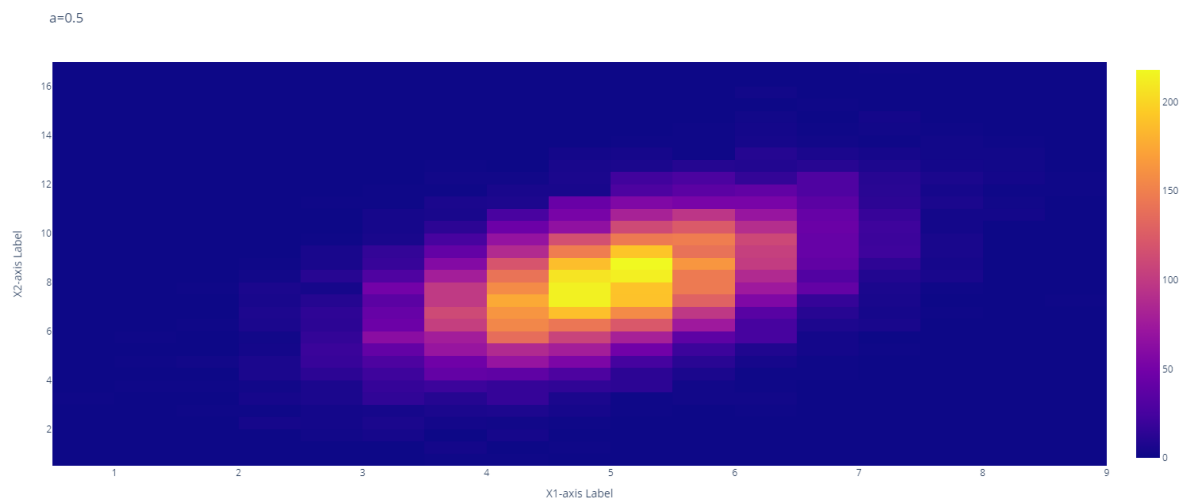
4. a = 1

   For this value of a the determinant of the variance-covariance matrix becomes zero, thus it is not invertible.
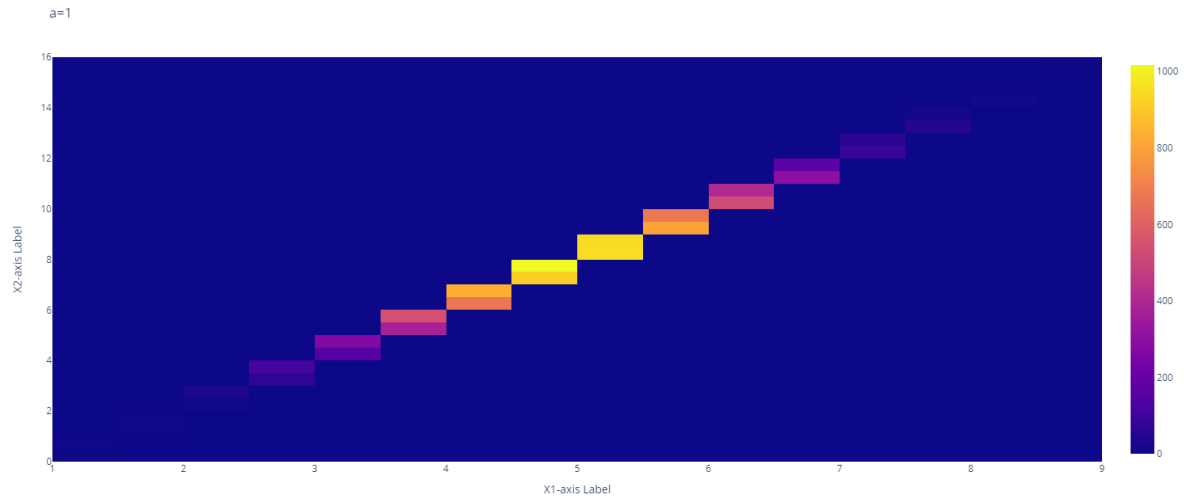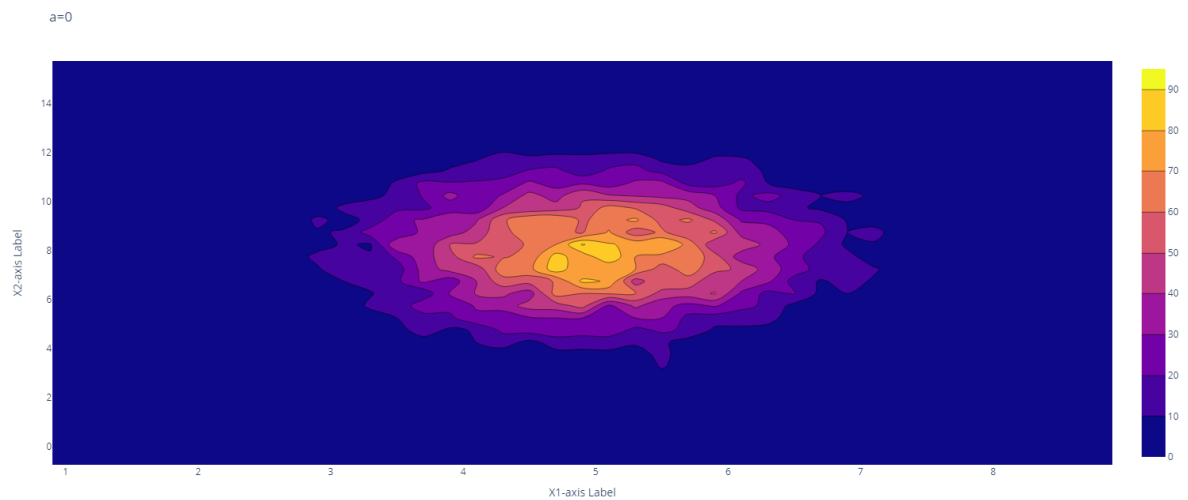
Answer 1.c
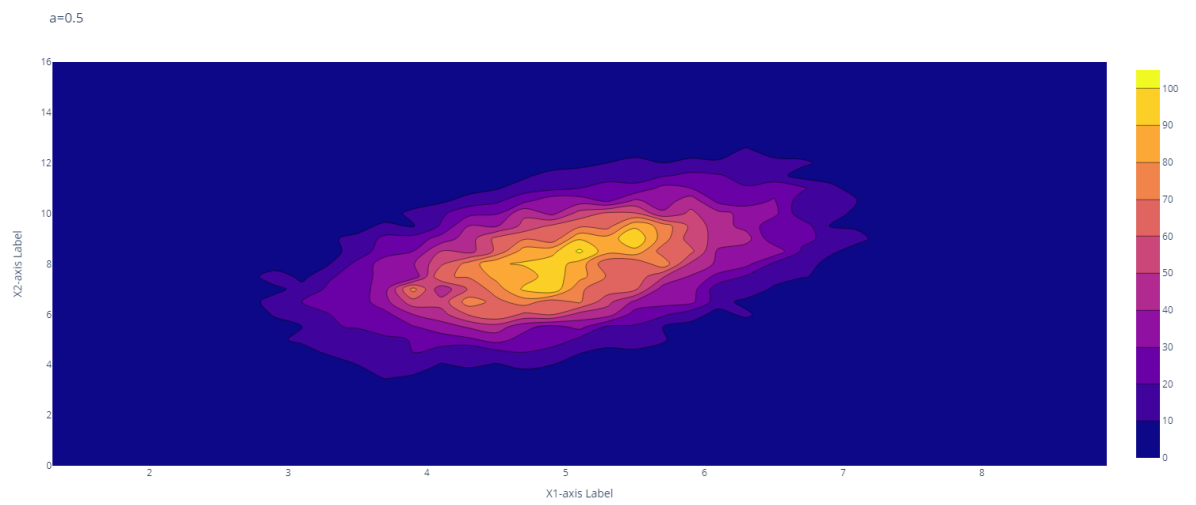
The contour plots of the actual densities are as follows:

1. a = -0.5

2. a = 0.0

3. a = 0.5

a=0.5

4. a = 1

a=1