2.38 For the adjacency matrix A, determine A^2 and A^3.

$A^2 =$

$$\begin{bmatrix} 2 & 1 & 1 & 1 & 0 \\ 1 & 2 & 1 & 1 & 0 \\ 1 & 1 & 3 & 0 & 1 \\ 1 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{bmatrix}$$

$A^3 =$

$$\begin{bmatrix} 2 & 3 & 4 & 1 & 1 \\ 3 & 2 & 4 & 1 & 1 \\ 4 & 4 & 2 & 4 & 0 \\ 1 & 1 & 4 & 0 & 2 \\ 1 & 1 & 0 & 2 & 0 \end{bmatrix}$$

2.41

a) Compute BB^t

$BB^t =$

$$\begin{bmatrix} 3 & 1 & 1 & 1 & 0 \\ 1 & 2 & 0 & 1 & 0 \\ 1 & 0 & 2 & 1 & 0 \\ 1 & 1 & 1 & 4 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$$

b) What does the (i, j) entry of BB^t represent?
The i is the vertex and the j is the edge. 0 means there is no connection, 1 means there is a connection. And the diagonal entries represent the degrees for each vertex.

3.2 Give an example of 3 graphs of the same size, order, and degree sequence that are not isomorphic to one another.

4.2

4.4