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1 Question 1

A complete graph with 100 vertices has 100*(100-1)/2=4950 edges.
A complete bipartite graph with 50 vertices in each partition set has 50*50=2500 edges.
So the total would be 7450.
The number of triangles in a bipartite graph is 0.
The number of triangles in a complete graph is the number of ways to choose 3 vertices from a set of 100 vertices so it would be equal to $\binom{100}{3} = 161700$

2 Question 2

$Q = [\frac{l_{c_1}}{m} - (\frac{d_{c_1}}{2m})^2] + [\frac{l_{c_2}}{m} - (\frac{d_{c_2}}{2m})^2]$
$d_{c_1} = 6 + 8 + 10 = 24$
$d_{c_2} = 4 + 6 + 8 = 18$
Then $Q = [\frac{12}{21} - (\frac{24}{2*21})^2] + [\frac{9}{21} - (\frac{18}{2*21})^2]$
Then $Q = 0.49$.

3 Question 3

Feature map of the shortest path kernel for C_4 : $\phi(C_4) = [4, 4, 0]$
Feature map of the shortest path kernel for P_4 : $\phi(P_4) = [3, 2, 1]$
Then if we denote by k the shortest path kernel we have :
$k(C_4, C_4) =< \phi(C_4), \phi(C_4) >= 32$
$k(C_4, P_4) =< \phi(C_4), \phi(P_4) >= 20$
$k(P_4, P_4) =< \phi(P_4), \phi(P_4) >= 14$

4 Question 4

A kernel value equal to 0 mean the graphlets that compose the two graphs G1 and G2 are different.As an example, we can take G1 the first graphlet of size 3, and G2 the second graphlet of size 3.