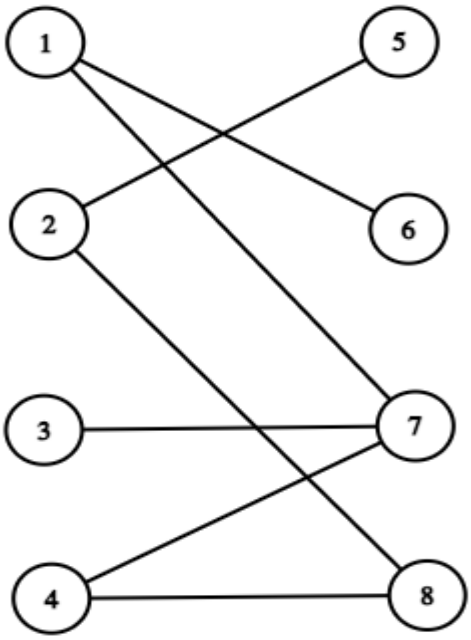
CON101 **7th September 2021**

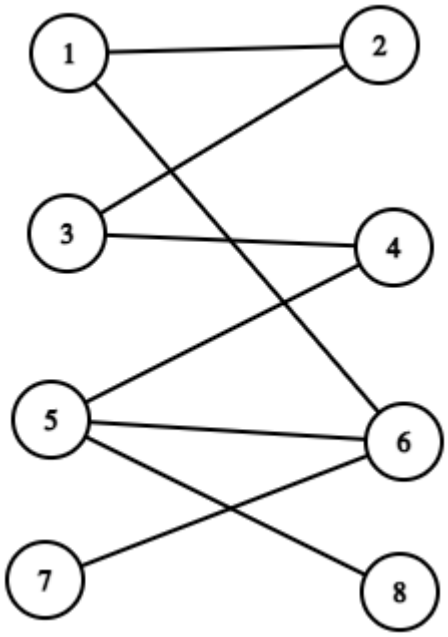
Assignment 4a: P-NP Problems

Due Date: 21st September 2021

Q1. For given graph identify the maximum matching

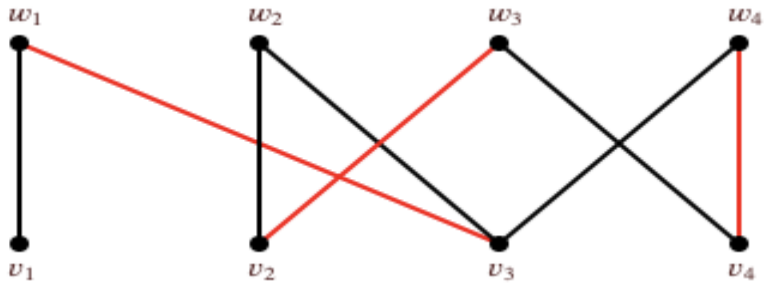


G1

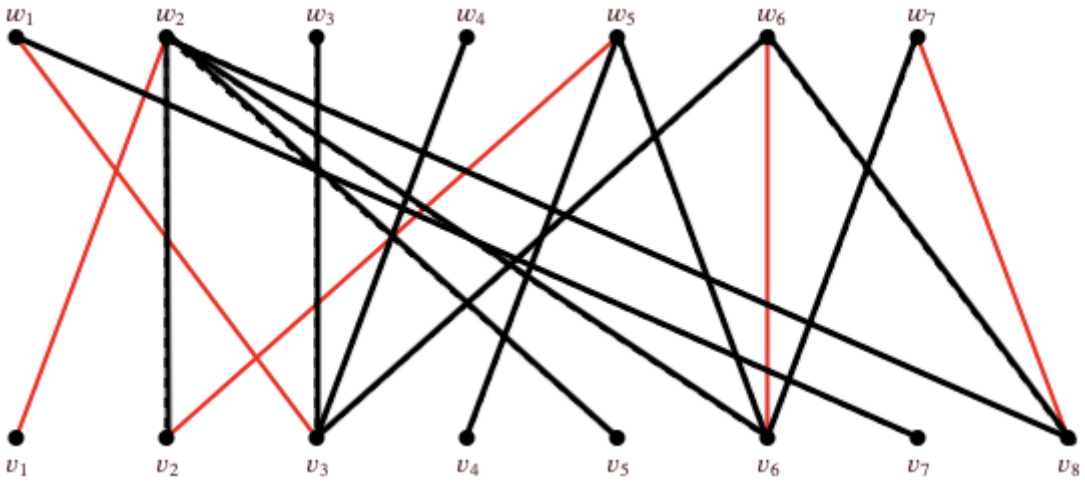


G2

Q2. Explain why the matching is not maximum (matching is In Red)

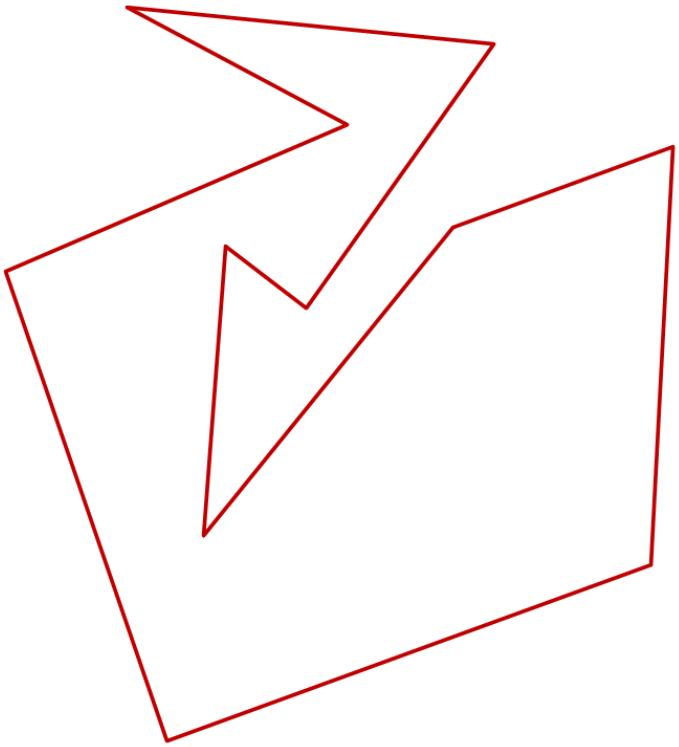


G3



G4

Q3. In the image given below, think of it as the boundaries of an art gallery where sides of the polygon represent the walls where costly paintings have been hung and vertices represent the corners of the gallery. You need to find out the minimum number of guards required in this gallery so that every point of the gallery is under constant surveillance and give a rigid explanation of how you concluded the solution. Assume that guards once put to their position will always stay at that point and will not move but can look everywhere (360^0) around them.



G5

Q4. Sort n distinct numbers using selection sort and using all n! permutation. And plot the running time as a function of n for n=1,5,10,15,20 say. Assume these n distinct numbers are in worst order (i.e., randomly arranged).

Submission Instructions:

- Write your explanation of Q1, Q2, and Q3 on LaTeX document.
- Write the code and generate the graph for Q4.
- Add the graph in the LaTeX document with proper explanation.
- Submit a single pdf (LaTeX Doc) file on both Turnitin and Moodle.
- Submit code on both Turnitin and Moodle separately.
- The pdf file uploaded should have the following naming convention <Entry Number>-<Name>-<Assignment Title>.