

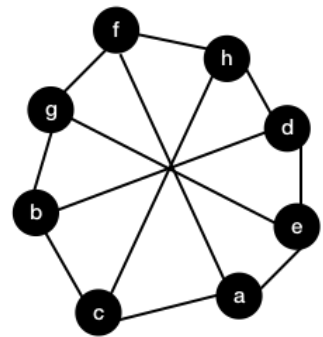
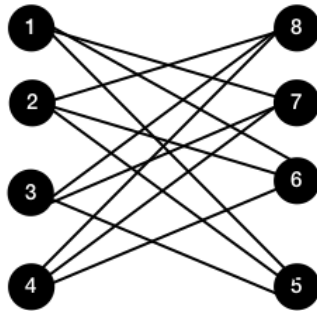
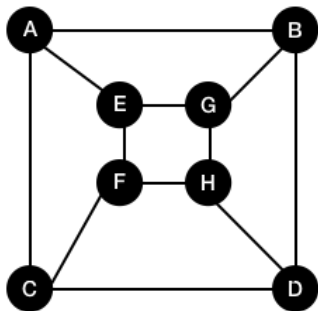
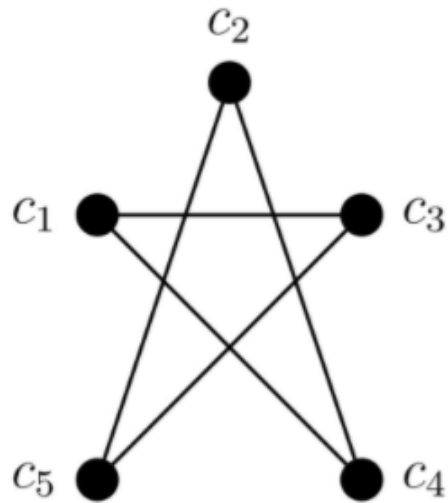
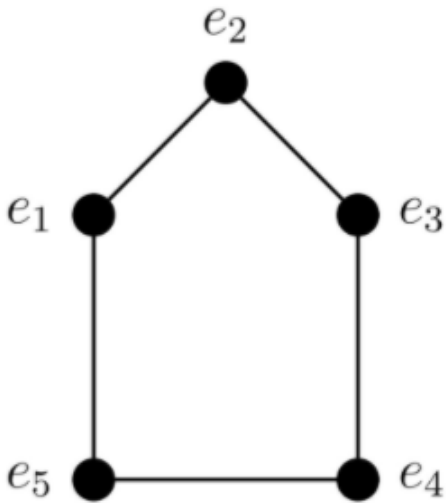
Problem 1. Gene Ontology database (10 points).

Write down at least two **Homo Sapiens** genes that are annotated to GO:0006285 (base-excision repair, AP site formation) based on experimental evidence (IDA, IMP). Please use AmiGO2 database (<http://amigo.geneontology.org/>)

Answer:

Problem 2. Graph Isomorphism (10 points).

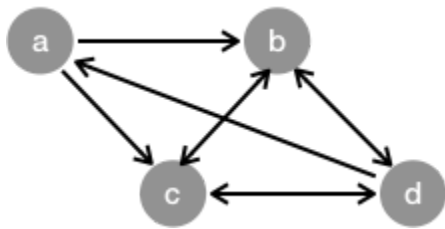
Find the graphs that are topologically equivalent (isomorphic) from the following graphs. Please also show the bijection function f .



Answer:

Problem 3. Graph diffusion (10 points).

Write the adjacency matrix of the following graph. Can the random walk on the following graph converge to a stationary distribution starting from a uniform distribution $[0.25, 0.25, 0.25, 0.25]$? If so, please write down the stationary distribution vector (round to 2 decimal places and write the distribution in the order of $[a,b,c,d]$). If not, please remove the minimum number of edges so that random walk can converge. We encourage you to solve this problem by writing a program. But code or pseudocode is not required. We will only grade this problem based on the solution.



Answer:

