Final Exam   **Graph Theory**   **31/01/2023**
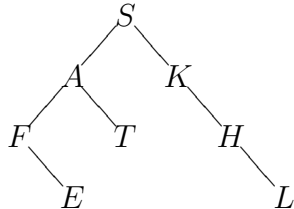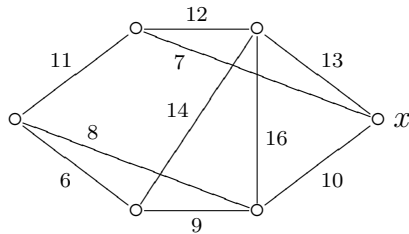
1. (2 points) Find the number of regions in $K_{2,20}$.

2. (2 points) Find $\chi(C_{11})$.

3. (2 points) Find $d(C_{11})$.

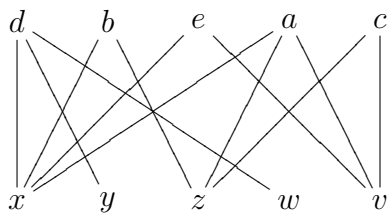4. (2 points) Find the LBT Sequence using In-Order Algorithm.

5. (2 points) Find the MST Sequence using Prim Algorithm from vertex x.

6. (2 points) Given the weight matrix W, find the distance matrix.

$$W = \begin{bmatrix} 0 & 6 & 7 & 4 \\ 6 & 0 & 3 & 8 \\ 7 & 3 & 0 & 2 \\ 4 & 8 & 2 & 0 \end{bmatrix}$$
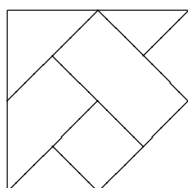
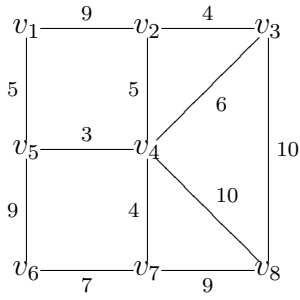7. (2 points) Find a complete matching or prove not exist.

8. (4 points) Find the number of triangles using the adjacency matrix A.

$$A = \begin{bmatrix} 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$
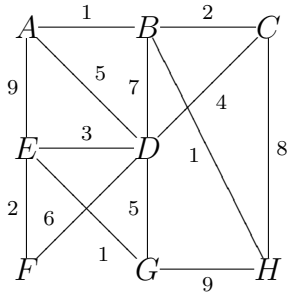
9. (2 points) Given the plane graph, draw the dual graph.

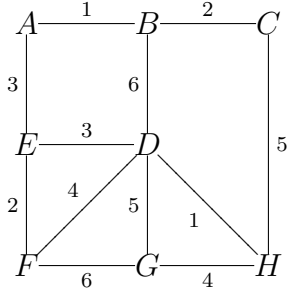(Univeristy ID Number)   (Name of Student)

10. (4 points) Find Row (3) of the distance matrix using Dijkstra's Algorithm.
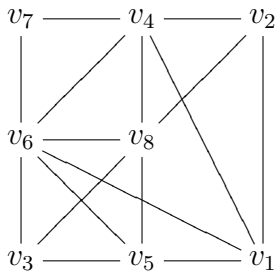

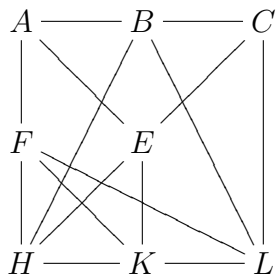
11. (4 points) Solve the Chinese Postman Problem.

12. (4 points) Draw all Hamilton cycles and solve the Traveling Salesman Problem.

13. (4 points) Show the Welsh-Powell Algorithm and find the Color Sequence.

14. (4 points) Prove planar or not planar using Hamilton cycle.

15. (Bonus 2 points) Prove that $\overline{C_{10}}$ is not planar.

–Amin Witno