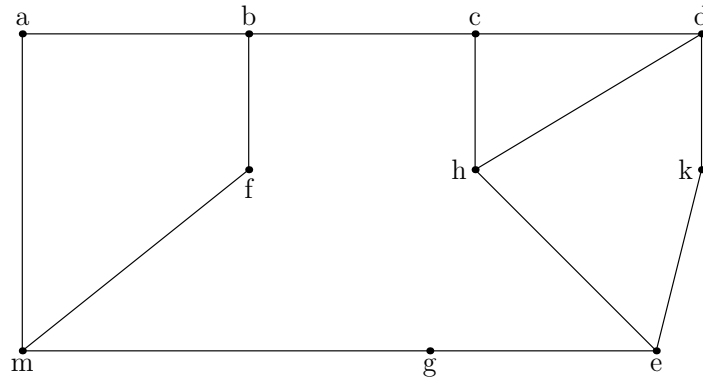


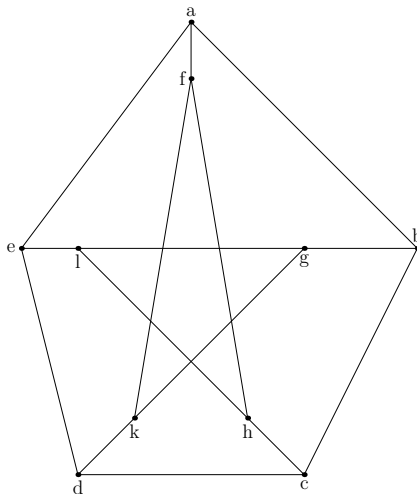
**Graph Theory and Combinatorics MATH-42021/52021.**  
**Home Work 4, due on Wednesday, SEPTEMBER 25**  
**Instructor: Prof. Artem Zvavitch**



**Problem 1.** Consider the graph  $G$  in the above figure

- Does this graph contain Euler cycle?
- Does this graph contain Euler trail?
- Does this graph contain Hamilton cycle?
- Does this graph contain Hamilton path?

**Problem 2.** Please remove some edges from the graph below, in a such a way that a new graph would contain and Euler cycle. Try to find a minimal number of edges you need to remove (this part is Tricky!).



**Problem 3.** In chase a "knight move" consists of two squares either vertically or horizontally and then one square in a perpendicular direction. Depending on where the knight is situated, he has a minimum

*mobility of two moves - when in a corner- and a maximum mobility of eight moves when near the center. Let  $C$  be a graph with 64 vertices corresponding to the squares of a chessboard. Let two vertices of  $C$  be joint by an edge whenever a knight can go from one of the corresponding squares to the other in the move. Does  $C$  have an Euler trail? (You don't have to draw  $C$  to answer!)*

**Problem 4.** \* *Prove that the graph  $C$  in the above problem has Hamilton path. Such a path is called "knight's tour" by puzzle enthusiasts.*