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**TNSL20 - basic logistic algorithms**  
**Homework Set 5, 2017**

Solutions are due October 13, 2017.

**Question 1 (Fast Mail plans new routes for its postmen):**

Fast Mail is trying to work more efficiently, and asks you to help them replan the routes for four of their postmen. The streets these postmen need to cover are given by the graphs  $G_1 \dots G_4$  in Figure 1.

- (a) For each graph  $G_i, i = 1 \dots 4$ : Can the responsible postman cover all of his streets without using any street twice, that is, does there exist a Eulerian cycle in  $G_i$ ? Give an argument for your statement.
- (b) For those  $G_i$  that do have a Eulerian cycle according to (a), use Algorithm 7.6 (Hierholzer's algorithm) to find the Eulerian cycle. What is the length of the resulting tours?
- (c) For all other  $G_i$  find the best route for the postman by using Algorithm 7.7. What is the length of the resulting tours?

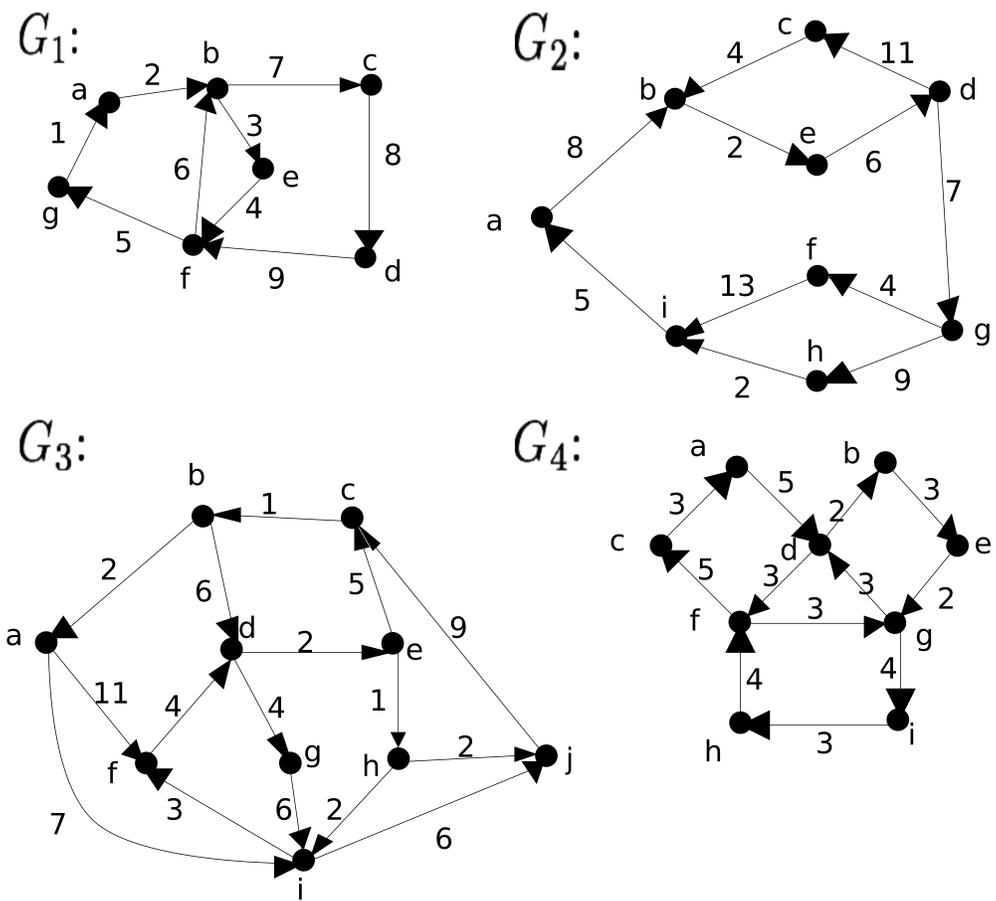


Figure 1: The graphs  $G_1, G_2, G_3, G_4$ .