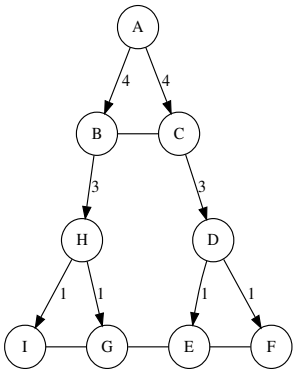
TDT4305 2021 - Assignment 8 solution

Mining Social Network Graphs

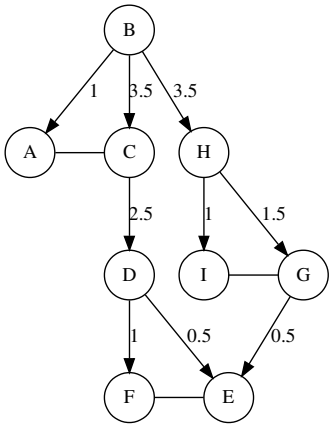
1. Why do the hierarchical and point-assignment clustering methods from [MMDS] chapter 7 not work for clustering social graphs?
   - *See section 10.2.2.*
2. What is the definition of edge betweenness?
   - *See section 10.2.3.*
3. [MMDS] exercise 10.2.1. (a) and (b).

   Figure 10.9 is an example of a social-network graph. Use the Girvan-Newman approach to find the number of shortest paths from each of the following nodes that pass through each of the edges.

   a)



   b)



4. Given the answer to question 3 above, how would you proceed to find the final betweenness scores and a set of communities?
    - “To complete the betweenness calculation, we have to repeat this calculation for every node as the root and sum the contributions. Finally, we must divide by 2 to get the true betweenness, since every shortest path will be discovered twice, once for each of its endpoints” [MMDS p. 366]. To find a set of communities, “[s]tart with the graph and all its edges; then remove edges with the highest betweenness, until the graph has broken into a suitable number of connected components” [MMDS p. 367].