

Assignment 12

R-6.1 Draw a simple undirected graph G that has 12 vertices, 18 edges, and 3 connected components. Why would it be impossible to draw G with 3 connected components if G had 66 edges?

R-6.4 Bob loves foreign languages and wants to plan his course schedule to take the following nine language courses: LA15, LA16, LA22, LA31, LA32, LA126, LA127, LA141, and LA169. The course prerequisites are:

- LA15: (none)
- LA16: LA15
- LA22: (none)
- LA31: LA15
- LA32: LA16, LA31
- LA126: LA22, LA32
- LA127: LA16
- LA141: LA22, LA16
- LA169: LA32

Find a sequence of courses that allows Bob to satisfy all the prerequisites.

R-6.7 Would you use the adjacency list structure or the adjacency matrix structure in each of the following cases? Justify your choice.

- a. The graph has 10,000 vertices and 20,000 edges, and it is important to use as little space as possible.
- b. The graph has 10,000 vertices and 20,000,000 edges, and it is important to use as little space as possible.
- c. You need to answer the query `areAdjacent` as fast as possible, no matter how much space you use.