

Math 142, problem set 01
First draft: Wed Aug 24
Final version: Mon Aug 29

Problems to be turned in:

1. The Wizard Area Rapid Transit (WART) subway system has eight stops: Albus, Barty, Cedric, Draco, Fred, George, Harry, and Lily. Albus is one stop away from Barty, Cedric, and Lily; Barty is one stop away from Albus; Cedric is one stop away from Albus, Fred, and Harry; Draco is one stop away from George and Lily; Fred is one stop away from Cedric and George; George is one stop away from Draco, Fred, and Harry; and Harry is one stop away from Cedric and George.

Your client, V. deMort, is interested (for purely theoretical reasons) in finding out how difficult it would be to disrupt service on WART.

- (a) As designed, it is possible to get from any station on WART to any other in at least one way. Find one station that, if it were out of service, would make it impossible to travel between some other pair of stations. Also, name the pair of stations between which you couldn't travel (e.g., "That would make it impossible to get from Cedric to George.")
 - (b) Is there a single station, that, if it were out of service, would make it impossible to travel from Albus to Harry? Explain why or why not.
 - (c) Is there a single station, that, if it were out of service, would increase the number of stops it takes to get from Draco to Harry? Explain why or why not.
2. (1.1) 18.
3. (1.1) 22.
4. (1.2) 6(d,e,h).
5. (1.2) 8.
6. Build 6-vertex graphs with the following degrees of vertices, if possible. If not possible, explain why not.
 - (a) Two vertices of degree 4, two vertices of degree 3, and two vertices of degree 1.
 - (b) Six vertices of degree 3.
 - (c) Vertices of degree 2, 2, 3, 3, 4, 5.