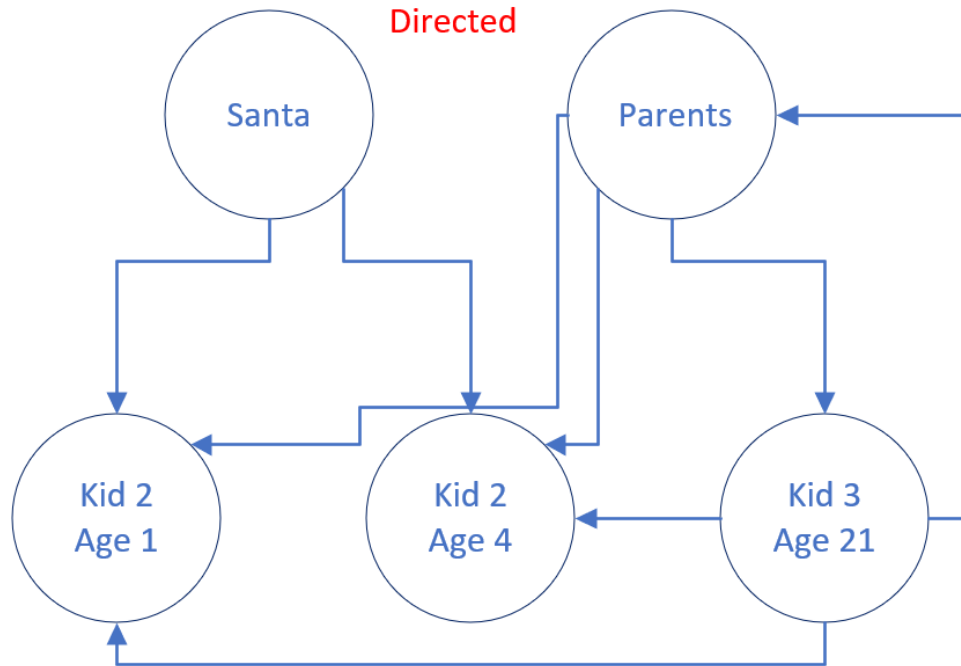


Holly Robertson
Comp 311
March 19, 2019
Homework 8

Problem 1 [10 points]

Envision three different real world relationships that you can represent via a graph. Draw these graphs so that each has at least five vertices. One graph must be weighted, one graph must be directed, and one graph must be not fully connected. Along with each graph, write out the adjacency matrix representation as well as the edge list representation.

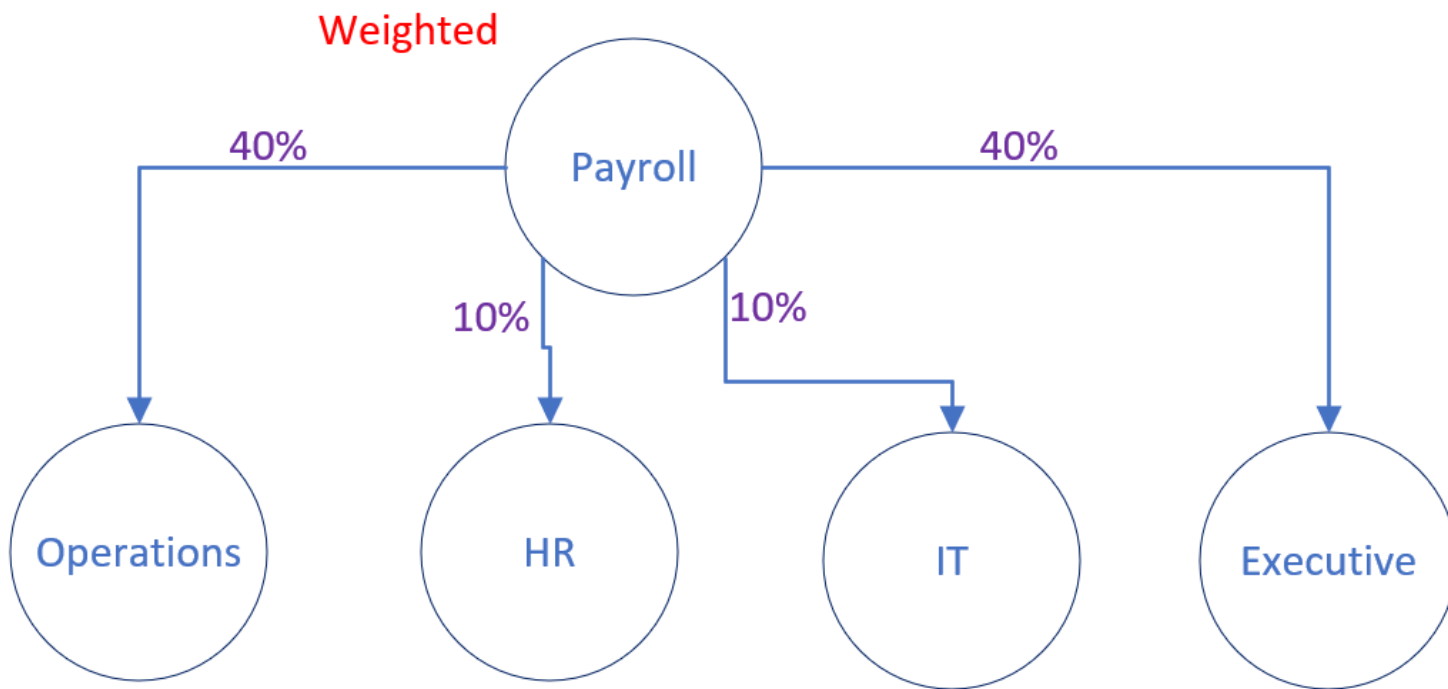


	Santa	Parents	Kid #1	Kid #2	Kid #3
Santa	0	0	1	1	0
Parents	0	0	1	1	1
Kid #1	0	0	0	0	0
Kid #2	0	0	0	0	0
Kid #3	0	1	1	1	1

...

Edge List

Santa	Kid #1
Santa	Kid #2
Parents	Kid #1
Parents	Kid #2
Parents	Kid #3
Kid #3	Parents
Kid #3	Kid #2
Kid #3	Kid #1



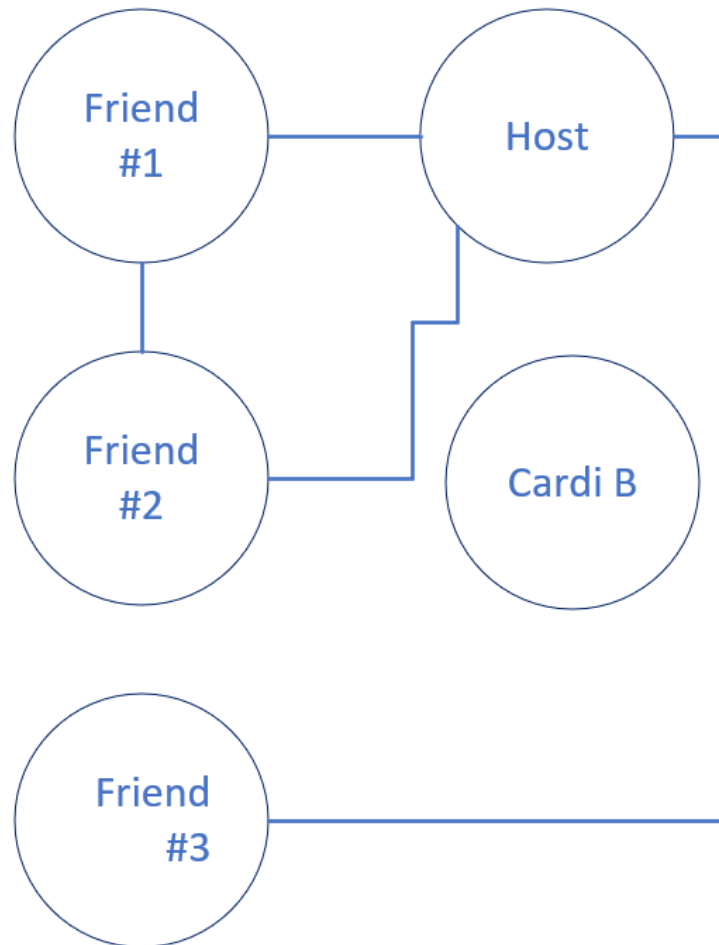
	Payroll	Operat	HR	IT	Executive
Payroll	∞	40	10	10	40
Operat	∞	∞	∞	∞	∞
HR	∞	∞	∞	∞	∞
IT	∞	∞	∞	∞	∞
Executive	∞	∞	∞	∞	∞

Edge List

payroll	operations	40
payroll	HR	10
payroll	IT	10
payroll	Executive	40

Not fully connected

****Cardi B performing at a party****



	Cardi B	Host	Friend #1	Friend #2	Friend #3
Cardi B	0	0	0	0	0
Host	0	0	1	1	1
Friend #1	0	1	0	1	0
Friend #2	0	1	1	0	0
Friend #3	0	1	0	0	0

Edge List	
Host	Friend #1
Host	Friend #2
Host #	Friend #3
Friend #1	Friend #2

Problem 2 [10 points]

Show that, given a directed graph already stored in adjacency matrix form, determining if there is a vertex with in-degree $|V|-1$ and out-degree 0 can be done in $O(|V|)$ time where $|V|$ is the number of vertices within the graph.

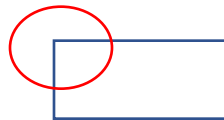
Given my directed graph above in an adjacency matrix. If Kid #2 bought for Kid #1, there would be $V-1$ in-degree and 0 out-degree. I'm sorry – I don't understand the question. I even asked Colin. I understand you're wanting us to do some type of Big O for an adjacency matrix, but I'm not understanding what you want us to pull from the matrix. Kid #1's column would have 1's except for itself, there is no loop of itself and the Kid #1 row would be 0 since there are no edges going away from it. Row would be Out-degree and column would be in-degree. I'm really sorry, but I just don't understand the question.

Reflection [5 points]

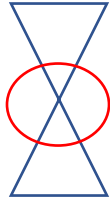
In two to three paragraphs of prose (i.e. sentences, not bullet lists) using APA style citations if needed, summarize and interact with the content that was covered in the class "Meet" session (or face-to-face class) this week. In your summary, you should highlight the major topics, theories, practices, and knowledge that were covered. Your summary should also interact with the material through personal observations, reflections, and applications to the field of study. In particular, highlight what surprised, enlightened, or otherwise engaged you. Make sure to include at least one thing that you're still confused about. In other words, you should think and write critically not just about what was presented but also what you have learned through the session. Feel free to ask questions in this as well since it will be returned to you with answers.

Degree of a vertex ([Source](#)):

- **Definition:** Number of edges adjacent on a vertex
- **Indirected Graph:**
 - Degree is 0 is an isolated vertex
 - If there is a loop at the node, the loop is considered 2 degrees (plus any other edges connected to the vertex).
 - The degree of 'a' below is 2. Two adjacent edges

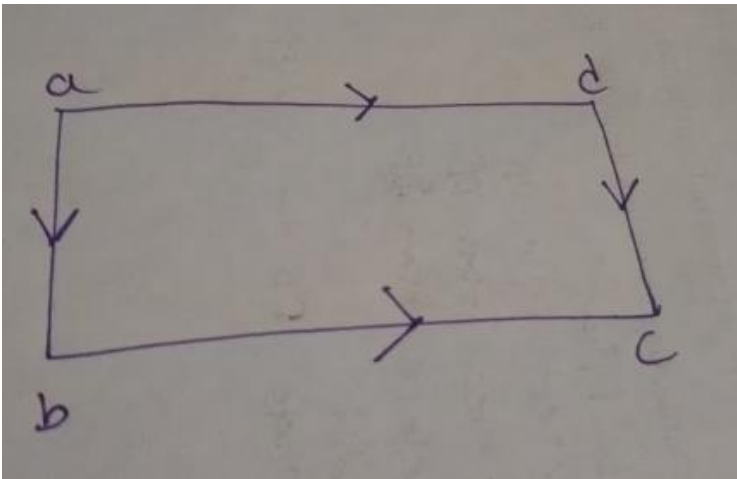


- The degree of 'b' below is 4



- **Directed Graph**

- There are **out-degrees & in-degrees**
 - Out-Degree
 - Edges going away from vertex
 - $O(a) = 2$
 - In-Degree
 - Edges going to vertex
 - $I(a) = 0$



My question is about #2. What should the answer have been?