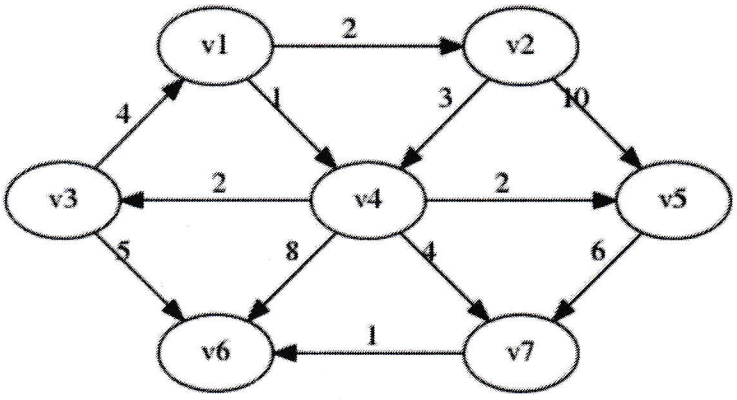
2. [4] Under what circumstances would we want to use an adjacency matrix instead of an adjacency list to store our graph?

I believe you would use a matrix in the situation when you have to do a lot of checking if an edge belong between two vertecies. Due to the speed of lookups. Also quick insert and deletion of edges

3. [6] Name three problems or situations where a graph would be a good data structure to use:

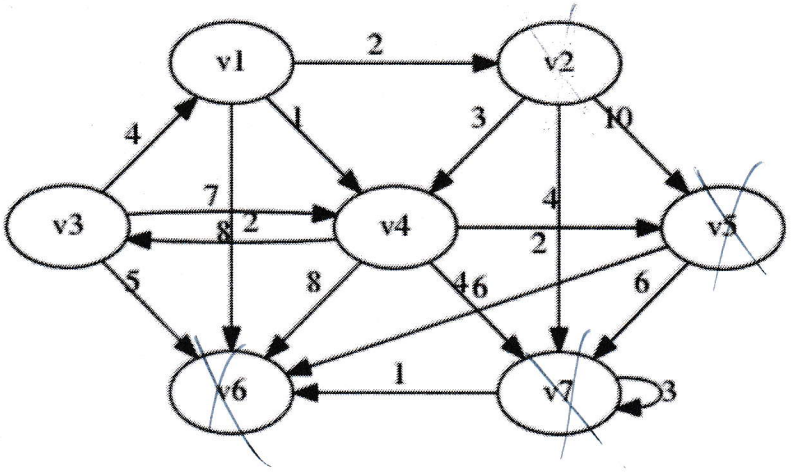
1. Obvious one is a map. Trying to get somewhere asap (driving)
2. Unique mob pathing in games. A weighted graph could give uniqueness to a monsters movement pattern.
3. being at a theme park where rides shut down at certain times.

4. [4] What kind of graph is this?



directed clearly. it is also a cyclic graph due to V1 V4 V3.

5. [4] Identify the loop in this graph:



The loop in this graph is V1, V4, V3, V1