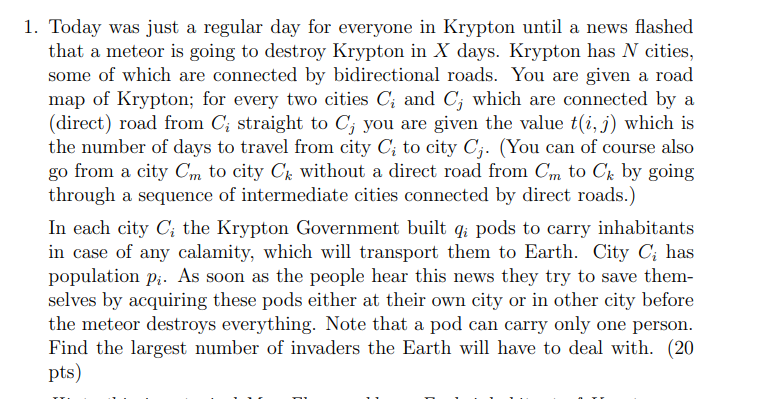
ASSIGNMENT5 QUESTION1



**Answer:**

This is a max flow problem. To find the largest number of invaders the earth will deal, we should determine for each city the set of cities that can reach within X days. We can use Dijkstra algorithm to determine every city that the shortest path (time) to other city. And filter city that can reach within X days. Then we get the set of cities that can reach within X for each city. To make the representation compact, make a bipartite graph with vertices corresponding to all cities both on the left and on the right side but with different interpretation: on the left vertices represent populations of the corresponding cities; on the right the vertices represent the set of ponds in the corresponding cities. Add a super-source on the left and connect it to all left vertices by edges of . Add a super-sink on the right and connect it to all right vertices by edges of .Then connect the left side city with the set of right city that can be reached in X days include itself by edges of infinite capacities. Then we turn this to a flow network and we need to find the maximum flow. We can Edmonds-Karp Max Flow algorithm to find the maximum flow and we can find the largest number of invaders the Earth will have to deal with.