CS218 HW 5 Challenge

due Thursday, June 6, 23:59 PM

Problem A // ID: 261956400

Use BFS to simulate daily melting occurrence. Keep queue of ice cells adjacent to water that will melt the next day. Check if two swans are in the same connected component. Output is the number of days when the two swans can meet.

Runtime: $O((r*c)^2)$ due BFS worst case, ending when all ice is melted or swans can meet; Space Complexity: $O(r*c)$, due storing the grid.

Problem B // ID:

Runtime: ; Space Complexity:

Problem C // ID: 261961150

Problem is to find minimum cut of the graph, separating the source from the sink. Solved using Edmonds-Karp. Use an adjacency matrix, use BFS to find the maximum flow from source to sink. Each augmenting path, update capacities of the edges. Edges leading to non-reachable nodes form the minimum cut.

Runtime: $O(V*E^2)$ due to $O(V*E)$ BFS calls, the maximum number of augmenting paths, and $O(E)$ being BFS complexity, worst case exploring all edges, multiplied together; Space Complexity: $O(V^2)$, due to the adjacency matrix.

Problem D // ID:

Runtime: ; Space Complexity: