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CS5008-HW08-GRAPH

1. What is the big-Oh space complexity of an adjacency list? Justify your answer.

The big-Oh space complexity of an adjacency list is O(V + E). In simple words, this means the list uses space based on the number of vertices (V) and edges (E) in the graph. This is because each vertex has a list of its neighbors, which is as long as the number of edges connected to it.

2. What is the big-Oh space complexity of an adjacency matrix? Justify your answer.

The big-Oh space complexity of an adjacency matrix is O(V^2). This means the matrix uses space based on the number of vertices (V) multiplied by itself. This is because the matrix has a row and a column for each vertex, so it has V rows and V columns.

3. What is the big-Oh time complexity for searching an entire graph using depth-first search (DFS)? Does the representation of the graph make a difference? Justify your answer.

The big-Oh time complexity for searching an entire graph using depth-first search (DFS) is O(V + E). This means the time it takes is based on the number of vertices (V) and edges (E) in the graph. The representation of the graph does not make a big difference in the time complexity. Both adjacency list and matrix have the same big-Oh time complexity for DFS, but using an adjacency list can be faster in practice because it only needs to look at the neighbors of each vertex, not all possible connections.

4. What is the big-Oh time complexity for searching an entire graph using breadth-first search (BFS)? Does the representation of the graph make a difference? Justify your answer.

The big-Oh time complexity for searching an entire graph using breadth-first search (BFS) is O(V + E). This means the time it takes is based on the number of vertices (V) and edges (E) in the graph. Like DFS, the representation of the graph does not make a big difference in the time complexity. Both adjacency list and matrix have the same big-Oh time complexity for BFS, but using an adjacency list can be faster in practice because it only needs to look at the neighbors of each vertex, not all possible connections.