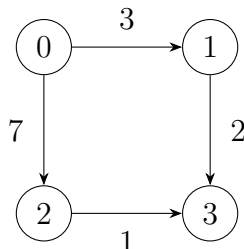


Quiz-4 Sample Questions

1. Consider the following directed, weighted graph with 4 vertices (0, 1, 2, 3).



After running Floyd-Warshall to completion, what is $D[0][3]$, the shortest-path cost from vertex 0 to vertex 3?

- A. 5, found by going $0 \rightarrow 1 \rightarrow 3$ with cost $3 + 2 = 5$.
 - B. 8, found by going $0 \rightarrow 2 \rightarrow 3$ with cost $7 + 1 = 8$.
 - C. 9, because Floyd-Warshall must use all intermediate vertices and sums all edge weights along every path.
 - D. ∞ , because there is no direct edge from vertex 0 to vertex 3.
2. Given n stairs, a person climbs to the top by taking either 1 or 2 stairs at a time. Let D_n denote the number of distinct ways to climb to the top. For $n > 2$, which recurrence is correct?
- A. $D_n = \min\{D_{n-1}, D_{n-2}\}$.
 - B. $D_n = \max\{D_{n-1}, D_{n-2}\}$.
 - C. $D_n = D_{n-1} + D_{n-2}$.
 - D. $D_n = \min\{D_{n-1}, D_{n-1} + D_{n-2}\}$.
3. Which of the following problems is NOT a combinatorial optimization problem?
- A. Given a graph, find the shortest path from node s to node t .
 - B. Given a set of cities and distances between each pair, find a tour that visits each city exactly once and minimizes total distance.
 - C. Given a function $f(x) = x^2 - 3x + 2.25$, find the real value of x that minimizes $f(x)$.
 - D. Given a set of items with weights and values, select a subset of items to maximize total value without exceeding a weight limit.