Quiz 3

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Quiz 3

6/6 points (graded)

1. Which of the following statements apply to Dijkstra's algorithm? (2 correct answers)

- [x] It is a traversal algorithm that explores vertices by increasing the distance from an initial vertex.
- [ ] It is an algorithm that outputs the size of the input graph.
- [x] It is an algorithm that is guaranteed to output the shortest paths from an initial vertex when input graph weights are non-negative.
- [ ] It is an algorithm that only operates on trees.

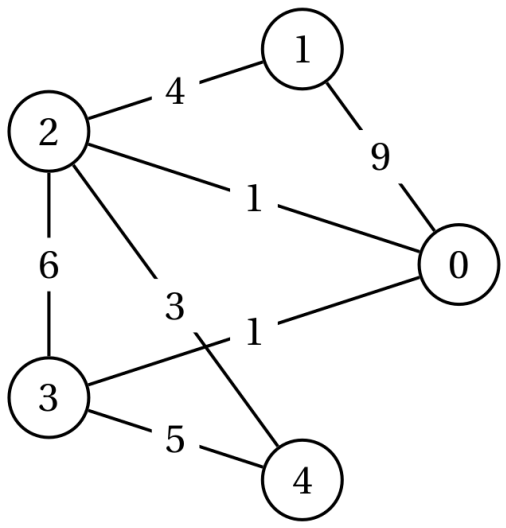
✔

2. What is the maximum number of iterations in Dijkstra's algorithm when applied to a graph with an order of n?

- ○ $n/2$.
- ◉ n.
- ○ $n\left(n-1\right)/2$.

✔

3. What is the routing table obtained using the Dijkstra algorithm from vertex 0 on the following graph?



Only the second row of the table is shown. The first row is $[0, 1, 2, 3, 4]$.

- ○ $[undefined, 2, 0, 2, 2]$
- ◉ $[undefined, 2, 0, 0, 2]$
- ○ $[undefined, 2, 1, 0, 2]$

✔

4. Given an input size n, the complexity of an algorithm is exactly $3n^2 + 4n + 17$ elementary operations. Which of the following big-O notations are valid (multiple answers are correct)? (hint: recall that $O\left(\right)$ means that it is "at most of the order of" so it holds that $n = O\left(n^5\right)$ for example)

- [ ] $\mathcal{O}\left(n\right)$
- [ ] $\mathcal{O}\left(n\log\left(n\right)\right)$
- [x] $\mathcal{O}\left(n^2\right)$

- [x] $\mathcal{O}(n^3)$

✔

5. Consider an algorithm that operates on graphs. The number of elementary operations it requires is exactly the number of edges in the graph. What is the complexity of the algorithm, expressed as a function of the order n of the graph?

- [ ] Since it depends on the number of edges, it cannot be defined.
- [ ] $\mathcal{O}(n)$
- [x] $\mathcal{O}(n^2)$

✔

6. Consider a min-heap with $(key, value)$ couples $(A, 5), (B, 3), (C, 7)$. What is the minimum number of operations (add-or-replace or remove) to obtain the configuration $(B, 8), (C, 7)$?

- [ ] 2
- [x] 3
- [ ] 4

✔

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