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IMTx NET04x
Advanced Algorithmics and Graph Theory with Python

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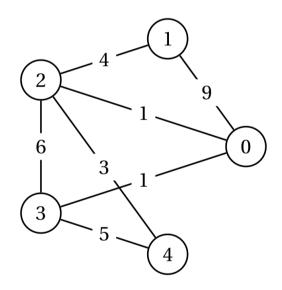
## Quiz 3

6/6 points (graded)

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

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.
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.
<b>✓</b>
2. What is the maximum number of iterations in Dijkstra's algorithm when applied to a graph with an order of $n$ ?
$\bigcirc n/2.$
left $n$ .
$\bigcap n\left(n-1 ight)/2$

3. What is the routing table obtained using the Dijkstra algorithm from vertex  $\boldsymbol{0}$  on the following graph?



 $igwedge \mathcal{O}\left(n^2
ight)$ 

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

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

$igcup \mathcal{O}\left(n ight)$		
$\bigcirc \mathcal{O}\left(n\log\left(n ight) ight)$		

onsider an alge	orithm that operates on graphs.	. The number of elementary operations it requires is exactly the	number of
es in the graph	n. What is the complexity of the a	algorithm, expressed as a function of the order $n$ of the graph?	
Since it depe	nds on the number of edges, it o	cannot be defined.	
$\mathcal{O}\left( n ight)$			
$\mathcal{O}\left(n^2 ight)$			
•			
onsider a min- eplace or remo	heap with $(key, value)$ couples ove) to obtain the configuration	s $(A,5),(B,3),(C,7)$ . What is the minimum number of opera	tions (add-
		(D,0),(C,I)?	
	,	$(B, \delta), (C, T)$ ?	
)2	,	(B, 8), (C, 1)?	
	,	(B, 8), (C, 1)?	
		(B, 8), (C, 1)?	
		(B, 8), (C, 1)?	
3		(B, 8), (C, 1):	
3		(B, 8), (C, 1):	
3		$(\mathcal{D}, \delta)$ , $(\mathcal{C}, I)$ ?	
3 4 Submit		$(B, \delta), (C, I)$ ?	
3 4 Submit	displayed within the problem		
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