<u>Dates</u>

Discussion

<u>Notes</u>

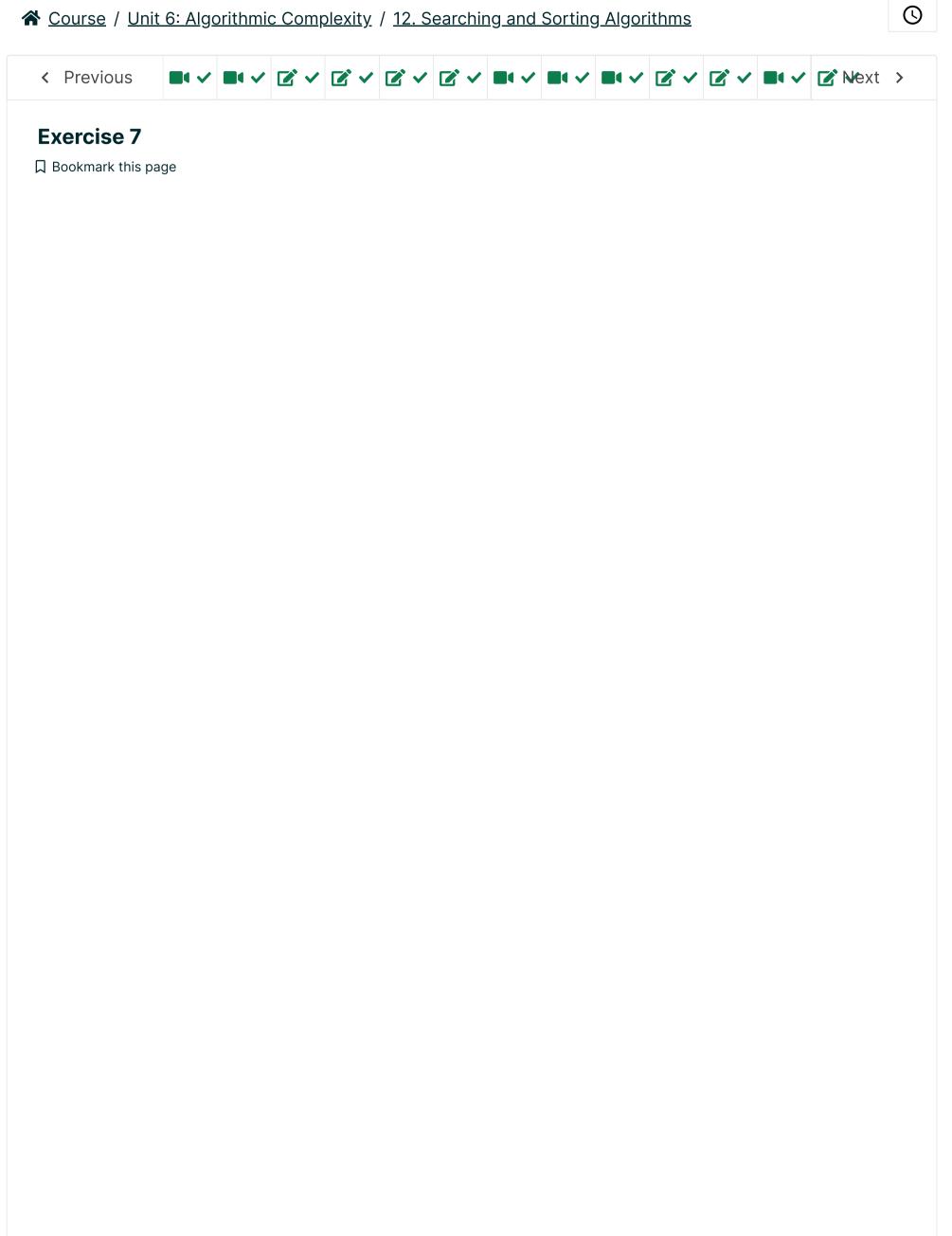
<u>Calendar</u>

<u>Course</u>

<u>Progress</u>

<u>Help</u>

shengtatng ~



Exercise 7

7/7 points (graded)

O(1)

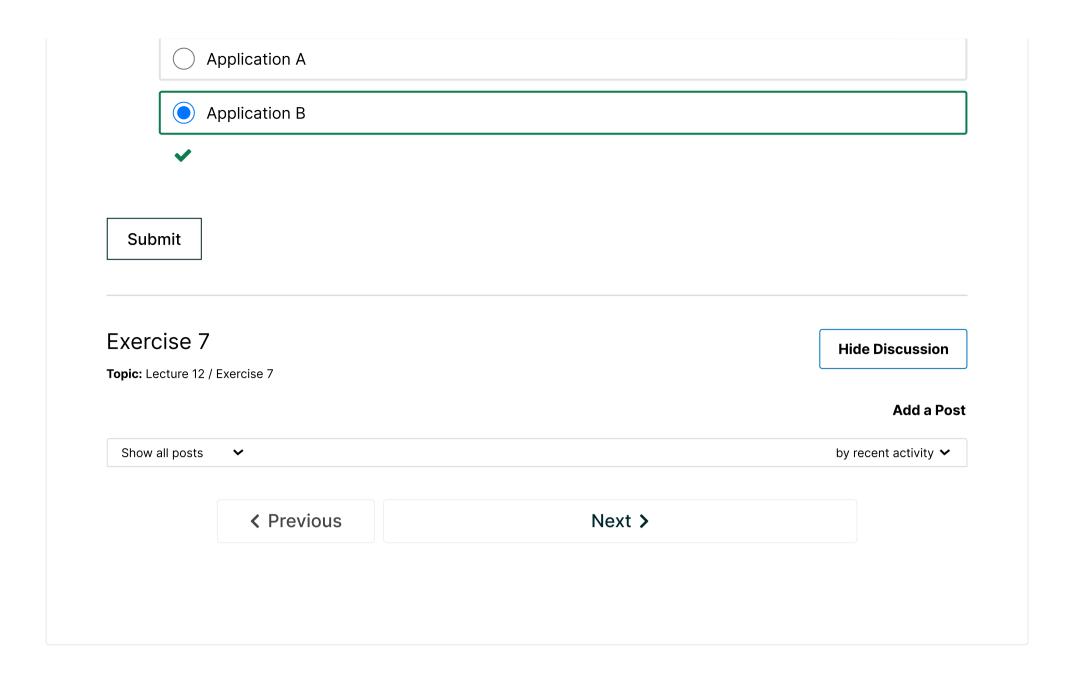
ESTIMATED TIME TO COMPLETE: 14 minutes

This problem will walk through some applications of complexity analysis. Suppose you're asked to implement an
application. One of the things it has to do is to report whether or not an item, x , is in a list L . L 's contents do
not change over time. Below are two possible ways to implement this functionality. Assume that <code>mergeSort</code> is
implemented as per the lecture.

	ange over time. Below are two possible ways to implement this functionality. Assume that <code>[mergeSort]</code> is nented as per the lecture.
is a	a list with n items.
Ар	plication A:
Eve	ery time it's asked to, it performs a linear search through list \Box to find whether it contains \Box .
Ар	plication B:
	rt list $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
1.	If the application is asked to find x in L <u>exactly</u> one time, what is the worst case time complexity for Application A?
	○ O(1)
	$\bigcirc O(\log n)$
	$\bigcirc O(n)$
	$\bigcirc O(n \log n)$
	$\bigcirc O(n^2)$
	✓
2.	If the application is asked to find x in L <u>exactly</u> one time, what is the worst case time complexity for Application B?
	○ O(1)
	$\bigcirc \ O\left(\log n ight)$
	$\bigcirc O(n)$
	$\bigcirc O(n \log n)$
	$\bigcirc \ O\left(n^2 ight)$
	✓

Hide Notes

	\bigcirc	$O\left(k + \log n ight)$
		$O\left(k+n ight)$
		$O\left(kn ight)$
		$O\left(n+k\log n ight)$
	~	
	f the B?	application is asked to find x in L k times, what is the worst case time complexity for Application
		$O\left(kn ight)$
		$O\left(n\log n ight)$
		$O\left(n+k\log n ight)$
		$O\left(n\log n + k\log n ight)$
		$O\left(kn\log n + \log n ight)$
	~	
	B?	value(s) of k would make Application A be faster (i.e., asymptotically grow slower than) Application $k=1$
		k=n
		$k = \log n$
		$k=n^2$
		$k=2^n$
	~	
i. \	What	value(s) of <i>k</i> would make Application A grow at the same rate as Application B?
		k=1
		k=n
	✓	$k = \log n$
		$k=n^2$
		$k=2^n$
	~	



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