

M1522.000900 Data Structure
Spring 2025, Kang
Homework 2 Answer Sheet [1/3]

2023-12753 EunSu Yeo

- ※ Write your answers on the “your answer” columns.
- ※ Do **NOT** write anything on “score” columns.
- ※ Before submission, delete all the blue-colored texts, and convert the file into **PDF-format**.
- ※ Write your proof on the solution sheet and leave the “your answer” column blank.

Question		Your Answer							Points	Score
1	(1)								3	
		Index	0	1	2	3	4			
		Front/Rear			F		R			
			Queue			z	z	q		
	(2)								3	
		Index	0	1	2	3	4			
		Front/Rear				F	R			
			Queue			z	z	q		
	(3)								3	
		Index	0	1	2	3	4			
		Front/Rear	R			F				
			Queue	n		z	z	q		
	(4)								3	
		Index	0	1	2	3	4			
		Front/Rear	R				F			
			Queue	n		z	z	q		
	(5)								3	
		Index	0	1	2	3	4			
Front/Rear			R			F				
		Queue	n	x	z	z	q			
(6)								3		
	Index	0	1	2	3	4				
	Front/Rear			R		F				
		Queue	n	x	f	z	q			

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Homework 2 Answer Sheet [2/3]
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Question		Your Answer	Points	Score						
2		<div><div>head</div><div>→</div><div>Elena</div><div>→</div><div>Brandon1332</div><div>→</div><div>Destini1332</div><div>→</div><div>null</div></div>	10							
3		<table><tr><td><div>S.push(10);</div><div><div></div><div></div><div></div><div>10</div></div><div>top →</div></td><td><div>S.push(5);</div><div><div></div><div></div><div>5</div><div>10</div></div><div>top →</div></td><td><div>S.pop();</div><div><div></div><div></div><div></div><div>10</div></div><div>top →</div></td></tr><tr><td><div>S.push(7);</div><div><div></div><div></div><div>7</div><div>10</div></div><div>top →</div></td><td><div>S.pop();</div><div><div></div><div></div><div></div><div>10</div></div><div>top →</div></td><td><div>S.push(4);</div><div><div></div><div></div><div>4</div><div>10</div></div><div>top →</div></td></tr></table>	<div>S.push(10);</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>	<div>S.push(5);</div> <div><div></div><div></div><div>5</div><div>10</div></div> <div>top →</div>	<div>S.pop();</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>	<div>S.push(7);</div> <div><div></div><div></div><div>7</div><div>10</div></div> <div>top →</div>	<div>S.pop();</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>	<div>S.push(4);</div> <div><div></div><div></div><div>4</div><div>10</div></div> <div>top →</div>	10	
<div>S.push(10);</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>	<div>S.push(5);</div> <div><div></div><div></div><div>5</div><div>10</div></div> <div>top →</div>	<div>S.pop();</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>								
<div>S.push(7);</div> <div><div></div><div></div><div>7</div><div>10</div></div> <div>top →</div>	<div>S.pop();</div> <div><div></div><div></div><div></div><div>10</div></div> <div>top →</div>	<div>S.push(4);</div> <div><div></div><div></div><div>4</div><div>10</div></div> <div>top →</div>								
4	(1)	2 5 + 3 * 4 7 + *	5							
	(2)	<div>(1) [/ / / 3(top)]</div> <div>(2) [/ / 7(top) / 3]</div> <div>(3) [/ 9(top) / 7 / 3]</div> <div>(4) [/ / 63(top) / 3]</div> <div>(5) [/ / / 66(top)]</div> <div>(6) [/ / 10(top) / 66]</div> <div>(7) [/ 5(top) / 10 / 66]</div> <div>(8) [/ / 2(top) / 66]</div> <div>(9) [/ / / 64(top)]</div>	15							

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Homework 2 Answer Sheet [3/3]

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Question		Your Answer	Points	Score									
5	(1)	Valid sequence	2										
	(2)	Valid sequence	2										
	(3)	Invalid sequence Reason: 912>911, 912 is the node under the left subtree of 911 but It has the larger value than 911. So, It does not satisfy the conditions of a BST.	2										
	(4)	Valid sequence	2										
	(5)	Invalid sequence Reason: 299<347, 299 is the under the right subtree of 347 but It has smaller value than 347. So It doesn't satisfy the conditions of BST.	2										
6	(1)	Satisfy: (d) Doesn't Satisfy: (a), (b), (c) (a): 16>15, doesn't satisfy max-heap property (b): it's min-heap (c): it's not a complete tree, So it's not a heap.	6										
	(2)	One out of leaf nodes	2										
	(3)	<table><tr><th>Operation</th><th>Time complexity</th></tr><tr><td>Insert</td><td>O(logn)</td></tr><tr><td>Remove</td><td>O(logn)</td></tr><tr><td>Max search</td><td>O(1)</td></tr><tr><td>Min search</td><td>O(n)</td></tr></table>	Operation	Time complexity	Insert	O(logn)	Remove	O(logn)	Max search	O(1)	Min search	O(n)	4
Operation	Time complexity												
Insert	O(logn)												
Remove	O(logn)												
Max search	O(1)												
Min search	O(n)												

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Question		Your Answer	Points	Score
7	(1)	<pre> graph TD 50 --> 30 50 --> 70 30 --> 20 30 --> 40 20 --> 10 20 --> 25 70 --> 65 70 --> 85 </pre>	4	
	(2)	<pre> graph TD 50 --> 30 50 --> 70 30 --> 20 30 --> 40 20 --> 10 20 --> 25 40 --> 35 40 --> 27 70 --> 65 70 --> 85 85 --> 90 </pre>	4	
	(3)	<pre> graph TD 50 --> 35 50 --> 70 35 --> 20 35 --> 40 20 --> 10 20 --> 27 10 --> 15 70 --> 85 70 --> 90 </pre>	4	
	(4)	(i) 10, 15, 20, 27, 35, 40, 50, 70, 85, 90 (ii) 50, 35, 20, 10, 15, 27, 40, 70, 85, 90 (iii) 15, 10, 27, 20, 40, 35, 90, 85, 70, 50	4	
	(5)	Height:5 node:15	4	
Total			100	

Homework 2 Solution Sheet

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EunSu Yeo

1. Question 1 [18 points]

1.1. Q1(1) [3 points]

Solution.

[Write here](#)

1.2. Q1(2) [3 points]

Solution.

[Write here](#)

1.3. Q1(3) [3 points]

Solution.

[Write here](#)

1.4. Q1(4) [3 points]

Solution.

[Write here](#)

1.5. Q1(5) [3 points]

Solution.

[Write here](#)

1.6. Q1(6) [3 points]

Solution.

[Write here](#)

2. Question 2 [10 points]

Solution.

[Write here](#)

3. Question 3 [10 points]

Solution.

[Write here](#)

4. Question 4 [20 points]

4.1. Q4(1) [5 points]

Solution.

[Write here](#)

4.2. Q4(2) [15 points]

Solution.

[Write here](#)

5. Question 5 [10 points]

5.1. Q5(1) [2 points]

Solution.

[Write here](#)

5.2. Q5(2) [2 points]

Solution.

[Write here](#)

5.3. Q5(3) [2 points]

Solution.

[Write here](#)

5.4. Q5(4) [2 points]

Solution.

[Write here](#)

5.5. Q5(5) [2 points]

Solution.

[Write here](#)

6. Question 6 [12 points]

6.1. Q6(1) [6 points]

Solution.

[Write here](#)

6.2. Q6(2) [2 points]

Solution.

[Write here](#)

6.3. Q6(3) [4 points]

Solution.

[Write here](#)

7. Question 7 [20 points]

7.1. Q7(1) [4 points]

Solution.

[Write here](#)

7.2. Q7(2) [4 points]

Solution.

[Write here](#)

7.3. Q7(3) [4 points]

Solution.

[Write here](#)

7.4. Q7(4) [4 points]

Solution.

[Write here](#)

7.5. Q7(5) [4 points]

Solution.

[Write here](#)