**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) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Index** | 0 | 1 | 2 | 3 | 4 | | **Front/Rear** |  |  | F |  | R | | **Queue** |  |  | z | z | q | | 3 |  |
| (2) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **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 | | 3 |  |
| (4) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Index** | 0 | 1 | 2 | 3 | 4 | | **Front/Rear** | R |  |  |  | F | | **Queue** | n |  | z | z | q | | 3 |  |
| (5) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Index** | 0 | 1 | 2 | 3 | 4 | | **Front/Rear** |  | R |  |  | F | | **Queue** | n | x | z | z | q | | 3 |  |
| (6) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Index** | 0 | 1 | 2 | 3 | 4 | | **Front/Rear** |  |  | R |  | F | | **Queue** | n | x | f | z | q | | 3 |  |

**M1522.000900 Data Structure**

**Spring 2025, Kang**

**Homework 2 Answer Sheet [2/3]**

2023-12753 EunSu Yeo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Question | | Your Answer | Points | Score |
| 2 | |  | 10 |  |
| 3 | | |  |  |  | | --- | --- | --- | | S.push(10); | S.push(5); | S.pop(); | |  |  |  | | S.push(7); | S.pop(); | S.push(4); | |  |  |  | | 10 |  |
| 4 | (1) | 2 5 + 3 \* 4 7 + \* | 5 |  |
| (2) | (1) [ / / / 3(top) ]  (2) [ / / 7(top) / 3 ]  (3) [ / 9(top) / 7 / 3 ]  (4) [ / / 63(top) / 3]  (5) [ / / / 66(top) ]  (6) [ / / 10(top) / 66 ]  (7) [ / 5(top) / 10 / 66 ]  (8) [ / / 2(top) / 66 ]  (9) [ / / / 64(top) ] | 15 |  |

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**Homework 2 Answer Sheet [3/3]**

2023-12753 EunSu Yeo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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) | |  |  | | --- | --- | | Operation | Time complexity | | Insert | O(logn) | | Remove | O(logn) | | Max search | O(1) | | Min search | O(n) | | 4 |  |

**M1522.000900 Data Structure**

**Spring 2025, Kang**

**Homework 2 Answer Sheet [3/3]**

2023-12753 EunSu Yeo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Question | | Your Answer | Points | Score |
| 7 | (1) |  | 4 |  |
| (2) |  | 4 |  |
| (3) |  | 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**

2023-12753

EunSu Yeo

1. **Question 1 [18 points]**
   1. **Q1(1) [3 points]**

**Solution.**

Write here

* 1. **Q1(2) [3 points]**

**Solution.**

Write here

* 1. **Q1(3) [3 points]**

**Solution.**

Write here

* 1. **Q1(4) [3 points]**

**Solution.**

Write here

* 1. **Q1(5) [3 points]**

**Solution.**

Write here

* 1. **Q1(6) [3 points]**

**Solution.**

Write here

1. **Question 2 [10 points]**

**Solution.**

Write here

1. **Question 3 [10 points]**

**Solution.**

Write here

1. **Question 4 [20 points]**
   1. **Q4(1) [5 points]**

**Solution.**

Write here

* 1. **Q4(2) [15 points]**

**Solution.**

Write here

1. **Question 5 [10 points]**
   1. **Q5(1) [2 points]**

**Solution.**

Write here

* 1. **Q5(2) [2 points]**

**Solution.**

Write here

* 1. **Q5(3) [2 points]**

**Solution.**

Write here

* 1. **Q5(4) [2 points]**

**Solution.**

Write here

* 1. **Q5(5) [2 points]**

**Solution.**

Write here

1. **Question 6 [12 points]**
   1. **Q6(1) [6 points]**

**Solution.**

Write here

* 1. **Q6(2) [2 points]**

**Solution.**

Write here

* 1. **Q6(3) [4 points]**

**Solution.**

Write here

1. **Question 7 [20 points]**
   1. **Q7(1) [4 points]**

**Solution.**

Write here

* 1. **Q7(2) [4 points]**

**Solution.**

Write here

* 1. **Q7(3) [4 points]**

**Solution.**

Write here

* 1. **Q7(4) [4 points]**

**Solution.**

Write here

* 1. **Q7(5) [4 points]**

**Solution.**

Write here