| | | |
|---|---|---|
| | King Saud University | College of Computer and Information Sciences<br>Department of Computer Science |
| | **Data Structures CSC 212** | **Quiz 5 - Spring 2018** |
| | Date: 24/04/2018 | Duration: 20 minutes |

| | |
|---|---|
| Student ID: | Name: |
| Section: | Instructor: |

| 1 | 2 | Total/30 |
|---|---|---|
| | | |

Question 1 . . . . . 15 points

Use the hash function $H(key) = key\%7$ to store the sequence of keys $16, 14, 21, 15, 8, 24, 3$ in a hash table. Use the following collision resolution strategies:

1. External chaining. Fill in the following table:

| Key | 16 | 14 | 21 | 15 | 8 | 24 | 3 |
|---|---|---|---|---|---|---|---|
| List position | | | | | | | |

2. Linear rehashing (c=1). Fill in the following table:

| Key | 16 | 14 | 21 | 15 | 8 | 24 | 3 |
|---|---|---|---|---|---|---|---|
| Position | | | | | | | |
| Number of probes | | | | | | | |

3. **[Extra:+10]** Coalesced chaining with cellar size 2 (do not change the hash function). Fill in the following table (put -1 if there is no next element):

| Key | 16 | 14 | 21 | 15 | 8 | 24 | 3 |
|---|---|---|---|---|---|---|---|
| Position | | | | | | | |
| Next | | | | | | | |

Question 2 . . . . . 15 points

(a) Consider the following heap represented as an array: 2, 6, 8, 12, 7, 10. Choose the correct answer for every operation (all operations are done on the above heap).

1. Heap after inserting 4:

   Ⓐ 2,6,8,12,7,10,4 Ⓑ 2,6,4,12,7,10,8 Ⓒ 2,6,8,12,7,4,10 Ⓓ 4,6,2,12,7,10,8 Ⓔ None

2. Heap after inserting 9:

   Ⓐ 2,6,9,12,7,10,8 Ⓑ 2,6,8,12,7,9,10 Ⓒ 2,6,8,9,7,10,12 Ⓓ 2,6,8,12,7,10,9 Ⓔ None

3. Heap after deleting one key:

   Ⓐ 6,12,8,10,7 Ⓑ 8,6,10,12,7 Ⓒ 6,7,8,12,10 Ⓓ 6,8,7,10,12 Ⓔ None

4. Heap after deleting two keys:

   Ⓐ 6,12,8,10 Ⓑ 7,10,8,12 Ⓒ 6,7,8,12 Ⓓ 12,8,7,10 Ⓔ None

(b) What is the result of a bottom-up min-heap construction of the following array: 1,3,5,2,4,0?

Ⓐ 0,1,2,4,3,5 Ⓑ 0,2,1,3,4,5 Ⓒ 1,0,2,3,4,5 Ⓓ 0,2,1,4,5,3 Ⓔ None.