


### QUESTION 1

6 points 


Use the hash function  $H(\text{key}) = \text{key} \% 11$  to store the sequence of keys: 27, 25, 38, 16, 32, 54, 21, 49, 30, 29, 43 in the hash table. Use the following collision resolution strategies:

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

please note that the first column indicate key and second one for the number of probes

Key	Probs
0 54	2
1 21	3
2 43	4
3 25	1
4 16	2
5 33	1
6 27	1
7 49	3
8 30	1
9 29	3
10 32	1

### QUESTION 2

6 points 

Use the hash function  $H(\text{key}) = \text{key} \% 11$  to store the sequence of keys: 27, 25, 38, 16, 32, 54, 21, 49, 30, 29, 43 in the hash table. Use the following collision resolution strategies:

2. External chaining (**List position starts at 0**). Fill in the following table (**note**: make sure you fill all the table, scroll the window all the way to the right):

Key	27	25	38	16	32	54	21	49	30	29	43
Table Position	5	3	5	5	10	10	10	5	8	7	10
List Position	0	0	1	2	0	1	2	3	0	0	3

### QUESTION 3

6 points 

Use the hash function  $H(\text{key}) = \text{key} \% 7$  to store the sequence of keys: 27, 25, 38, 16, 32, 54, 21, 49, 30, 29, 43 in the hash table. Use the following collision resolution strategies:

3. Coalesced chaining with cellar size 4 and address region size 7. Fill in the following table (put -1 if there is no next element) (note: make sure you fill all the table, scroll the window all the way to the right):

Key	27	25	38	16	32	54	21	49	30	29	43
Table Position	6	4	3	2	10	5	0	9	8	29	7
Index of next element	-1	10	-1	8	-1	-1	9	-1	-1	7	-1

### QUESTION 4

2 points 

Consider the following heap represented as an array: 6, 12, 18, 30, 16, 22. Choose the correct answer for every operation (all operations are done on the above heap).

Heap after inserting 8:

- ☐ None
- ☒ 6, 12, 8, 30, 16, 22, 18
- ☐ 6, 8, 18, 30, 16, 22, 12
- ☐ 6, 12, 18, 30, 16, 22, 8
- ☐ 6, 12, 18, 30, 16, 8, 22

### QUESTION 5

2 points 

Consider the following heap represented as an array: 6, 12, 18, 30, 16, 22. Choose the correct answer for every operation (all operations are done on the above heap).

Heap after inserting 24:

- ☐ 6, 12, 16, 18, 30, 22, 24
- ☐ 6, 12, 18, 30, 16, 24, 22
- ☐ 6, 12, 24, 30, 16, 22, 18
- ☐ None
- ☒ 6, 12, 18, 30, 16, 22, 24

**QUESTION 6****2 points** ✓ Saved

Consider the following heap represented as an array: 6, 12, 18, 30, 16, 22. Choose the correct answer for every operation (all operations are done on the above heap).

Heap after inserting 2:

- ☐ 2, 6, 12, 30, 16, 22, 18
- ☒ None
- ☐ 2, 12, 6, 16, 30, 22, 18
- ☐ 6, 12, 18, 30, 16, 22, 2
- ☐ 2, 12, 6, 30, 16, 18, 22

**QUESTION 7****2 points** ✓ Saved

Consider the following heap represented as an array: 6, 12, 18, 30, 16, 22. Choose the correct answer for every operation (all operations are done on the above heap).

Heap after deleting one key:

- ☐ 22, 12, 18, 30, 16
- ☐ 12, 30, 18, 22, 16
- ☐ 12, 22, 18, 30, 16
- ☐ None
- ☒ 12, 16, 18, 30, 22

**QUESTION 8****4 points** ✓ Saved

Consider the following heap represented as an array: 6, 12, 18, 30, 16, 22. Choose the correct answer for every operation (all operations are done on the above heap).

Heap after deleting two keys:

- ☐ 16, 18, 30, 22
- ☒ 16, 22, 18, 30
- ☐ None
- ☐ 22, 16, 18, 30
- ☐ 16, 18, 22, 30