Ch 6
Priority queues

Workshop10

CSC-340
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Name:________________________________

In CoCalc Workshop `6.5-Max_Priority_Queue`, write a program `max_priority_queue.cpp` or `max_priority_queue.py` that ultimately implements and demonstrates the below max-priority queue operations. HINT: You may start with the file `heapsort.cpp` or `heapsort.py` from the Midterm if you'd like.

Listing 1: get max description

```
/* heap_maximum(A)
*  return the max element of the integer max-heap A
*  A is unmodified
*/
```

Listing 2: extract max description

```
/* heap_extract_max(A, n)
*  extract and return the max element of the integer max-heap A
*  decrement n due to the extraction of the max key
*  indicate an error if A is empty
*/
```

Listing 3: increase key description

```
/* heap_increase_key(A, i, key)
*  increase the value at index i to key in the integer max-heap A
*  indicate an error if key < the current value at index i
*  A is modified to maintain the max-heap
*/
```

Listing 4: insert key description

```
/* max_heap_insert(A, key, n)
*  add the key to the integer max-heap A
*  increase the size of A with the addition of the new key
*  A is modified to maintain the max-heap
*/
```

Listing 5: main

```
/*
* main()
*   Demonstrate the max-priority queue operations
*/
```

Listing 6: build max heap example run

```
Max-heap A = <15,13,9,5,12,8,7,4,0,6,2,1>
The maximum value of the priority queue is 15.

Extracting max...
The maximum value of the heap was 15.
After extraction Max-heap A = <13,12,9,5,6,8,7,4,0,1,2>
```

```
Back to the original max-heap...
Max-heap B = <15,13,9,5,12,8,7,4,0,6,2,1>

Increasing the value at index 9 to 14...
After increasing the value Max-heap B = <15,14,9,13,12,8,7,4,5,6,2,1>

Back to the original max-heap...
Max-heap C = <15,13,9,5,12,8,7,4,0,6,2,1>

Inserting the key 10 into C...
After inserting the value Max-heap C = <15,13,10,5,12,9,7,4,0,6,2,1,8>
```