

COSC 311: ALGORITHMS
MINI 1
Solutions

1. Read the syllabus!

(a) Where and when are your section instructor's office hours?

Gardner: Monday 2-3:30pm and Wednesday 4-5:30pm. SCCE C215.
McGeoch: Tuesday, 3-4:30, and Wednesday, 1-2:30. SCCE C216.

(b) Suppose you're stuck on a homework assignment. You've read through your class notes and the textbook, but you still have questions. What are three things you can do to get help?

1. Go to office hours
2. Go to an evening TA help session
3. Post to the Moodle forum
4. Peer tutoring

(c) Under what circumstances are you allowed to get an extension on mini homework?

None.

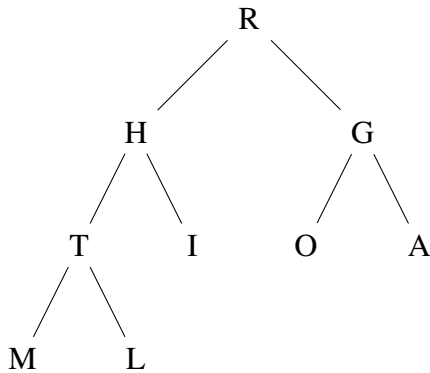
(d) Suppose Kathleen has used up 1 late day already. The next homework assignment is due Friday in class, and Kathleen submits it on Sunday at 5pm. How many penalty-free late days does she have left, and what is the maximum score she can receive on this assignment?

Kathleen has one penalty-free late day left, and the maximum score she can receive is 50%.

2. Heapify. Here's an unsorted array. Draw the array and the corresponding partially-heapified tree after each iteration of the `heapify` algorithm we wrote in class (include the initial unheapified tree, and leave blank any boxes you don't need). (NOTE: this relies on Monday's class)

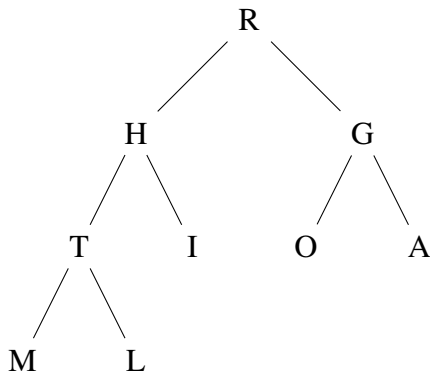
R	H	G	T	I	O	A	M	L
---	---	---	---	---	---	---	---	---

Initially:



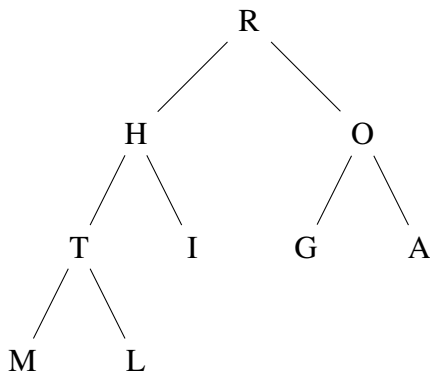
R	H	G	T	I	O	A	M	L
---	---	---	---	---	---	---	---	---

After Step 1: Sift down T



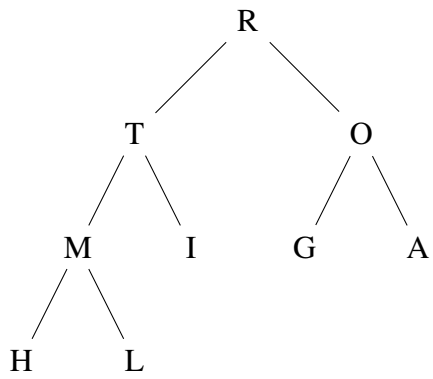
R	H	G	T	I	O	A	M	L
---	---	---	---	---	---	---	---	---

After Step 2: Sift down G



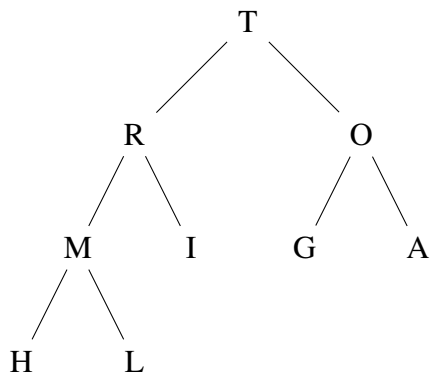
R	H	O	T	I	G	A	M	L
---	---	---	---	---	---	---	---	---

After Step 3: Sift down H



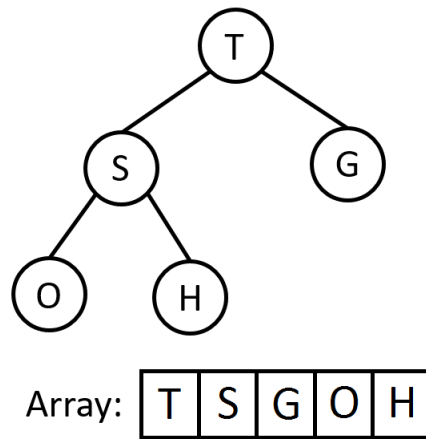
R	T	O	M	I	G	A	H	L
---	---	---	---	---	---	---	---	---

After Step 4: Sift down R

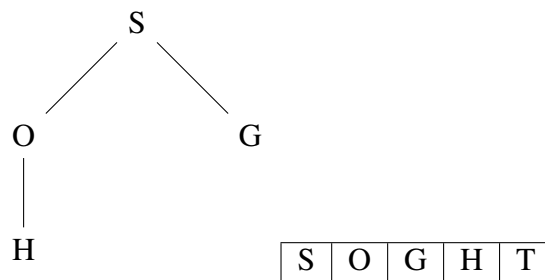


T	R	O	M	I	G	A	H	L
---	---	---	---	---	---	---	---	---

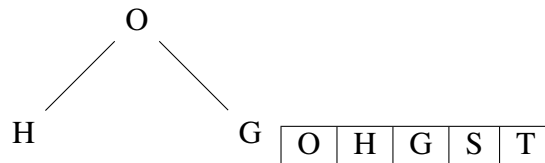
3. Heapsort. Here is a picture of a heap and an array in which the heap is stored. Draw a picture of the heap and the array after each step of heapsort (there should be five pictures). (NOTE: this relies on Monday's class)



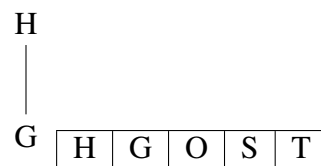
After Step 1:



After Step 2:



After Step 3:



After Step 4:

G

G	H	O	S	T
---	---	---	---	---

After Step 5:

(empty tree)

G	H	O	S	T
---	---	---	---	---