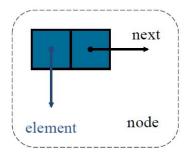
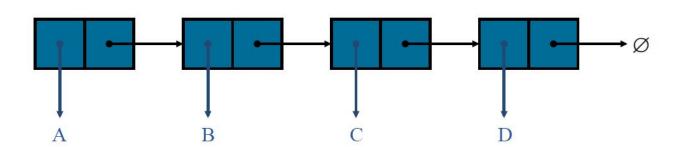
Midterm Review

林苡晴 <u>110356019@nccu.edu.tw</u> 蔣其叡 <u>111356024@nccu.edu.tw</u>

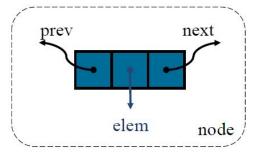
(linked) list-based/array-based

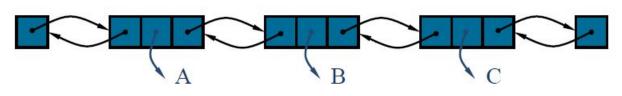
Singly linked list





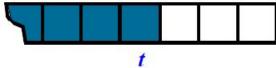
Doubly linked list





Array-based





(linked) list-based/array-based (cont.)

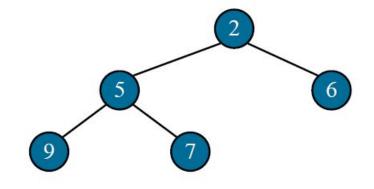
Array-based stack



Array-based heap

For the node at rank i

- the left child is at rank 2i
- the right child is at rank 2i + 1

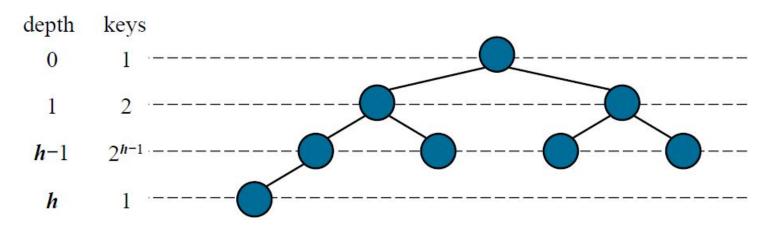




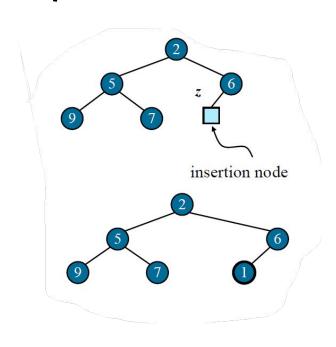
Tree

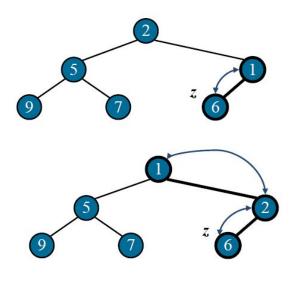
- Terminology:
- Root: a node without any parent (A)
- Internal node: a node with at least one child (A, B, C, F)
- External node (a.k.a. leaf): a node without children (E, I, J, K, G, H, D)
- Subtree: tree consisting of a node and its descendants

Height/Depth: for a heap's height is h



Heap

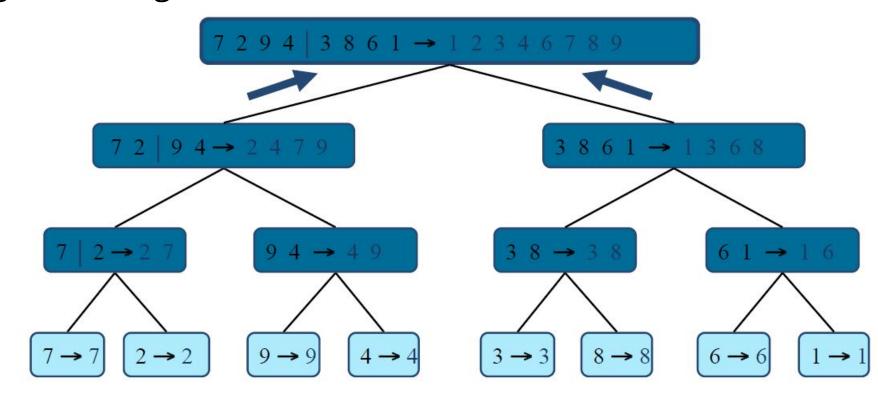




- Max/Min heap
- Insert & RemoveMin : O(log n)

Merge

- based on the divide-and-conquer paradigm
- Sorting have O(n log n) running time

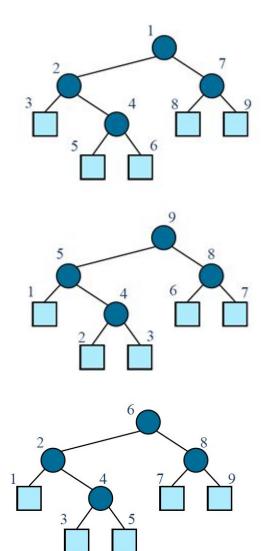


Traversal

- Preorder
 - o A node is visited (so is the operation) before its descendants

- Postorder
 - A node is visited after its descendants

- Inorder
 - o A node is visited after its left subtree and before its right subtree



Summary of Sorting Algorithms

Algorithm	Time	Notes
selection-sort	$O(n^2)$	in-placeslow (good for small inputs)
insertion-sort	$O(n^2)$	in-placeslow (good for small inputs)
quick-sort	O(n log n) expected	in-place, randomizedfastest (good for large inputs)
heap-sort	$O(n \log n)$	in-placefast (good for large inputs)
merge-sort	$O(n \log n)$	sequential data accessfast (good for huge inputs)

題型

是非

- 。一些java中關於型態、變數的觀念(class, interface,繼承,多型等.....)
- 各種 sort, tree, algorithm的性質(如何建構、定義、使用等.....)
- Pattern matching
- Time Complexity!!!!!!!!!!!!

手寫

- Define/Apply/Describe/Complete a (sort, tree, algorithm, etc.)
- Step by step!!

review 20221128

- 1. Lecture Review for Midterm
 - Lec 1-9, TextBook Ch1-9, 11-12 (part)
- 2. Notice for Midterm (20221201)
 - The location is at 資訊大樓 301 (9:10-12:00am), 資訊大樓 401 (1:10-4:00pm).
 - Email TA and Teacher before the exam if you are in quarantine.