Exam 3: ch10, 12, 18, 15

Open book, paper notes
No electronic devices
Please show your work

27 Nov 2012
CMPT231
Dr. Sean Ho
Trinity Western University

TRINITY WESTERN UNIVERSITY

Exam 3: 40pts

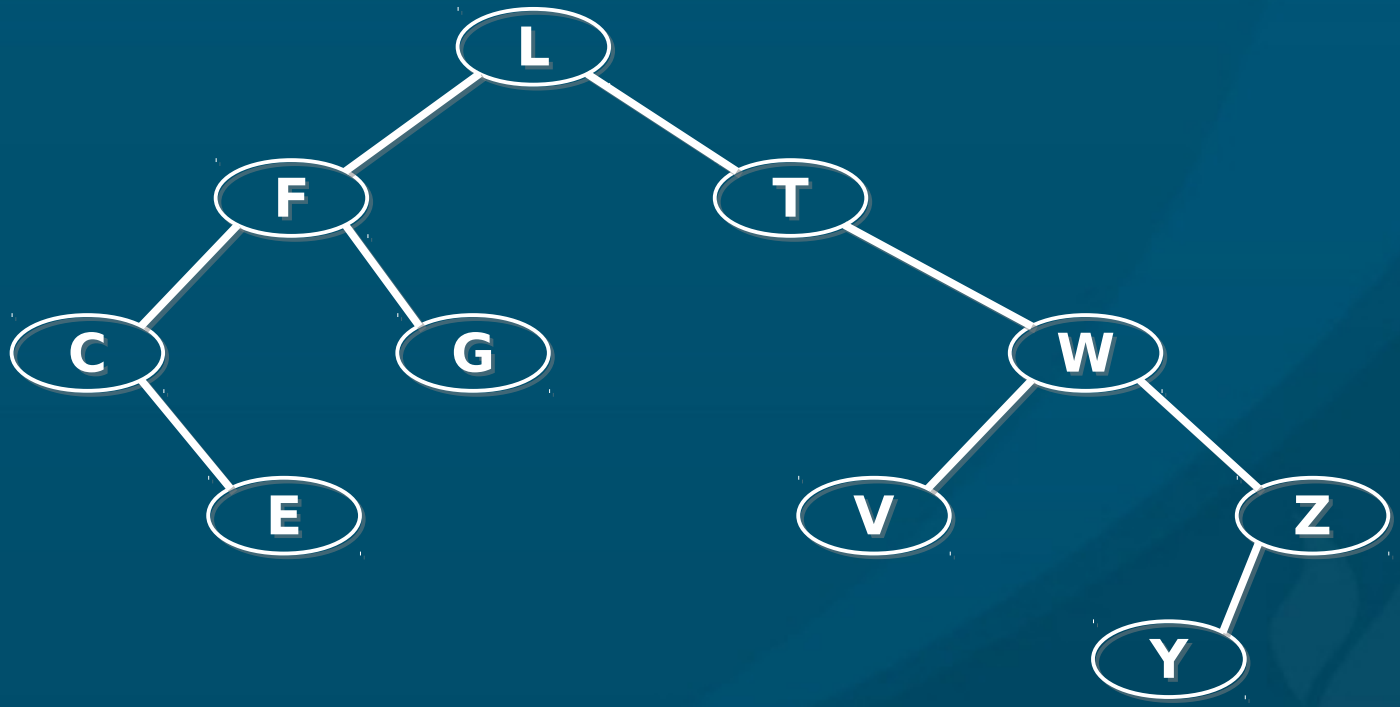
- [8] Write a function that reverses a doubly-linked list in O(n) time.
- Preorder traversal of a BST yields: L F C E G T W V Z Y
  - [7] Draw the BST.
  - [3] Print a postorder traversal.
- [10] Draw the B-tree of t=3 with the following inserted in order. Draw the tree just before and just after each split:
  A G F B K D H M J E S I R X
  - [2] Draw the above tree after deleting H.
- [10] Demonstrate the dynamic programming solution for optimal parenthesisation of a list of matrices with dimensions: (2x5), (5x10), (10x4), (4x5)

Exam 3: solutions #1

- [8] Write a function that reverses a doubly-linked list in O(n) time.
  - def reverse(list):
    - cur = list.head
    - while cur is not NULL:
      - tmp = cur.next
      - cur.next = cur.prev
      - cur.prev = tmp
      - cur = tmp
    - tmp = list.tail
    - list.tail = list.head
    - list.head = tmp

Exam 3: solutions #2

- Preorder traversal of a BST yields: L F C E G T W V Z Y
  - [7] Draw the BST.



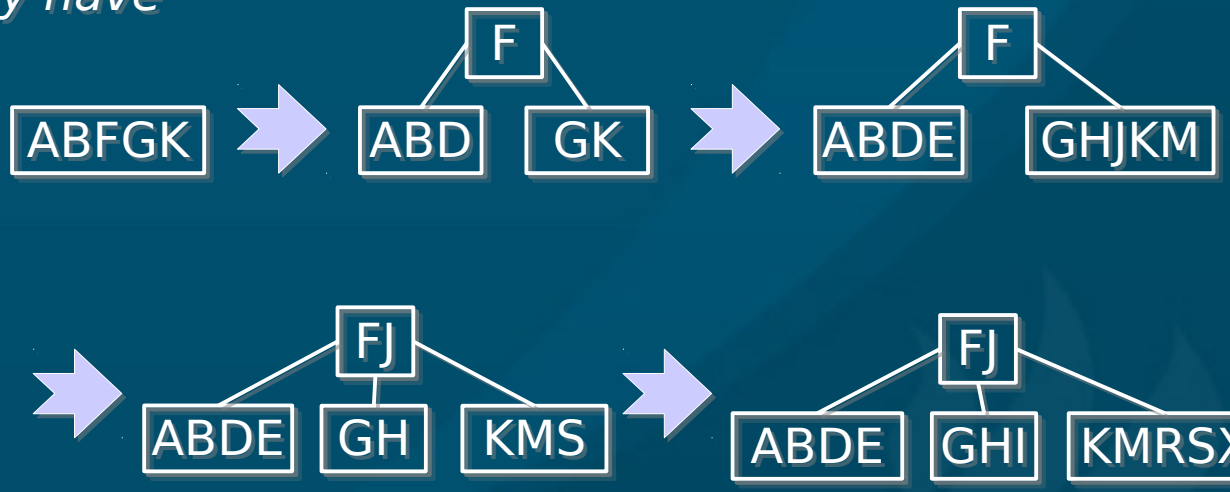
  - [3] Print a postorder traversal.
  - E C G F V Y Z W T L

Exam 3: solutions #3

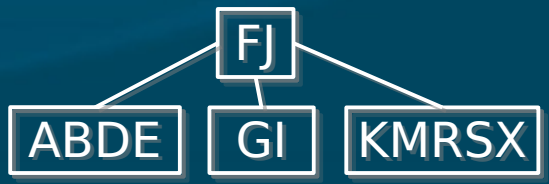
- [10] Draw the B-tree of t=3 with the following inserted in order. Draw the tree just before and just after each split:

  A G F B K D H M J E S I R X

t=3 means each node may have between 2 and 5 keys



- [2] Draw the above tree after deleting H.



Exam 3: solutions #4

- [10] Demonstrate the dynamic programming solution for optimal parenthesisation of a list of matrices with dimensions: (2x5), (5x10), (10x4), (4x5)

m(i,j)	1	2	3	4
1	0	100	180	220
2	.	0	200	300
3	.	.	0	200
4	.	.	.	0

s(i,j)	2	3	4
1	.	2	3
2	.	.	3
3	.	.	.

- Solution: (((2x5) (5x10)) (10x4)) (4x5)