

School of Computer Science and Software Engineering
Clayton Campus, Monash University

CSE1303 Part A
Summer Semester, 2002

Tutorial 5: Recursion, Binary Search Trees and Complexity Solutions

Exercise 1.

```
/*
 * Deletes all the nodes in a Linked Structure from
 * the node pointed to by nodePtr until the end of list.
 */
void
killNodes(Node* nodePtr)
{
    if (nodePtr != NULL)
    {
        killNodes(nodePtr->nextPtr);
        free(nodePtr);
    }
}

/*
 * Deletes all the nodes
 */
void
killList(List* listPtr)
{
    if (listPtr->headPtr != NULL)
    {
        killNodes(listPtr->headPtr);
    }

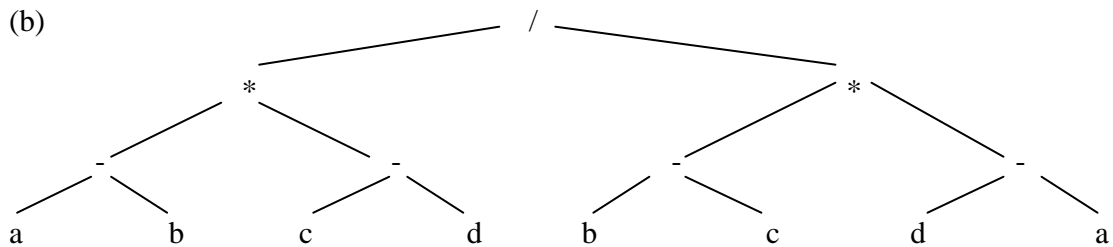
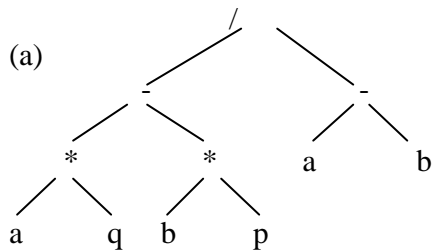
    initializeList(listPtr);
}
```

Exercise 2.

```

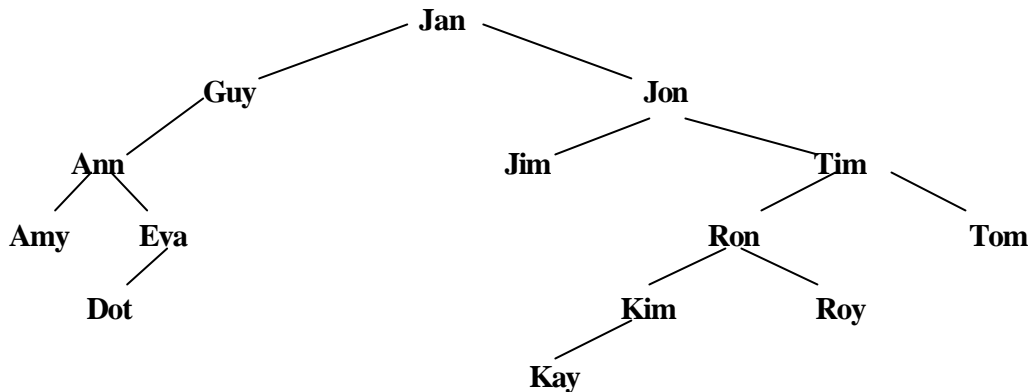
/*
 * Deletes all the nodes in a Binary Tree.
 */
void
killTree(TreeNode* nodePtr)
{
    if (nodePtr != NULL)
    {
        killTree(nodePtr->leftPtr);
        killTree(nodePtr->rightPtr);
        free(nodePtr);
    }
}

```

Exercise 3.**Exercise 4.**

- (a) **Prefix:** (4a) $/ - * a q * b p - a b$
 (4b) $/ * - a b - c d * - b c - d a$
- (b) **Infix:** (4a) $a * q - b * p / a - b$
 (4b) $a - b * c - d / b - c * d - a$
- (c) **Postfix:** (4a) $a q * b p * - a b - /$
 (4b) $a b - c d - * b c - d a - * /$

Exercise 5.



Exercise 6.

- (a) **Preorder:** Jan Guy Ann Amy Eva Dot Jon Jim Tim Ron Kim Kay Roy Tom
- (b) **Inorder:** Amy Ann Dot Eva Guy Jan Jim Jon Kay Kim Ron Roy Tim Tom
- (c) **Postorder:** Amy Dot Eva Ann Guy Jim Kay Kim Roy Ron Tom Tim Jon Jan

Exercise 7.

- (a)
 - (Selection sort: find largest) 3 swaps
 - worst case: 4 5 6 7 8
 - (Insertion sort: sorting small – large) 5 moves
 - worst case: 8 7 6 5 4 (insert at the start of the array each time, $O(n^2)$)
- (b)
 - 6, anything > 12
 - 3
 - 4, anything > 12 or < 3
 - 2
- (c)
 - 4 comparisons, search for 5
 - 2 (and a bit) comparisons

