

CSI 33 LECTURE NOTES (Ojakian)

Topic 7: Trees and Applications

OUTLINE

(References: Ch. 7)

1. Trees
 2. Decision Trees
 3. Compression
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1. Trees: Recall Basic Terminology

- (a) Vertices, Nodes, Edges
- (b) Rooted vs. non-Rooted Tree
- (c) Root, Parent, Child, Sibling
- (d) Binary Tree
- (e) Complete Binary Tree

2. Before Trees: Redo Linked Lists

- (a) Program Linked Lists using Python
- (b) Just do basic examples from scratch

3. Programming Binary Trees

Basically: Do the linked lists, but have 2 references to children, instead of one reference.

(a)

PROBLEM 1. *Create just a `TreeNode` class and build a tree from scratch.*

(b) Typical “addressing” in binary trees.

PROBLEM 2. *Create a `BinaryTree` class that uses this addressing method to: 1) add nodes and 2) get node data.*

4. Application: Simple Decision Trees

For all this, see the coding example.

- (a) Example: Do some guessing game (animal, or food, or etc?)
- (b) Use basic addressing approach to build.

5. Application: Data Compression

PROBLEM 3. *Consider Problem 8 (pages 249 - 251), and discuss how to do **without** data compression.*

PROBLEM 4. *Reconsider the last problem, but now **with** data compression.*

PROBLEM 5. *Use the `BinaryTree` class to program the data compression.*