

Object-Oriented Programming

5th Weekly Note (E12, Week 49)

Reading for Week 49

Sections 9.3 and 9.4.1–9.4.2 of “Introduction to Programming Using Java”

Lecture: Monday, December 3, 12-14 (U91)

In this lecture we first repeat the recursive data structure idea and the List ADT implementation based on linked lists.

Then we see at more specialized recursive data structures like stacks and queues. Finally, we take a look first at binary and then at multi-variate trees.

The second part of the project will be introduced at the end of the lecture.

Discussion: see detailed schedule on course home page

First discuss Quizzes 9.4–9.8.

Then discuss the differences between pre-order, in-order, and post-order traversal of a binary tree. All these traversals are depth-first traversals, i.e., they first explore one path of the tree to a leaf, before visiting any other node. A depth-first traversal corresponds to using a stack to keep track of the nodes still to visit. If, instead of using a stack, we use a queue, we obtain a breadth-first traversal. Take an example tree and manually play through both depth-first and breadth-first traversal using a stack and a queue, respectively.

Finally, discuss how breadth-first search using a queue can be used to build a game tree for Tic-Tac-Toe. To this end, discuss how to use the same traversals as discussed before for a multivariate tree, i.e., a tree with an arbitrary number of children (typically represented by a list of children).

Lab: see detailed schedule on course home page

Solve Exercises 9.4, 9.2, 9.5.