

CS 42 Fall 2012, Mid-Term Study Guide (Midterm date: Tuesday 10/30 in class)

The mid-term can include anything we have discussed up to the break, including the items listed below. The focus is on concepts, rather than fine-grain details and syntax. Coding and short essay questions can be included.

You may use a single physical reference sheet 8.5 x 11" of your own construction. The sheet is to be submitted with your exam. It will be returned to you when the exams are graded. No other materials can be used, including computers.

States and Transitions

Functional programming

S expressions

Higher-order functions (map, foldl, foldr, filter, mappend, ...)

Common list functions (cons, list, first, rest, null?, assoc, append, reverse)

Function composition and decomposition

Symbols vs. strings

Anonymous functions (lambda expressions)

Recursion

Mutual recursion

Tail recursion

McCarthy's transformation (imperative programs to tail-recursive functions)

Accumulators

Grammars

Terminal vs. non-terminal symbols

Rules (productions)

Parsing based on grammar

Open List structures

Box-pointer diagrams

Sharing

Cost of operations (in time): $O(1)$, $O(n)$ notation

Language interpretation

Eval function

Environments and bindings

Constructing and evaluating expressions containing *lets* and lambda expressions

Objects and classes

References

Closed lists, such as stacks and queues

Using stacks and queues in graph search

Depth-first vs. Breadth-first search