Final Exam Review: Interpreters

CS 350

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Last updated: August 14, 2024

Interpreters

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- Lazy evaluation

Syntax and the Language Pipeline

Life of a program

- The Language Pipeline:

Source code	parsing ⟶	Abstract syntax tree	*translation* ⟶	Core Syntax	*evaluation* ⟶	Result
text file	lexing / tokenizing first	data structure	desugaring / compilation	simpler AST / machine code	interpreter, execute on CPU	value, side effects

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  - Whatever the result of the computation is

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    - e.g. We can't use Plait `+` on an `Expr`, but once we apply `interp` and get a `Number` we can

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    - Ignoring bound occurrences gives us *shadowing*

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    - This is how we say “run the body”

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if (someCondition){
  cout >> "hello";
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  while (x > 0){
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  - No equivalent in a purely functional language

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- Similar to:

```
if (true){ // make the scope explicit
  int x = xExpr;
  body;
}
```

Dynamic Type Checking

- When we have functions as values, we need a way to

Environments

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- Environments *give meaning to programs with free variables*
  - The program has a value *paramterized over* values for the free variables
- Performance:
  - Instead of traversing the entire body of the function, just push a binding onto the front of a list

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- Operations:
  - Make empty environment

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- Interpret `xExpr` to a value
- Make a new environment with `x` bound

Closures