Lab #6—Simulator

Goal: *run PC-231 hex code programs*

Strategy: loop until HALT; switch on opcode; modify RAM and register arrays

Decisions: what format for word storage?

Other issues: back-and-forth conversion between internal words & Java integers

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Design Choices for Word Storage Format

Options: *ints, Strings of hex or boolean, vectors or arrays of ints, characters or booleans*

Int: Pro: efficient space-wise; Con: requires bit-shifting

Strings: Pro: easy output; Con: inefficient, hard to convert

Vectors/arrays: Pro: easy element access; Con: inefficient

Lab #7—Assembler

Goal: *convert assembly programs to hex*

Strategy: identify real code lines; count for labels; look-up or convert mnemonics

Decisions: save or re-identify code lines?

Other issues: handling of CONST; adding new features?

Lab #8—Interpreter/Evaluator

Goal: *evaluate & print expressions-as-trees*

Strategy: design tree classes; build trees with new; traversal, hash for variables

Decisions: class and sub-class structure

Other issues: order of evaluation (dictated by lab); input & output style

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Lab #9—Parser

Goal: *build expression tree from string*

Strategy: use stack of trees (or recursion); incrementally identify syntactic structure

Decisions: recursive descent, ad-hoc stack based or parser-generator tool?

Other issues: handling tokenization

Design Choices for Parsing Techniques

Options: *recursive descent, ad-hoc stack or parser tool*

Recursive descent: Pro: sample code available, easy to understand; Con: requires massaging grammar to eliminate left recursion

Ad-hoc: Pro: descriptions available; Con: need to make ad-hoc decisions on how to process each language form

Parser tool: Pro: most work is automated; Con: must learn how to use the tool, may have to massage grammar

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Lab #10—Compiler/Code Generator

Goal: *generate PC-231 program from tree*

Strategy: recursively walk tree; keep variable information in hash table

Decisions: register allocation; sub-routine calls; level of optimization "aggression"

Other issues: other individual language feature issues (constant handling)