CS 313 Lecture 9

C: structs
activation records
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• point.c
• stack.c
Activation records (Sethi 5.7)

• Info associated with function call is stored in the function’s *activation record* (= stack frame)
  • parameters
  • local variables
  • temporary values
  • saved state (old register contents)
  • return value

• Frame pointer FP (%ebp) points to start of current frame
  • store old frame pointer as well: *control link* (= dynamic link)

• [Stack pointer SP (%esp) points to top of stack]
Stack frames during recursion

Sethi Figures 5.20 and 5.21
Nested procedures require access links

- To find frame for variable, follow N access links
- N = difference in nesting depth
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- Faster: store access links in “display” array indexed by nesting depth

*Figure 5.27* Display elements, indexed by nesting depth, point to visible blocks.
Conclusion

• Procedural languages obey “stack discipline”
  • naturally supports recursion
  • nested function definitions possible

• Dynamical memory allocation allows creation of variable-sized data

• But: cannot dynamically create functions

• Next: Object-oriented programming