Princeton University
COS 217: Introduction to Programming Systems
Spring 2005 Midterm Exam Preparation

Topics

You are responsible for all material covered in lectures, precepts, assignments, and required readings. This is a non-exhaustive list of topics that were covered:

C programming
- The program preparation process
- Memory layout (text, stack, heap, rodata, data, bss sections)
- Data types
- Variable declarations and definitions
- Variable scope, linkage, and duration/extent
- Variables vs. values
- Operators
- Statements
- Function declarations and definitions
- Pointers
- Call-by-value and call-by-reference
- Arrays
- Strings
- Command-line arguments
- Constants: #define, enumerations, the "const" keyword
- Text files
- Structures
- Dynamic memory management (malloc, calloc, realloc, free)
- Void pointers
- Function pointers
- The assert macro

Programming style
- Modularity, interfaces, implementations
- Programming by contract
- Multi-file programs using header files
- Protecting header files against accidental multiple inclusion
- Opaque pointers
- Abstract data types
- Memory "ownership"
- Invariants

Applications

- De-commenting, lexical analysis via finite state automata
- String manipulation
- One-line emacs
- Symbol tables, linked lists, hash tables
- Dynamically expanding arrays

Tools: The UNIX/GNU programming environment

- UNIX, bash, xemacs, gcc, gdb

Readings

As specified by the course "Schedule" Web page...

Required:

- *C Programming* (King): 1-19
- *The Practice of Programming* (Kernighan & Pike): 1, 2, 4

Recommended:

- *Programming with GNU Software* (Loukides & Oram): 1, 2, 3, 4, 6