Princeton University
COS 217: Introduction to Programming Systems
Spring 2003 Midterm Exam Preparation

You are responsible for all material covered in lectures, precepts, and the assigned readings.

Topics

Programming style
- Modularity, interfaces, implementations
- Abstract data types
- Abstract objects
- Testing strategies
- Profiling and instrumentation
- Robust programming, error handling strategies

Advanced C programming
- Memory layout
- Dynamic memory management
- Void pointers
- Function pointers
- Variable declarations and definitions
- Variable scope, linkage, and duration
- Const variable declarations and definitions
- Function declarations and definitions
- Opaque pointers
- Macros and their dangers
- The assert macro
- Unions, enumerations, tagged unions

The UNIX/GNU programming environment
- Emacs, gcc, gdb, make, gprof

Digital Circuits
- Combinational Circuits
  - Building blocks: NOT, AND, and OR gates
  - Common combinational circuits: decoder, multiplexer, demultiplexer, adder, ALU
- Designing combinational circuits using NOT, AND, and OR gates
  - Truth tables
  - Boolean expressions in sum of products form
Sequential Circuits
    Building blocks: RS flip flops, clocked RS flip flops, clocked D flip flops,
    Clocked master slave D flip flops
    Common sequential circuits: register, register bank, memory
    Designing sequential circuits using clocked master slave D flip flops
    State machines
    Truth tables
    Boolean expressions in sum of products form

Applications
    String manipulation
    Hash tables, symbol tables
    Digital circuit simulation

Readings

Extracted from the course web pages:

Loukides: 3, 4, 6, 7, 9
King: 10, 15, 16.4-5, 17, 18, 19

Old Exam Questions

These old exam questions are particularly pertinent:

Fall 2002 Exam 1: 3, 4, 5
Fall 2002 Exam 2: 2, 4a, 5
Spring 2002 Exam 1: 1, 2, 3, 4, 5, 6, 8, 9 (generally, although the Set ADT is not
    pertinent)
Fall 2001 Exam 1: 3, 4, 5, 6, 10