

Princeton University
COS 217: Introduction to Programming Systems
Midterm Exam 2 Topics

1. Dynamic memory management errors in C

- Memory leak (i.e. garbage creation)
- Dangling pointer
- Double free
- Shared memory (not necessarily erroneous)

2. SPARC architecture

- Registers vs. memory
- Memory sections: data, rodata, bss, text, stack, heap
 - Stack structure
- Register windows
- Instruction formats

3. SPARC assembly language

- Directives (i.e. pseudo-ops) and mnemonics
- Sections
- Fundamental programs
- Branching
 - Optimization by minimizing memory access
 - Optimization by eliminating nop instructions
 - Delayed control transfer instructions
 - Delay instructions
 - Annul bits in branching instructions**
 - Control structure optimization patterns**
- Using the stack
- Subroutine calling conventions
 - “Regular” subroutines
 - Leaf subroutines
 - Subroutines with more than 6 parameters**
 - Indirect subroutine calls (as with C function pointers)**

4. Assemblers

- Pass 1: generating the symbol table
- Pass 2: generating the data and text sections
 - ELF relocation information**

5. UNIX system calls

- The SPARC trap instruction**