CMSC 313
COMPUTER ORGANIZATION
&
ASSEMBLY LANGUAGE
PROGRAMMING

LECTURE 28, FALL 2012

ANNOUNCEMENTS

- **Final Exam, Section 01**
  - Tuesday, December 18, 1pm – 3pm, ITE 229
- **Final Exam, Section 02**
  - Thursday, December 13, 1pm – 3pm, ITE 229
- **Switching sections must be pre-approved.**
- **Bring 4"x6" crib sheet, double sided.**
- **NO MAGNIFYING GLASSES!**

TOPICS TODAY

- **Final exam topics: C Programming**
- **Final exam topics: Digital Logic**

FINAL EXAM TOPICS: C PROGRAMMING

BASIC C SYNTAX

- **Functions**
  - local variables
  - function prototypes
  - parameter passing
  - return values
- **Header files**
  - `#include <libfuncs.h>`
  - `#include "mine.h"`
  - Guarding with `#ifndef` ...
- **Separate compilation**

BASIC I/O

- **Input using `scanf()`**
  - `%d, %f, %s`
  - need `&`
  - return value

- **Output using `printf()`**

C TYPES

- **Arrays**
- **Structs**
- **Characters & Strings (null terminated)**
- **`typedef`**

POINTERS

- basic pointer use: `*` and `&` operators
- pointers and arrays
- pointers and strings
- pointers to struct
- combinations of pointers, struct and arrays
- pointer arithmetic
- `void *` pointers

MEMORY ALLOCATION

- **allocating memory on the heap**
- **be able to write programs using these:**
  - `sizeof()`
  - `malloc()`
  - `free()`

FUNCTIONS POINTERS

- declaring function pointers (including using `typedef`)
- assigning values to function pointers
- invoking functions using function pointers
- function pointers as actual parameter

FINAL EXAM TOPICS: DIGITAL LOGIC

BOOLEAN ALGEBRA

- truth tables
- AND OR NOT
- Sum of Products (disjunctive normal form)
- Product of Sums (conjunctive normal form)
- Simplification

COMBINATIONAL LOGIC

- CMOS circuits using MOSFET transistors
- combinational vs sequential logic
- logic gates: AND, OR, NOT, XOR (plus ***bubbles***)
- logic components: MUX, DEMUX, DECODER

FLIP FLOPS

- D flip flops
- J-k flip flops
- good flip flops vs ***bad***
- clocks

FINITE STATE MACHINES

- Implemented using flip flops + gates
- State assignment
- Simplification is possible

MEMORY HIERARCHY

- **Memory cache**
  - Why?
  - caching policies
- **Virtual memory**
  - Why? what problems are solved
  - hardware assisted (TLB)
  - page tables

NEXT TIME

- **Final Exam**