# Goto, Exceptions, and Assembly in C

## CS 2022: Introduction to C

Instructor: Hussam Abu-Libdeh

Cornell University
(based on slides by Saikat Guha)

Fall 2011, Lecture 12

# Switch Statement

- N-way `if` (N $>$ 2), but equality check only
- Only integers
  - But then many things in C are glorified integers
  - Notably, enums

# Switch Statement

```
enum days {Sun, Mon, Tue, Wed, Thu, Fri, Sat};
...
enum days day = ...;
switch (day) {
    case Sat:
        ...
        break;

    case Sun:
        ...
        break;

    case Mon:
        printf("Sounds like someone has a case of the Mondays.\n");
    case Wed:
    case Fri:
        ...
        break;

    default:
        ...

}
```

# Goto

- Unstructured control flow
  - (unlike `if`, `switch`, `for` etc.)
- Evil
- Except when it's not
- Especially, when it is the cleanest

# Goto

```
    ...
    goto foo;
    ...

foo:
    ...
```

# Goto

Extremely useful for

- breaking out of deeply nested loops
- handling errors and exceptions
  - by writing code that cleans up resources in reverse order of allocation
  - and jumping to the correct position in the list if allocation fails at some point

# Exceptions (kinda)

- To break out of a deep call stack quickly
- Think goto breaking out of deep loops, but applied to function calls

# Exceptions (kinda)

- To break out of a deep call stack quickly
- Think goto breaking out of deep loops, but applied to function calls
- setjmp and longjmp

# Inline Assembly

- For when no C statement exists for the task
- Or when the compiler isn't generating the assembly you want

```
asm("...assembly code...");  // Basic form

asm("code" : output);    // Assembly -> C

asm("code" : ... : input);    // C -> C
```

For more info check out:
http://www.ibiblio.org/gferg/ldp/GCC-Inline-Assembly-HOWTO.html