

ECE 471 – Embedded Systems

Lecture 6

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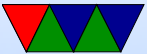
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Announcements

- HW#2 due Wednesday
- Nvidia did buy ARM



HW#2 Something Cool

- ANSI escape color/art
- In old days: how could you do colors on screen?
- Over serial port, so couldn't directly write to video card
- Escape sequences: A pattern not normally typed by accident
- ESCAPE (ASCII 27) followed by [then some pattern of characters.
- Can move cursor, change colors, etc.
- Back in the day I used to make a lot of ANSI/ASCII art.



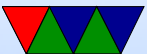
C Review

In past years sometimes the reason a HW assignment didn't work was due to using C poorly rather than misunderstandings of the desired algorithm.



Loops in C

- `for(i=0;i<10;i++) {}`
- `while(i<10) { i++; }`
- `do { i++; } while(i<10);`
Always runs at least once



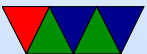
printf() in C

- printf()
- Lots of options, see man page
- How print an integer? `printf("%d", i);`
- Character? String? floating point?
`printf("%c %s %f %x", c, s, f, x);`
- More advanced formatting stuff
`printf("%0.3f", f);`
- Escape characters like percent, newlines and quotes
`printf("\t \n \" \%\");`



Common C Pitfalls – Memory

- Out of bounds in memory (see the `a[5]` example earlier. Also a problem with `malloc()` memory, Valgrind can help with that.



Common C Pitfalls – Braces

- Missing braces

```
if ( a==0)
    b=2;
```

```
if ( a==0)
    b=2;
    c=3;
```



Common C Pitfalls – equality check

- = vs ==

```
if (a=0) do_something_important();
```

- Never ignore warnings from the compiler!



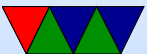
Coding Style

- How should you format your code?
- Does C have rules? Not really.
- International Obfuscated C Code Competition (IOCCC)
- Your company or open-source project might have strict rules
- Things like how tabs vs spaces, how wide are tabs, if curly brace goes after function declaration or line down
- Also rules about commenting style



Debugging – when things go wrong

- Use a debugger like gdb
 - Compile your code with `-g` for debug symbols
 - Run `gdb ./hello`
 - `bt` backtrace, `info regis` gives register, `disassem` disassembles, etc.
- Sprinkle `printf` calls



Brief Linux History

- UNIX history, UNIX lawsuit, rise of the BSDs
- Linus Torvalds (from Finland) gets a 386, announces his custom OS in 1991
- No free UNIX? FreeBSD caught up in AT&T lawsuit
- Don't be afraid of Linus (or open-source projects in general)
The media over-hypes how angry some developers get.

