C Programming

Magic Numbers

Reading

http://www.parashift.com/c++-faq-lite/newbie.html#faq-29.11

Writing Unmaintainable Code (?!?!?)

There are a lot of bad programming practices that you can use to make your code "unmaintainable"

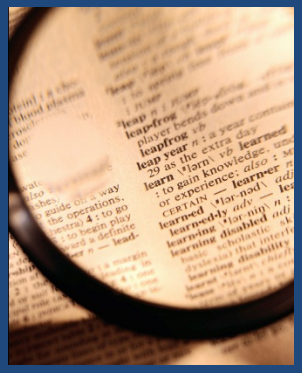
- You can find lists on the Internet but you MUST realize that it is SATIRE!

Many won’t have any relevance to you yet

One that you would be able to relate to involves “magic numbers”

“Magic Numbers?”

A magic number is a number that appears in your code and that only has meaning within the context of the code



Example

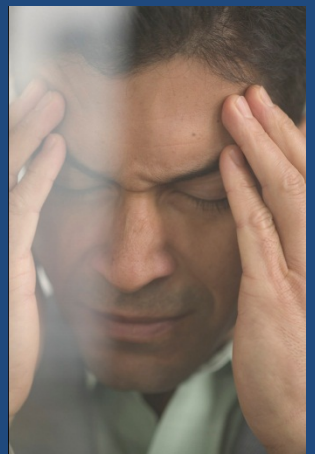
Example from the reading:
"Suppose your program is working with shipping crates. The weight of an empty crate is 5.7."

Your code would likely have 5.7 sprinkled within it multiple times

Problems

Problem #1: It's not necessarily obvious what 5.7 represents

Problem #2: If you have to change it, it could be an enormous pain to do and an even more enormous pain to do correctly



Solution

Use const or #define to create a constant that represents that value

- const is preferred

You can then provide any additional meaning information when you create the constant (e.g. /* an empty crate is 5.7 kg */)

You can also change the value trivially by changing the constant where created, instead of EVERYWHERE

Overdoing It …

You don't want to create constants for every occurrence of a number, since some don't necessarily need the context (e.g. starting a loop at 1 or 0)

Good rule of thumb from the FAQ: Focus on those values that are likely to change or that are unclear

Course Caveat

Examples given in class will likely have the "magic numbers" hardcoded into the code

This is done to make examples smaller

Since you're not going
to make a living
writing code examples
on PowerPoint,
don't hardcode your magic
numbers

Why Now?

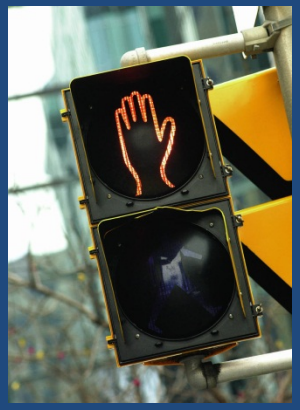
One of the first places where you are likely to run across magic numbers is in array size declarations

[9]

It's best to create
array size constants
like:

```
#define  kArraySizePrices  30
```

Visual Studio will not accept const items used as array sizes



e.g. const int kIllegalArraySizePrices = 30;

int prices[kIllegalArraySizePrices];

getNum()
in assignment #2
should have a
#define for the array size

Course Requirement?

Avoiding the use of magic numbers is expected

But you still need to develop the experience to decide when to use them

Expectation:
Obvious magic numbers
should be replaced
by constants

“Obvious” is subjective,
of course

So, you'll only lose marks
when it's
really, really blatant

Other courses will
likely be stricter,
since you're expected
to be more experienced
later