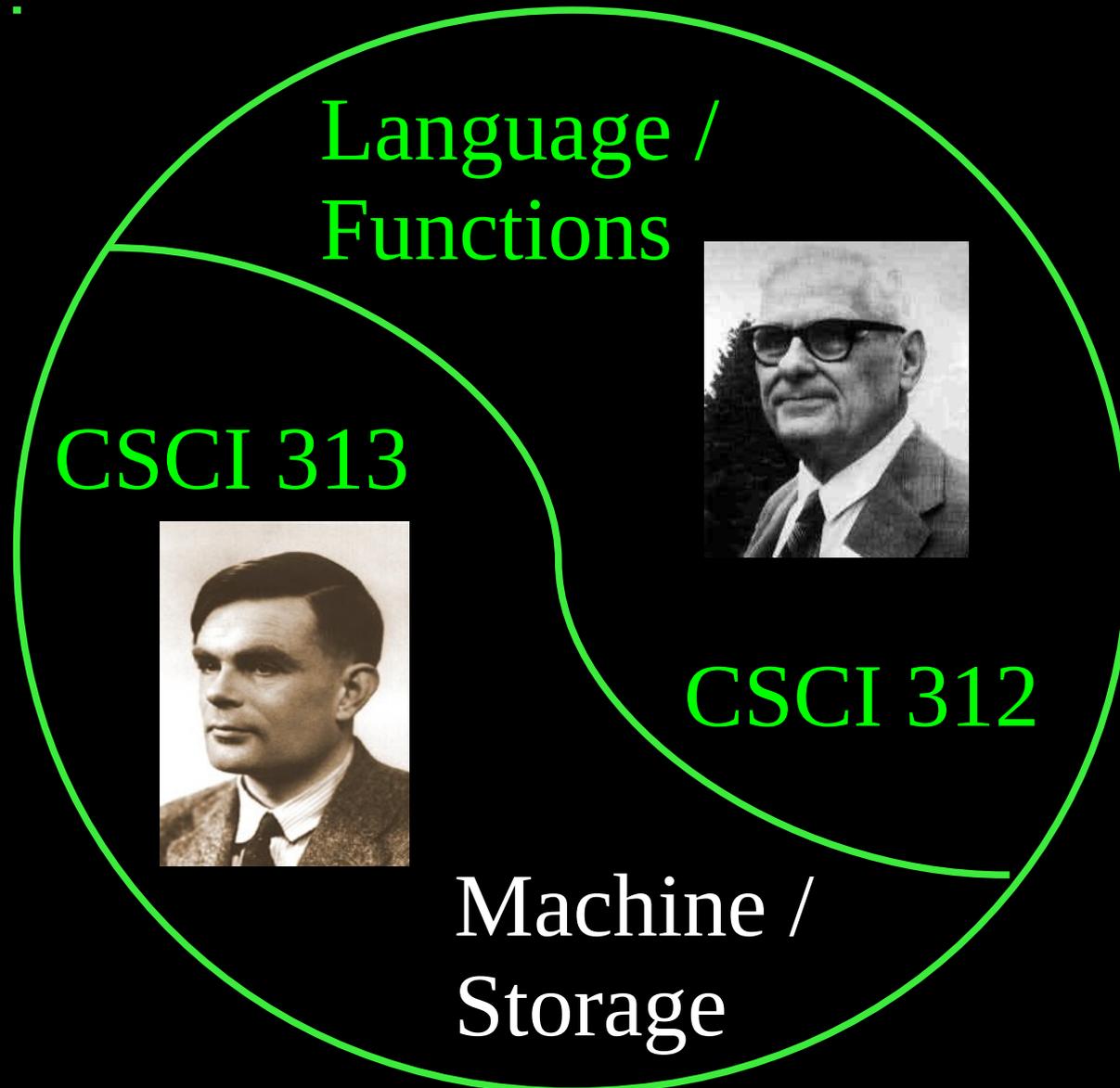


# Two Views of Computing



# Natural Languages vs. Programming Languages

- NL's are *semantically ambiguous*:  
*The spring was hot.*
- NL's are *syntactically ambiguous*:  
*tall men and women*
- Can lead to embarrassment...

# “Actual” Headlines

ENRAGED COW INJURES FARMER WITH AX

DRUNK GETS NINE MONTHS IN VIOLIN CASE

IRAQI HEAD SEEKS ARMS

2 SISTERS REUNITED AFTER 18 YEARS IN CHECKOUT COUNTER

BRITISH LEFT WAFFLES ON FALKLAND ISLANDS

STUDENTS HEAR REPTILE LECTURE

EYE DROPS OFF SHELF

SQUAD HELPS DOG BITE VICTIM

MINERS REFUSE TO WORK AFTER DEATH

JUVENILE COURT TO TRY SHOOTING DEFENDANT

STOLEN PAINTING FOUND BY TREE

DEAD CATS PROTEST

ACTOR SENT TO JAIL FOR NOT FINISHING SENTENCE

# Poetic Puns

I met a traveller from an antique land  
Who said: Two vast and trunkless legs of stone  
Stand in the desert. Near them on the sand,  
Half sunk, a shatter'd visage lies, whose frown  
And wrinkled lip and sneer of cold command  
Tell that its sculptor well those passions read  
Which yet survive, stamp'd on these lifeless things,  
The hand that mock'd them and the heart that fed.  
And on the pedestal these words appear:  
"My name is Ozymandias, king of kings:  
Look on my works, ye mighty, and despair!"  
**Nothing beside remains:** round the decay  
Of that colossal wreck, boundless and bare,  
The lone and level sands stretch far away.

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- P. B. Shelley

# Programming Languages

- PLs avoid semantic ambiguity through *denotational semantics* : explicit rules relating each token (word) to its meaning in context.
- PLs avoid syntactic ambiguity through
  - Conventions (order of operations)
  - Required indentation (Python)
  - Explicit bracketing (Java, C++): *good style doesn't rely on the conventions!*

# BAD STYLE

```
a = b / c / d;
```

```
if (a > b)
```

```
c = a;
```

```
if (x < y)
```

```
c = b;
```

```
else
```

```
c = a;
```

# GOOD STYLE

```
a = (b / c) / d;
```

```
if (a > b) {  
    c = a;
```

```
}
```

```
if (x < y) {  
    c = b;
```

```
}
```

```
else {  
    c = a;
```

```
}
```

# NL vs. PL: Summary

- All NL's are equally good for most things that people want to talk about (but cf. Sapir/Whorf Hypothesis)
- PL's are designed with specific purposes in mind: *expressiveness*. One PL may be better than another, for a particular application.
- An educated person should know more than one language.