

This week in Compsci 6/101

- **Review sets and lists**
 - What is a set, when is it useful
 - What operations available on sets
- **New APTs, some of which leverage sets**
 - Others use while loops, danger here?
 - What is a mastery APT?
- **Hangman assignment: understanding modules**
 - What we're doing this week, lead into *cheating* hangman

How to build a program

- **Create a *module***
 - Can be used by other modules via import
 - Collection of functions, later collection of classes
 - How do the functions in one module communicate?
- **Sometimes functions in one module interact**
 - Easy if one function calls another
 - Harder if state must be saved between function calls
- **Enter global variables (not used in Hangman)**
 - The scourge of human kind

Programming Style

- **Functions return a value**
 - If they don't they do anyway: None
 - Sometimes it's ok not to, the function has a *side effect*
 - Sometimes alter a parameter and return a value: *side effect*
 - Could be printing, could be altering global state
 - Could be ...
- **Functions have a comment indicating their purpose**
 - Describe functionality
 - Describe parameters
 - Describe return type
 - Describe exceptions (later)

Luis von Ahn (Duke 2000, Macarthur)

I am working to develop a new area of computer science that I call **Human Computation**. In particular, I build systems that combine the intelligence of humans and computers to solve large-scale problems that neither can solve alone.



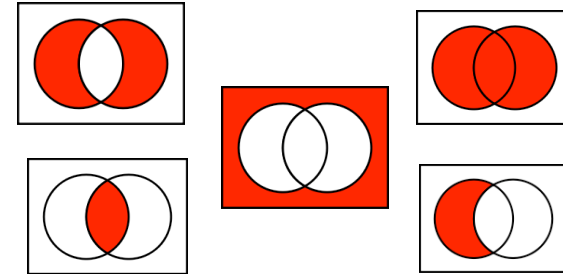
An example of my work is **reCAPTCHA**, in which over 750 million people—more than 10% of humanity—have helped digitize books and newspapers.

Python Sets

- **What do sets do (that lists and tuples cannot do?)**
 - Very efficient membership queries, really efficient...
 - Can only store immutable elements, why?
 - Are iterable, but no particular order (what?)
- **Set operators and methods interchangeable?**
 - How do we compute set intersection
 - `S&T` v. `S.intersection(T)` v. `S.intersection_update(T)`
 - Compare `S&=T`
 - Other operators: `|` (union) – `-` (difference) ^ (symmetric diff)

Set Operations from pictures

- <http://en.wikipedia.org/wiki/File:Venn0111.svg>



APTs for practice: great minds ...

- **Membercheck and SimpleWordGame**
 - Set idioms
 - List comprehensions
 - Understandable code
- **Why do we study more than one way to ...?**
 - Expressive power
 - Neuronal excitement
 - Creating connections
 - We don't have to

Playing (word) games

- **What is hangman and how is it played?**
 - Identify crucial features from programming standpoint
 - What should we do first?
 - How do we test it?
- **Designing program to be changeable**
 - How do we add a GUI for selecting letters?
 - How do we add a GUI for drawing hanged person?
- **How do we move toward cheating?**