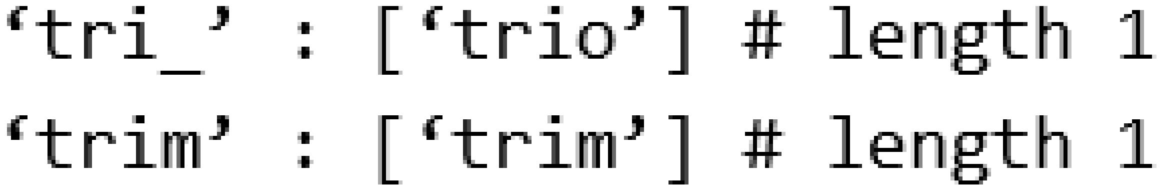
Compsci 101
Clever Hangman, Exam, Modules
Live Lecture



```
‘tri_’ : [‘trio’] # length 1
‘trim’ : [‘trim’] # length 1
```

S is for …

- **Software**
  - Joy, sorrow, fun, changing the world
- **System and sys**
  - Connecting to the machine at different levels
- **Sorting**
  - From hat to tim to more

Announcements

- APT-6 due TODAY
- APT-7 out TODAY! Due April 8

- Assignment 5 Clever Hangman due Tues. April 6

- Lab 9 Friday
    - There is a prelab!

- Exam 3 April 13
    - Old exams on old tests page

More Announcements

- APT Quiz 2 is April 8-11
  - Topics through today
  - Topics through APT-6

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- M.S./Ph.D., CS
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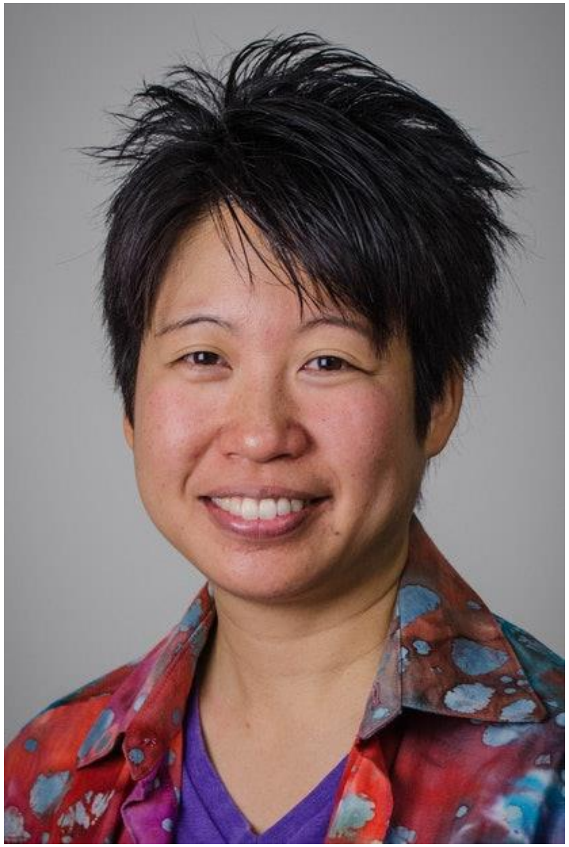


PFTD

- Finish Clever Hangman details

- Modules: reducing program complexity, re-use
  - pathlib library for reading files and folders
  - Using import to develop your own modules

CH Review: there will be letters

- The letter “u” has been guessed and is the 2nd letter
  Ex: `_ u _ _ _` and user guesses ‘r’

- **["ruddy", "rummy", "rungs", … "rusty"]**
  - *5 words start with “ru” and no other “r” or “u”*
- **["burch", "burly", "burns", … "turns"]**
  - *17 words only ‘u' as second letter and only ‘r’ third letter*
- **["bucks", "bucky", … "tufts"]**
  - *98 words with only “u” second letter and no ‘r'*
- What should our secret word be? "ruddy" ,"burch" or "bucks“?

Greedy Algorithms

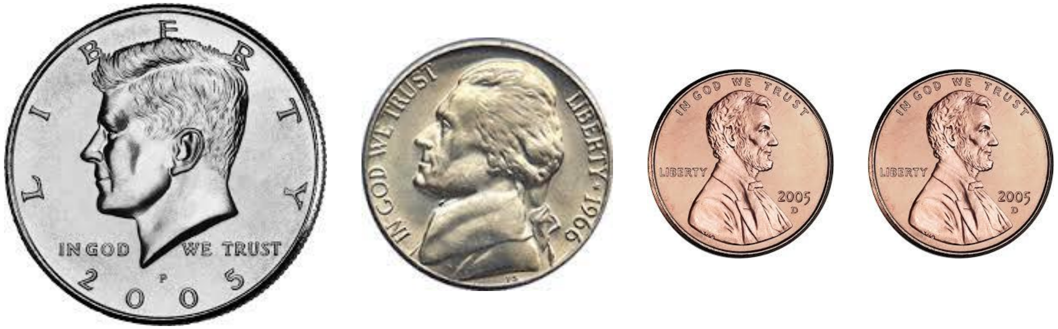
- “Choosing largest group” -> *greedy algorithm*
  - Make a locally optimal decision that works in the long run
  - Choose largest group to make game last …

- Greed as in “it chooses the best current choice every time, which results in getting the best overall result”

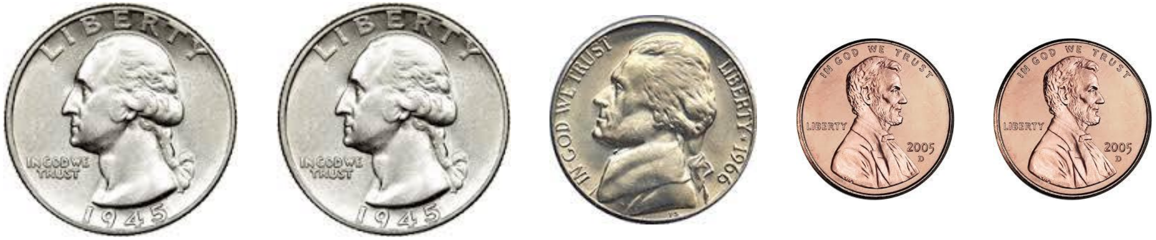
- Canonical example? Change with coins
  - Minimize # coins given for change: 57 cents

Making change for 57 cents

- When choose next coin, always pick biggest
- With half-dollar coins

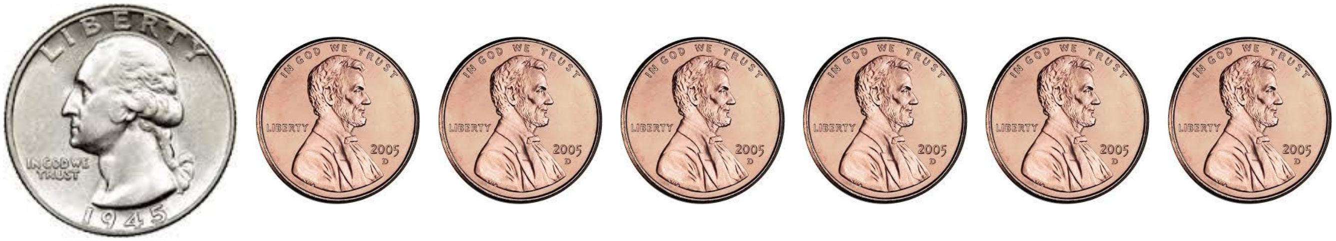


- With quarters and no half dollars

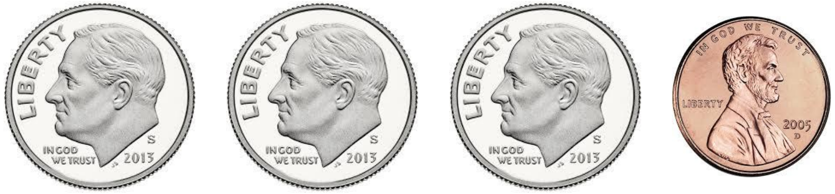


When greedy doesn't work

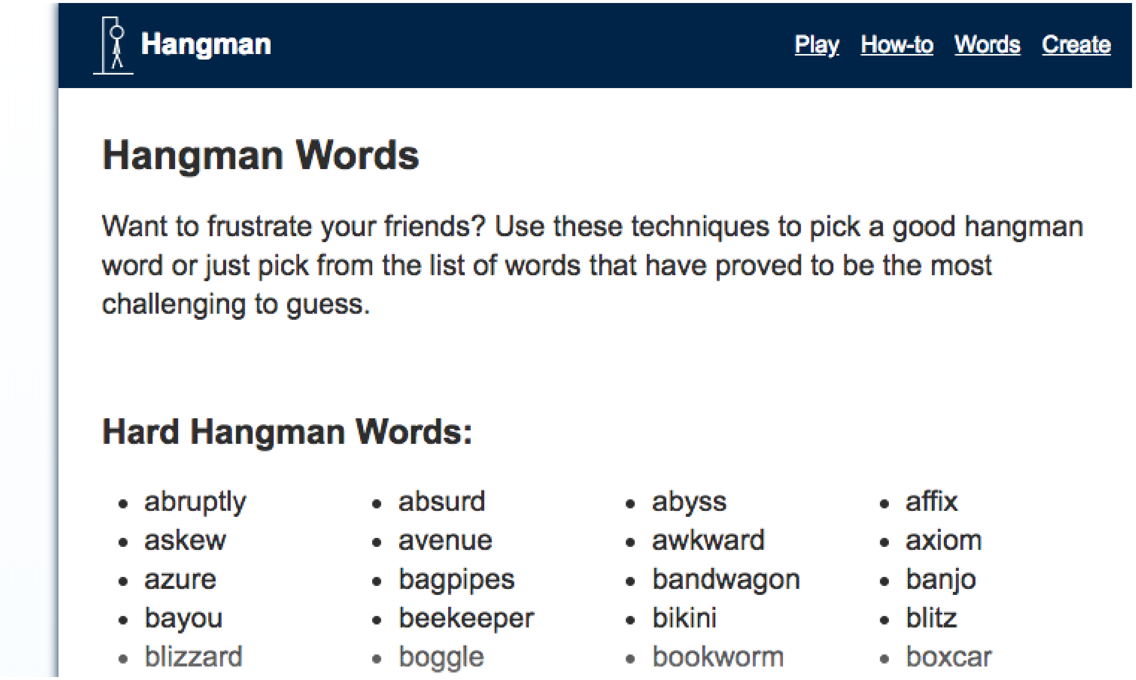
- What if no nickels? Making change for 31 cents:



- Can we do better? Yes!



WOTO-1 Clever Hangman
http://bit.ly/101s21-0401



Hangman Words

Want to frustrate your friends? Use these techniques to pick a good hangman word or just pick from the list of words that have proved to be the most challenging to guess.

Hard Hangman Words:

- abruptly
- absurd
- abyss
- affix
- askew
- avenue
- awkward
- axiom
- azure
- bagpipes
- bandwagon
- banjo
- bayou
- beekeeper
- bikini
- blitz
- blizzard
- boggle
- bookworm
- boxcar

Clever vs Plain Hangman

- Minor changes, though they require coding
  - Regular: show `‘a e t w'`
  - Clever: show `‘ bcd fghijklmnopqrs uv xyz’`
  - User inputs added – debug mode, length of word
  - `processUserGuessClever`
- Major changes
  - Debug mode
  - List of potential words changes at each turn
  - Function **`getNewWordList`** and **`createTemplate`**

Testing your code

- Alternative to lowerwords.txt? This is large!
  - Create your own file of words. Small file
  - Facilitates testing

- Call random.seed(…)
  - If seeded with same number
  - Same words/order every time you play
  - Reproduce errors more easily

Testing your methods

- CheckMyFunctions.py
  - Can you add anything to check/test things?

- Testing **`getNewWordlist(guess,letter,words)`**
  - From watching the debug game play?
  - Better: Test in isolation from game

- **`getNewWordList`** calls **`createTemplate(template,word,letter)`**
  - How we test one without the other?
  - Test `createTemplate` function first and separately

Running program again

- Create a small file for testing

Edge Case

- Words left: [‘trim’, ‘trio’]
- Hangman template is: ‘tri_’
- Users guesses ‘m’
  - What should the secret word be? ‘trio’!
  - But the dictionary has a tie!
    - `‘tri_’ : [‘trio’] # length 1`
    - `‘trim’ : [‘trim’] # length 1`
  - `getNewWordList` should take this into account
    - Pick the template with most `‘_’`

Why use modules?

- Easier to organize code
- Easier to reuse code
- Easier to change code
  - As long as the “what” is the same, the “how” can change
    - Ex: sorted(…), one function many sorting algorithms

WOTO-2 Party Planning

http://bit.ly/101s21-0401-2