

Being Clever at Games, aka Cheating

- When you play solitaire, does the computer cheat?
 - What would this mean?
- When you play chess, who wins?
 - Computer? You?
- When you play Poker?
 - pokerstars.net
 - pokerstars.com
- Hangman???



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IBM Watson

<http://ibm.co/godoMD>

Watson was optimized to tackle a specific challenge: competing against the world's best Jeopardy! contestants



Beyond Jeopardy!, the IBM team is working to deploy this technology across industries such as healthcare, finance and customer service.

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Computer is clever at Hangman?

- Cheating/clever NOT OK! : user guesses 't'
 - Computer says 'no occurrence of t'
 - Later secret word is 'chocolate'
- Clever IS OK: user guesses 't' knowing that word is six letters with third letter 'r': _ _ r _ _ _
 - Computer's secret word is 'street'
 - Computer says 'no occurrence of t'
 - Changes secret word to 'person'
 - Why is this ok?

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How to program clever game?

- Suppose the possible words are those here:
["OBOE", "NOON", "ODOR", "ROOM", "TRIP",
"SOLO", "PICK", "FRAT", "HOOP"]
- What happens if player guesses 'O' as the very first guess?
 - What should computer's secret word be?
- ["OBOE", "ODOR"] is an *equivalence class*
- ["NOON", "ROOM", "HOOP"] is too
- What about words with no O's?

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Aside: Help in debugging programs

- Often very useful to print information
 - Contents of list, set, dictionary, ...
 - After computer winnows possible words?
 - After computer creates dictionary?
- We don't want debugging/print statements in released (final) code

```
if __DEBUG:  
    for key in d:  
        print key,d[key]
```

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How do we use global __DEBUG?

- If it's a global variable we don't need to declare it when we use it in a function when ...
 - If we write/change global variable must declare
 - If we read/access, don't need to declare! Use this!
- Sometimes useful to create print/debug function

```
def debug(info):  
    if __DEBUG:  
        print info  
  
debug("%s has len %d" % (key, d[key]))
```

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PHP, Rasmus Lerdorf and Others

- Rasmus Lerdorf
 - Qeqertarsuaq, Greenland
 - 1995 started PHP, now part of it
 - <http://en.wikipedia.org/wiki/PHP>
- Personal Home Page
 - No longer an acronym
- “When the world becomes standard, I will start caring about standards.”



Rasmus Lerdorf

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Clever and Python reminders

- Dictionary keys must be immutable
 - Strings are good, lists are bad, tuples are ok
 - When can you write s[i] = 'c'?
- Write a small amount of code and test it
 - Knowing where your bug is beats trying to find it
 - This is a skill you'll get much better at, but practice*3
- This program combines ... lists, dictionaries, sorting (or max), strings,
 - Plus it's both frustrating and fun

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