

CS1110

Lecture 16: **More recursion, including A3**

Announcements

Academic integrity policy description finalized: be sure to read the new version.

<http://www.cs.cornell.edu/courses/cs1110/2014sp/about/integrity.php>

The aspect students are most likely to not realize:

To not acknowledge the contributions of others is fraudulent.

Therefore, to us, the acknowledgment part of your submissions is really important to get right:

*"At the top of your assignment, you must list the names of the authors (the students who are submitting the work for course credit) **and of every person or other source that contributed to the submission**".* You don't have to credit course materials or course staff; those resources are understood.

CS1110

Announcements

Submission "petitions": email Head TA Dongwook Yoon (DY252), cc:ing profs optional.

"Petitions" include requests for extensions due to illness or other reasons, problems with CMS upload, explanations of unusual grouping situations, etc. Petitions are generally considered on a case-by-case basis, so send such emails as early as possible.

(We profs need to devote more time to curriculum development and other management issues.)

Example: Palindromes

- String with ≥ 2 characters is a *palindrome* if:
 - its first and last characters are the same, and
 - the rest of the characters form a palindrome

the same

AMANAPLANACANALPANAMA

has to be a palindrome

- All strings with fewer than 2 characters are palindromes

Practical application: RNA secondary structure:
loops form because of "antepalindromes" (G/C and A/U)

Code skeleton

```
def ispalindrome(s):
```

```
    """Returns: True if string s is a palindrome, False otherwise"""
```

```
    # base case
```

```
    # recursive case
```

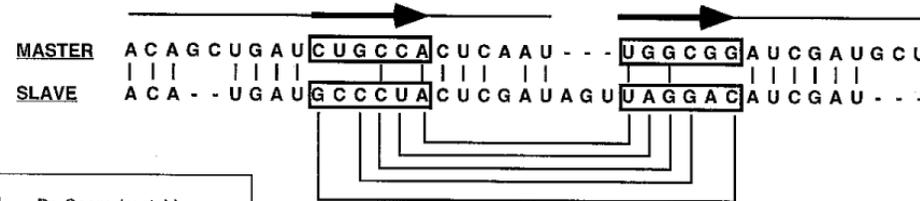
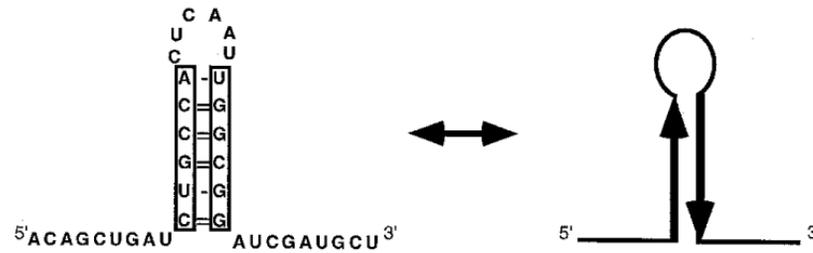
A. `return s[0] == s[len(s)-1] and ispalindrome(s[1:len(s)-1])`

B. `return s[0] == s[len(s)] and ispalindrome(s[1:len(s)])`

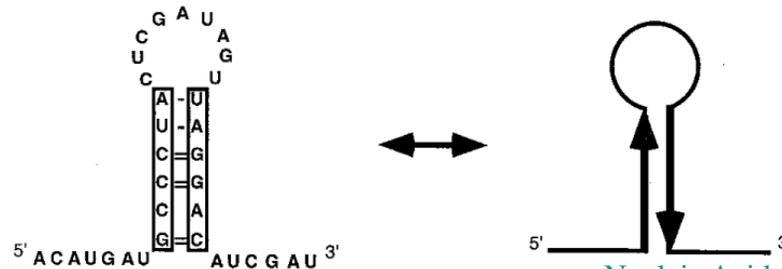
C. `return s[0] == s[len(s)] and ispalindrome(s[1:])`

D. I did something else

RNA structure and "antepalindromes"



| Pr Score (match)
 — Se Score (potential pair)



[Nucleic Acids Res.](#) 1997 Nov 15;25(22):4570-80.

RAGA: RNA sequence alignment by genetic algorithm.

[Notredame C¹](#), [O'Brien EA](#), [Higgins DG](#).

Code skeleton

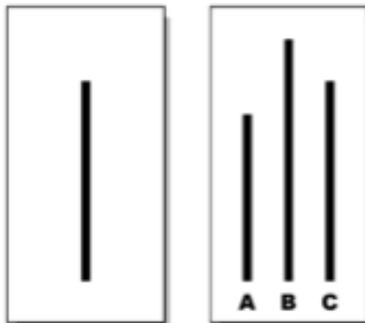
```
def is5Ahairpin(s):
```

```
    """Returns: True if string s represents a hairpin RNA  
    sequence with a loop consisting of 5 As, False otherwise.
```

```
    Pre: s is a (possibly empty) string of As, Cs, Gs, and Us."""
```

```
    # Assume we have access to function iscomplement(x,y)
```

A3 motivation: the Asch social-conformity experiments



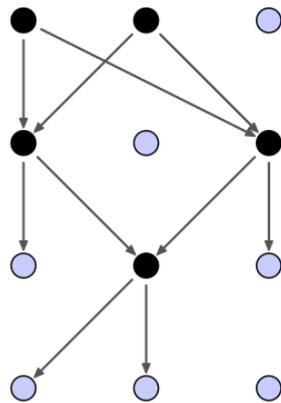
Q: Which of A, B, or C has the same length as the line on the card to the left?



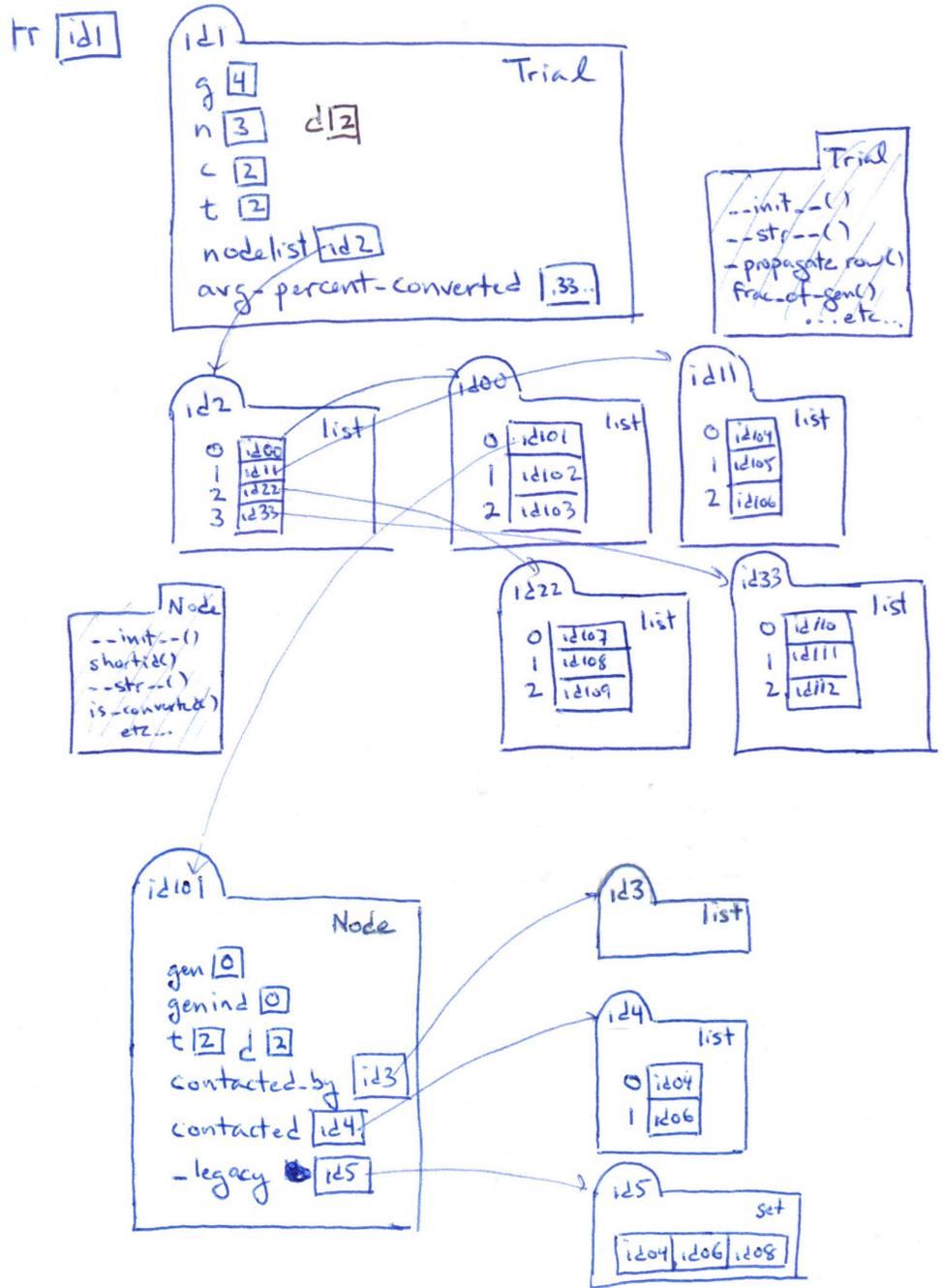
College- student subject, wearing glasses, leaning forward to look more closely at the cards as many of the other (planted-confederate) students gave incorrect answers.

Image sources: http://en.wikipedia.org/wiki/Asch_conformity_experiments; http://www.age-of-the-sage.org/psychology/social/asch_conformity.html

generation



0 1 2
index



... etc ...

Distant influence in A3 trial structures

Let `n1` be a converted node. How might we compute whether another node `oldone` was an influencer, direct or indirect?

Recursive formulation: `oldone` is an influencer if it is a direct influencer (i.e., in `n1`'s `contacted_by` list), or **if `oldone` is an influencer of at least one of `n1`'s direct influences** (again, the nodes in `n1`'s `contacted_by` list.)

```
def was_influenced_by(self,oldone):  
    """Returns: True if this node is in oldone's legacy and is  
    actually converted, False otherwise"""
```

Code skeleton for method

```
def was_influenced_by(self, oldone):
```

My recursive case most resembles:

(A) `return self.contacted_by[1:].was_influenced_by(oldone)`

(B) `for contacter in self.contacted_by:`

`return contacter.was_influenced_by(oldone)`

(C) `for contacter in self.contacted_by:`

`if contacter.was_influenced_by(oldone):`

`return True`

`Return False`

(D) None of the above