CompSci 101
Introduction to Computer Science

pop	none	hybrid
pop	position	hybrid
sort	none	mutator

Oct 12, 2017

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Announcements

- Reading and RQ 11 due next time
- APT 4 out due next Thursday

- Today:
  - More on Lists
  - Solving APTs with: while True
  - Coming – more ways to process data
  - Exam 1 back next time

Problem: Find the location of first adjacent duplicate word

- "This is a story story about a girl with a red hood…"

- Return 3 as the location of the first word that has a duplicate adjacent word (start at 0)

Seven Steps – Step 1 work example by hand

- *This is a story story about a girl …*
- *This is a story story about a girl …*
- *This is a story story about a girl …*
- *This is a story story about a girl …*

- Step 2 – write down what you did
- Step 3 – generalize, special cases
- Step 4 – work another example

Bit.ly/101f17-1012-1

```
def positionDuplicate(phrase):
    words = phrase.split()
    if len(words)< 2:
        return -1
    pos = 0
    while True:



        pos = pos+1
    return pos
```


APTs solved in a similar way with: while True

- Pikachu
- NameGroup

APT: Pikachu

Problem Statement

Pikachu is a well-known character in the Pokemon anime series. Pikachu can speak, but only 3 syllables: "pi", "ka", and "chu". Therefore Pikachu can only pronounce strings that can be created as a concatenation of one or more syllables he can pronounce. For example, he can pronounce the words "pikapi" and "pikachu".

Specification

```
filename: Pikachu.py

def check(word):
    """
    return String based on parameter
    word, a String
    """

    # you write code here
```

You are given a String word. Your task is to check whether Pikachu can pronounce the string. If the string can be produced by concatenating copies of the strings "pi", "ka", and "chu", return `"YES"` (quotes for clarity). Otherwise, return `"NO"`.

APT: Pikachu

- What is the iteration?
- What are the choices: pi ka chu

`pichukarunkapi`

Try:

Good:

APT NameGroup

APT: NameGroup

Problem Statement

You are given a string of names called **names** , two additional names, called **one** and **two**, and a number called **space**. Your task is to figure out if the two names are in the string names with one first and then two and exactly "space" names between them. Neither name one or two can be in the names between them, and they must be different names. A **namegroup** is then a string of the name one, followed by the names in the space and then name two, all separated by a space. If this is true, return the first such namegroup string found. Otherwise return an empty string.

Specification

```
filename: NameGroup.py

def calculate(names, one, two, space):
    """
    names is a String of names separated by blanks,
    one and two are names, returns a string of names
    that starts with one and ends with two and has
    "space" names between them. Neither one nor two
    can be in the spacing. one cannot equal two.
    Otherwise returns ""
    """
    # you write code here
```


APT NameGroup

1. `"joe moe fred gus sam ted bo tom" "joe" "ted" 4`

   Returns "joe moe fred gus sam ted"

   There is a name group that starts with joe, ends with ted and has 4 names between them.

2. `"a b" "a" "b" 0`

   Returns: "a b"

   There is a name group that starts with a, ends with b and has 0 names between them.

3. `"a b c d b f g a b c d e f g a b c" "b" "g" 4`

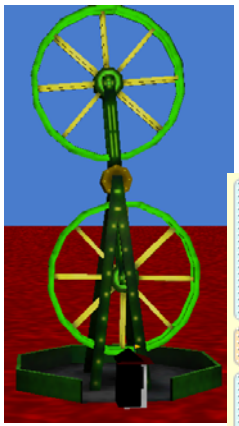
   Returns: "b c d e f g"

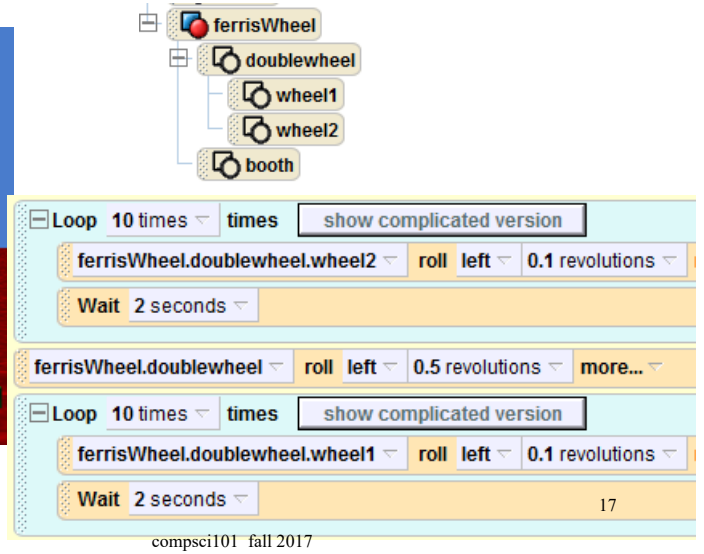
   Note that "b c d b f g" is not a name group since it contains b in the inner part. However, there is a valid name group, "b c d e f g", with no b nor g it.

7 steps – Step 1 work example calculate(names, “joe”, “bo”, 2)

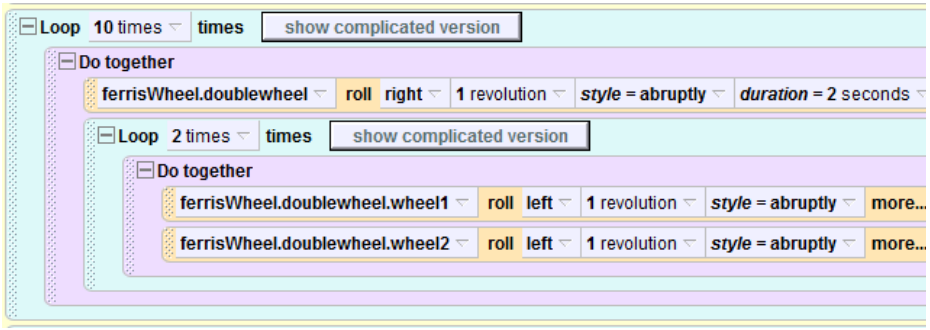
- *moe joe sue bo joe po fa bo sue*

Alice programming language alice.org, Alice version 2.4

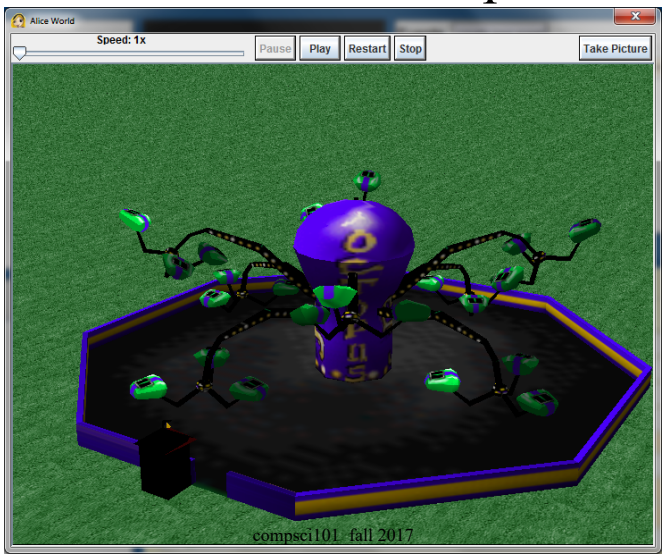




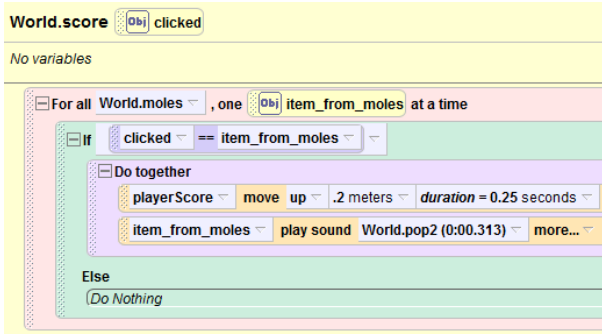
Nested Loop

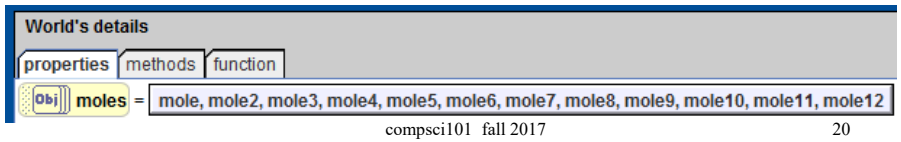


Fair Ride – Octopus



Wac-A-Mole





More on lists

```
sounds = ['fa', 'la', 'ti']
sounds2 = sounds * 2
sounds[1] = 'so'
```

```
sounds = ['fa', 'la', 'ti']
sounds2 = [sounds] * 2
sounds[1] = 'so'
```

```
x = ["a", "b", "c"]
y = x
z = y
w = y[:]
```

```
a = [5, 6, 7]
b = [ 2, 3]
c = a + b
d = [a] + [b]
```

Creating a list

- Given a list of numbers, create a second list of every number squared.

```
nums = [8, 3, 5, 4, 1]
sqnums = []
for v in nums:
    sqnums.append(v*v)
print sqnums
```

[64, 9, 25, 16, 1]

More on List operations

- Previous page
  - nameOfList "dot" function (parameter)
    `sqnums.append(v*v)`
- See list operations on next page
- Mutator vs hybrid vs return
  - Mutator changes the list (no return value)
  - Hybrid changes list and returns value
  - Return – returns value, no change to list

List operations from book

Method	Parameters	Result	Description
append	item	mutator	Adds a new item to the end of a list
insert	position, item	mutator	Inserts a new item at the position given
pop	none	hybrid	Removes and returns the last item
pop	position	hybrid	Removes and returns the item at position
sort	none	mutator	Modifies a list to be sorted
reverse	none	mutator	Modifies a list to be in reverse order
index	item	return idx	Returns the position of first occurrence of item
count	item	return ct	Returns the number of occurrences of item
remove	item	mutator	Removes the first occurrence of item

Problem

- Remove all negative numbers from list

  [4, -2, 5, 6, -3] → [4, 5, 6]

- Two ways

  1) return a new list with all negative numbers removed

  2) Modify a list to remove negative numbers

www.bit.ly/101f17-1012-2

```
def removeNegatives(numberlist):
    answer = []
    for num in numberlist:
        if num >= 0:
            answer.append(num)
    return answer
```

somenums = [3, -1, 8, -5, -2, 6, 7]

nonegs = removeNegatives(somenums)

www.bit.ly/101f17-1012-3

```
def removeNegatives2(numberlist):
    for x in range(len(numberlist)):
        value = numberlist[x]
        if value < 0:
            numberlist.pop(x)
```

somenums = [3, -1, 8, -5, -2, 6, 7]

removeNegatives2(somenums)

www.bit.ly/101f17-1012-4

```
def removeNegatives3(numberlist):
    pos = 0;
    while (True):
        if pos >= len(numberlist):
            break
        value = numberlist[pos]
        if value < 0:
            numberlist.pop(pos)
        pos = pos + 1
```

somenums = [3, -1, 8, -5, -2, 6, 7]

removeNegatives3(somenums)

APT MorseCode

1.
```
library = ["O ---",
           "S ..."]
message = "... --- ..."

Returns: "SOS"
```

The example from the problem statement.

2.
```
library = ["O ---"]
message = "... --- ..."

Returns: "?O?"
```

This time we don't have the S, so we replace the three dashes with question marks.

3. library = ["H -", "E .", "L --", "L ..", "O -."] message = "- . -- .. -." Returns: "HELLO"

Solving problems – APT MorseLikeCode

- Compare find vs index
  - find with string – returns -1 when not found
  - index with list – CRASHES if not there!
  - You can't say: pos = alist.index("…")
  - Instead: if "…" in alist:

    pos = alist.index("…")
- How to get started?