

CIS 122

Homework Review

Conditional Logic Review

```
if color == "green":  
    print "Go Ducks!"
```

Conditional Logic Review

```
if color == "green":  
    print "Go Ducks!"  
  
else:  
    print "That's a nice color"
```

Conditional Logic Review

```
if color == "green":  
    print "Go Ducks!"  
  
elif color == "yellow":  
    print "Yellow is swell"  
  
else:  
    print "That's a nice color"
```

Conditional Logic Applied

- Let's put what we've learned to use
 - Finish the function

```
def abs(x):  
    """Return the absolute value of x"""
```

Conditional Logic Applied

- Let's put what we've learned to use
 - Finish the function

```
def abs(x):  
    """Return the absolute value of x"""  
    if x < 0:  
        return -x  
    else:  
        return x
```

Conditional Logic Applied

- Let's put what we've learned to use
 - How about this one?

```
def longer(string1, string2):  
    """Return the larger of the two strings"""
```

Conditional Logic Applied

- Let's put what we've learned to use
 - How about this one?

```
def longer(string1, string2):  
    """Return the larger of the two strings"""  
  
    if len(string1) > len(string2):  
        return string1  
    else:  
        return string2
```


Assignment 1

- Part 0 - Stringing Things Together
- Part 1 - Is it Cold in Here?
- Part 2 - Taking it to the Max
- Part 3 - A Shifty Problem (part one)

Assignment 1 - Part 0

- You are given three strings:
 - `a = "ARMADILLO"`
 - `b = "BUTTERFLY"`
 - `c = "CHAMELEON"`
- Your task is to produce different strings
 - Use string manipulation techniques
 - Store results to variables
- For example, to produce the string "MADMADMELON"
 - `string0 = a[2:5] * 2 + c[3:6] + c[7:]`

Assignment 1 - Part 0

- You are given three strings:
 - `a = "ARMADILLO"`
 - `b = "BUTTERFLY"`
 - `c = "CHAMELEON"`
- Could select each character individually
 - `a[3] + a[4] + a[5] + a[2] + ...`
 - This is tedious
- As a challenge, find creative string productions
 - The fewer operations, the better

Assignment 1 - Part 1

- Write 3 temperature conversion functions
 - FtoC (Fahrenheit to Celsius)
 - CtoK (Celsius to Kelvin)
 - FtoK (Fahrenheit to Kelvin)
- You are given formulas
 - $T_c = (5/9) (T_f - 32)$
 - $T_k = T_c + 273$
- No formula converting from Fahrenheit to Kelvin
 - Don't compute it yourself!
 - Let Python do your work for you

Assignment 1 Part 2

- Write 3 functions:
- myMax(a,b) returns largest of a and b
 - Conditional logic
- myMax3(a,b,c) returns largest of a, b, and c
- myMax5(a,b,c,d,e) returns largest of a, b, c, d, and e

Assignment 1 - Part 2

```
def myMax5(a,b,c,d,e):  
    if a > b:  
        if a > c:  
            if a > d:  
                if a > e:  
                    return a  
                else:  
                    return e  
            if d > e:  
                return d  
            else:  
                return e
```

augh!

Assignment 1 - Part 2

```
def myMax5(a,b,c,d,e):  
    f = myMax3(a,b,c)
```

Reduce your problem to ones you've already solved

Assignment 1 - Part 3

- Cryptosystems
 - Used for sending secret messages
 - Sender enciphers message into ciphertext
 - Receiver decipheres message recovering plaintext
- Caesar Cipher
 - A system for sending secret messages
 - Enciphering:
 - shift each character forward the same distance
 - Deciphering:
 - shift each character back the same distance

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

A → D

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

A → D

B → E

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

A → D

B → E

C → F

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

- Use single character shifts to encode message

ATTACK AT DAWN

Assignment 1 - Part 3

- Suppose we want to shift 3 spaces forward
 - With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

- Use single character shifts to encode message

ATTACK AT DAWN
D

Assignment 1 - Part 3

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DEFGHIJKLMNOPQRSTUVWXYZABC

- Use single character shifts to encode message

ATTACK AT DAWN
DW

Assignment 1 - Part 3

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DEFGHIJKLMNOPQRSTUVWXYZABC

- Use single character shifts to encode message

ATTACK AT DAWN
DWWDFN DW GDZQ

Assignment 1 - Part 3

- How would we approach this problem programmatically?
- Break it down into simpler pieces
 - How do we shift a single character?
 - Given the ability to shift a single character, how do we shift an entire string?
- We'll tackle the first question this week
 - Stay tuned for part two...

Assignment 1 - Part 3

- Your task is to write a character shifter
 - Takes character and number as input
 - Return character shifted forward by number
 - Non-alphabetic characters should return unchanged

```
>>> shiftChar('A', 3)
```

```
'D'
```

```
>>> shiftChar('z', 7)
```

```
'g'
```

```
>>> shiftChar('7', 3)
```

```
'7'
```

Assignment 1 - Part 3

- But how do we shift a character?
 - Characters are strings
 - String addition just merges strings together
 - If only we could work with numbers...

Assignment 1 - Part 3

- Under the surface, strings are just numbers!
 - ord function converts a character to a number
 - chr function converts a number to a character
- A few useful encodings:
 - 'A' = 65, 'B' = 66, ..., 'Y' = 89, 'Z' = 90
 - 'a' = 97, 'b' = 98, ..., 'y' = 121, 'z' = 122
- Given some character **c** with encoding **n**
 - What can we determine about **c**?
 - What character comes right after **c**?

Assignment 1 - Part 3

- You may assume that the $0 \leq \text{shiftNum} \leq 25$
 - But you don't have to
 - Feel free to handle very large shifts
 - May find the % operator useful...

Assignment 1 - Notes

- Avoid excessive nesting
- Don't forget your docstrings
- Don't forget to comment your code