CIS 122

Homework Review
if color == "green":
    print "Go Ducks!"
Conditional Logic Review

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

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

```python
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 "MADMADMELOON"
Assignment 1 - Part 0

● You are given three strings:
  ○ a = "ARMADILLO"
  ○ b = "BUTTERFLY"
  ○ c = "CHAMELEON"

● Could select each character individually
  ○ 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
  ○ \( T_c = \frac{5}{9} (T_f - 32) \)
  ○ \( T_k = T_c + 273 \)

● No formula converting from Fahrenheit to Kelvin
  ○ Don't compute it yourself!
  ○ Let Python do your work for you
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`
def myMax5(a,b,c,d,e):
    if a > b:
        if a > c:
            if a > d:
                if a > e:
                    return a
                else:
                    return e
        else:
            return e
    if d > e:
        return d
    else:
        return e

augh!
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 deciphers 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
Suppose we want to shift 3 spaces forward

- With paper and pencil...

A → D

ABCDEFHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

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

A → D
B → E
Suppose we want to shift 3 spaces forward
  ○ With paper and pencil...

\[
\begin{align*}
&\text{ABCDEFGHIJKLMNOPQRSTUVWXYZ} \\
&\text{DEFGHIJKLMNOPQRSTUVWXYZABC}
\end{align*}
\]

A → D
B → E
C → F
● Suppose we want to shift 3 spaces forward
  ○ With paper and pencil...

ABCDEFGHIJKLMNOPQRSTUVWXYZ
DEFGHIJKLMNOPQRSTUVWXYZABC

● Use single character shifts to encode message

ATTACK AT DAWN
• 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

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

  ABCDEFGHIJKLMNOPQRSTUVWXYZ
  DEFGHIJKLMNOPQRSTUVWXYZ

● Use single character shifts to encode message

  ATTACK AT DAWN
  DW
Assignment 1 - Part 3

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

  ABCDEFGHIJKLMNOPQRSTUVWXYZ
  DEFGHIJKLMNOPQRSTUVWXYZ

- 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

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

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

>>> shiftChar('7', 3)
'7'
```
But how do we shift a character?
○ Characters are strings
○ String addition just merges strings together
○ If only we could work with numbers...
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 $0 \leq shiftNum \leq 25$
  - 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