there is a new drink called the Sandy, it is a watered down Manhattan.

too soon?

Like · Comment · 11 minutes ago near

8 people like this.

Write a comment...

10:23 PM

Tweets

HURRICANE SANDY @AHurrica..2h
RETWEET IF U WANT ME 2 DESTROY YO SCHOOL. I GOT YOU.

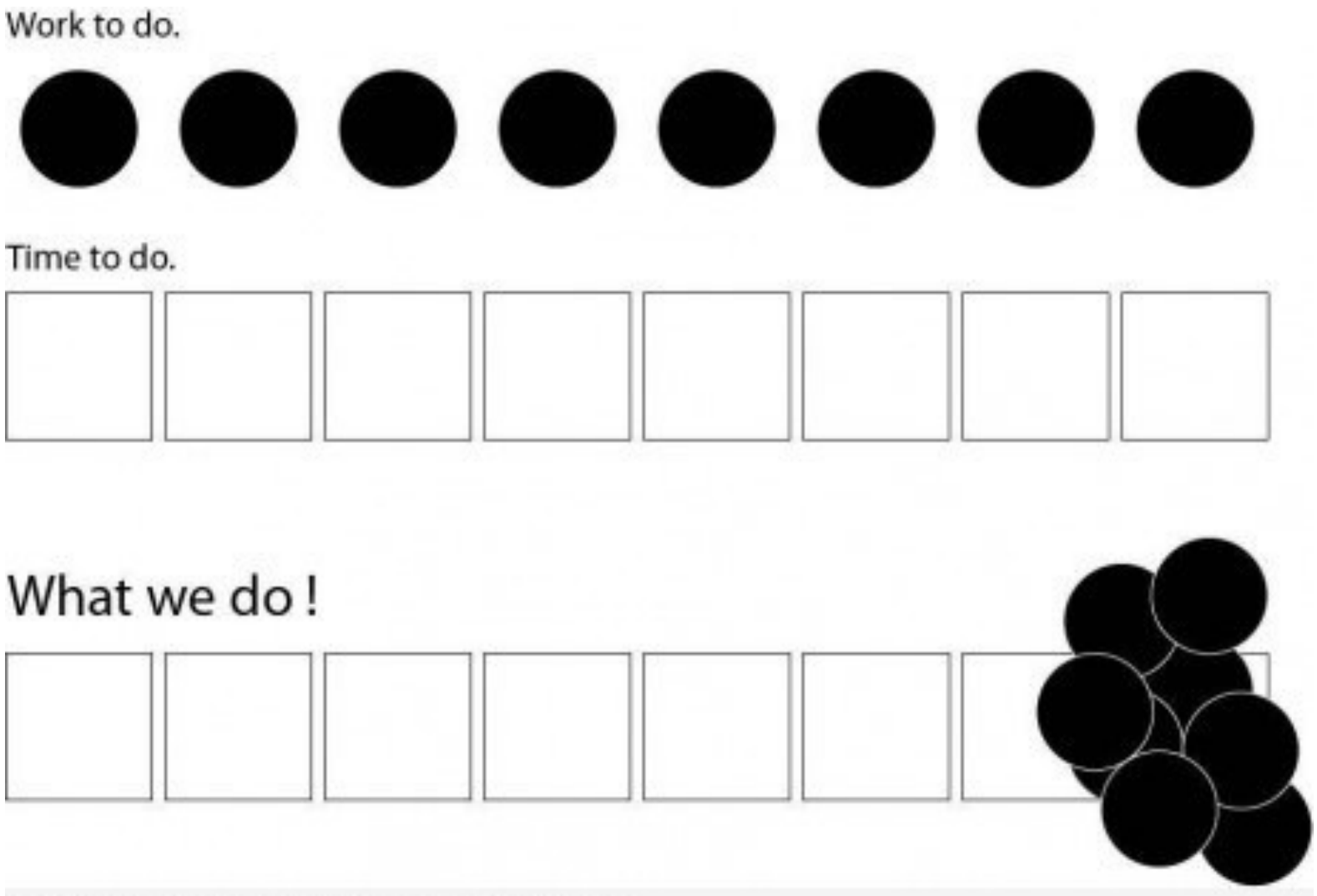
HURRICANE SANDY @AHurrica..1h
.@MITTROMNEY YOU IS A BASIC BITCH.

HURRICANE SANDY @AHurrica..1h
50 SHADES OF ME F[redacted]KING UP THE EAST COAST.

HURRICANE SANDY @AHurric.31m
I WENT TO HIGHSCHOOL WIT IRENE. SHE CAN'T EVEN TWERK. SHE AIN'T BOUT DAT HURRICANE LYFE.

HURRICANE SANDY @AHurric.20m
JUS BLEW DA ROOF OFF A OLIVE GARDEN FREE BREADSTICKS FOR EVERYONE

New Schedule



Lab 6:
avg=95/100

1. Handling floats, weird output for negative/ float numbers

```
Please give a value of n:-2
 The sum of the first -2 natural
numbers is: 0
 The sum of the cubes of the
first -2 natural numbers is: 0
```

3. Show off what works: ints, floats, negative, formulas, fractions, different length lists

Lab 7:
Avg = 94/100

1. Testing conditions
   - 30, 9
   - 30, 7
   - 29, 9
   - 30, 8
   - 25, 6
   - 24, 7

Lab 7:
Avg = 94/100

2. 4 combinations
   - 2001: N
   - 1900: N
   - 2004: Y
   - 2000: Y

Lab 7:
Avg = 94/100

3. Conjecture
   - Shouldn't give answer for 100 or odd numbers.
   - Don't print out same numbers twice.
   - Say something if input was invalid.
   - Can use list of primes, not calc
   - Testing Conditions
     - 0
     - 9
     - 10
     - 98
     - 100

Homework Questions?

Sentinel Loops

```
# average4.py
#    A program to average a set of numbers
#    Illustrates sentinel loop using empty string as sentinel

def main():
    sum = 0.0
    count = 0
    xStr = input("Enter a number (<Enter> to quit) >> ")
    while xStr != "":
        x = eval(xStr)
        sum = sum + x
        count = count + 1
        xStr = input("Enter a number (<Enter> to quit) >> ")
    print("\nThe average of the numbers is", sum / count)
```

```
def main():
    fileName = input("What file are the numbers in? ")
    infile = open(fileName,'r')
    sum = 0.0
    count = 0
    line = infile.readline()
    while line != "":
        for xStr in line.split(“,”):
            sum = sum + eval(xStr)
            count = count + 1
        line = infile.readline()
    print("\nThe average of the numbers is", sum / count)
```

Computing with Booleans

- `if` and `while` both use Boolean expressions
- Boolean expressions evaluate to `True` or `False`
- So far, used Boolean expressions to compare two values, e.g.,
  (`while x >= 0`)

Boolean Operators

- Sometimes simple expressions not expressive enough
- Suppose you need to determine whether two points are in the same position – their *x* coordinates are equal and their *y* coordinates are equal

Boolean Operators

```
if p1.getX() == p2.getX():
    if p1.getY() == p2.getY():
        # points are the same
    else:
        # points are different
else:
    # points are different
```

- Clearly, this is awkward
- Boolean operators: `and`, `or`, and `not`

Boolean Operators

- The Boolean operators `and` and `or` are used to combine two Boolean expressions and produce a Boolean result.

- `<expr> and <expr>`
- `<expr> or <expr>`

Boolean Operators

- The `and` of two expressions is true exactly when both of the expressions are true
- We can represent this in a *truth table*

P	*Q*	*P and Q*
T	T	T
T	F	F
F	T	F
F	F	F

Boolean Expressions

- In the truth table, *P* and *Q* represent smaller Boolean expressions.
- Since each expression has two possible values, there are four possible combinations of values.
- The last column gives the value of `P and Q`.

Boolean Expressions

- The `or` of two expressions is true when either expression is true

P	*Q*	*P or Q*
T	T	T
T	F	T
F	T	T
F	F	F

Boolean Expressions

- The only time `or` is false is when both expressions are false.
- Also, note that `or` is true when both expressions are true. This isn't how we normally use "or" in language.

Boolean Operators

- The `not` operator computes the opposite of a Boolean expression
- `not` is a *unary* operator, meaning it operates on a single expression

P	*not P*
T	F
F	T

Boolean Operators

- Can put these operators together to make complex Boolean expressions
- Interpretation of the expressions relies on the precedence rules for the operators

Boolean Operators

- Consider

```
a or not b and c
```

- How should this be evaluated?
- The order of precedence, from high to low, is

```
not and or
```

- This statement is equivalent to

```
(a or ((not b) and c))
```

- Most people (including Matt) don't memorize the the Boolean precedence rules… use parentheses to prevent confusion

Boolean Operators

- To test for the co-location of two points, we could use an `and`

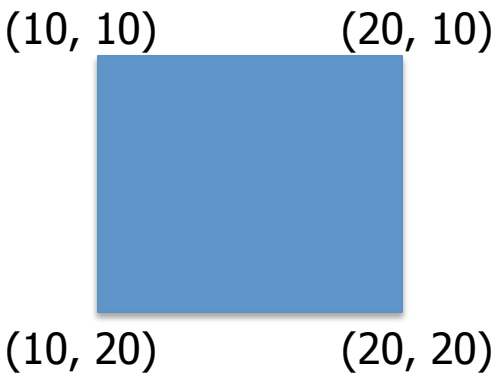
```
if p1.getX() == p2.getX() and p2.getY() == p1.getY():
    # points are the same
else:
    # points are different
```

- Entire condition will be true *only* when both of the simpler conditions are true

Clicking in a Box

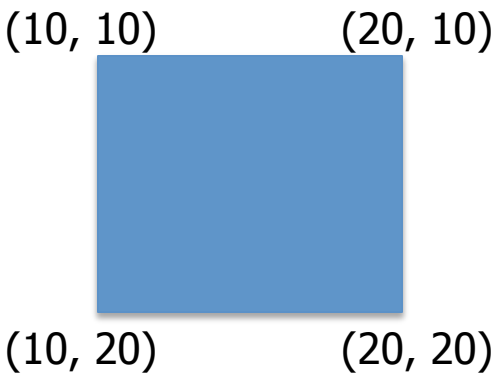
- Suppose you wanted to tell if a user clicked inside the box shown.
- Complete the following code:

```
p=win.getMouse()
if
    print("Clicked")
else:
    print("You missed")
```



Clicking in a Box

- Well, that's peachy, but kind of specific
- Write a general method that will tell you if some box has been clicked
- Assume you know xmin, xmax, ymin, ymax of any box you'd want to test



Boolean Operators

- Racquetball simulation: *The game is over as soon as either player has scored 15 points.*
- How can you represent that in a Boolean expression?

```
scoreA == 15 or scoreB == 15
```

- When either of the conditions becomes true, the entire expression is true. If neither is true, expression is false

Boolean Operators

- *We want to construct a loop that continues as long as the game is **not** over*
- You can do this by taking the negation of the game-over condition as your loop condition!

```
while not(scoreA == 15 or
          scoreB == 15):
    #continue playing
```

Boolean Operators

- Sometimes, use a shutout rule: *if one player has scored 7 points and the other person hasn't scored yet, the game is over*

```
while not(scoreA == 15 or scoreB == 15  or
          (scoreA == 7 and scoreB == 0) or
          (scoreB == 7 and scoreA == 0)    ):
    #continue playing
```

Boolean Operators

- What about volleyball? To win, a team needs to win by at least two points
- A team wins at 15 points
- If the score is 15 – 14, play continues, just as it does for 21 – 20
- Write down the expression to determine when play should stop

Boolean Operators

- What about volleyball? To win, a team needs to win by at least two points
- A team wins at 15 points
- If the score is 15 – 14, play continues, just as it does for 21 – 20

```
(a >= 15 and a - b >= 2) or
  (b >= 15 and b - a >= 2)
```

```
(a >= 15 or b >= 15) and
   abs(a - b) >= 2
```

Boolean Algebra

- The ability to formulate, manipulate, and reason with Boolean expressions is an important skill.
- Boolean expressions obey certain algebraic laws called *Boolean logic* or *Boolean algebra.*

Boolean Algebra

Algebra	Boolean algebra
$a * 0 = 0$	*a* and false == false
$a * 1 = a$	*a* and true == *a*
$a + 0 = a$	*a* or false == *a*

- `and` has properties similar to multiplication
- `or` has properties similar to addition
- `0` and `1` correspond to false and true, respectively

Boolean Algebra

- Anything `or`ed with true is true:

```
a or true == true
```

- Both `and` and `or` distribute:

```
a or  (b and c) == (a or  b) and (a or  c)
a and (b or  c) == (a and b) or  (a and c)
```

Boolean Algebra

- Double negatives cancel out:

```
not(not a) == a
```

- De Morgan's laws:

```
not(a or  b) == (not a) and (not b)
not(a and b) == (not a) or  (not b)
```

Augustus De Morgan
Born: 1806
Died: 1871
Causing pain for students: Today

Boolean Algebra

- We can simplify our Boolean expressions

```
while not(scoreA == 15 or scoreB == 15):
    #continue playing
```

- "While it is not the case that player A has 15 or player B has 15, continue playing"

Boolean Algebra

- "While it is not the case that player A has 15 or player B has 15, continue playing"

- Applying DeMorgan's law:

```
while (not scoreA == 15) and (not scoreB == 15):
    #continue playing

while scoreA != 15 and scoreB != 15
    # continue playing
```

- "While player A has not reached 15 and player B has not reached 15, continue playing"

Boolean Algebra

- Organizing expressions can make things easier to understand and debug

```
while not(scoreA == 15 or scoreB == 15):
    #continue playing
```

```
while (not scoreA == 15) and (not scoreB == 15):
    #continue playing
```

```
while scoreA != 15 and scoreB != 15
    # continue playing
```

Other Common Structures

- The `if` and `while` can be used to express every conceivable algorithm
- For certain problems, an alternative structure can be convenient

Post-Test Loop

- Write a program to get a nonnegative number from user
- If user types an incorrect input, the program asks for another value
- Process continues until a valid value has been entered
- input validation

Post-Test Loop

```
repeat
    get a number from the user
until number is >= 0
```