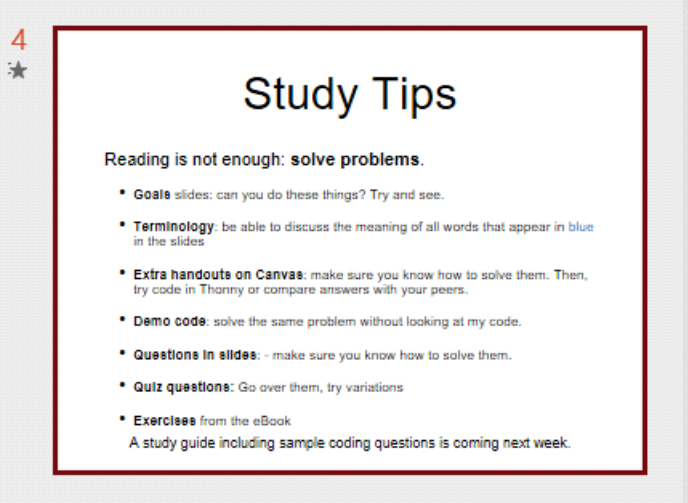
L10: Turtles, for loop

Thursday, January 27, 2022 9:28 PM

(notes: too long! Keep the beginning shorter so there's more time for breakout rooms.

Add more interactivity



Mimir: assume it is right and double check your code Office hours, tutors if need help. Or the Discord!

Messages to me personally: I do my best, but I teach 100 students in 2 classes this quarter. It might be 24 hours

yuates. It might be 24 hows before I can get back to you. Just want to set expectations: Ive been getting messages late at night close to the deadline → Not likely to get a response in time.

Don't forget Quizzes: 5 lowest are dropped to auto cover when you forget. there are no other extensions.

Midterm ABCD

A: multiple choice (like the Quizzes) on paper, in this room

B: Multiple choice on a computer, in a moderated lab

C: write code on your computer, here in the classroom [illegible]

use on your computer,
not in the classroom, timed.

A3 is out!

A2 pseudocode & planning

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Herb Thyme game

an incomplete summary of in pseudocode

Program arguments?

No:

- Sunflower found?
- Pennyroyal found?
- (narrative)
- Sunflower trade?
- Pennyroyal trade?

(calculate offer)

enough?

N: :(

Y:

Trade?

Yes → (calc result)

- # Opals
- # Sunflower
- # Pennyroyal

No →

- # sunflower
- # Pennyroyal

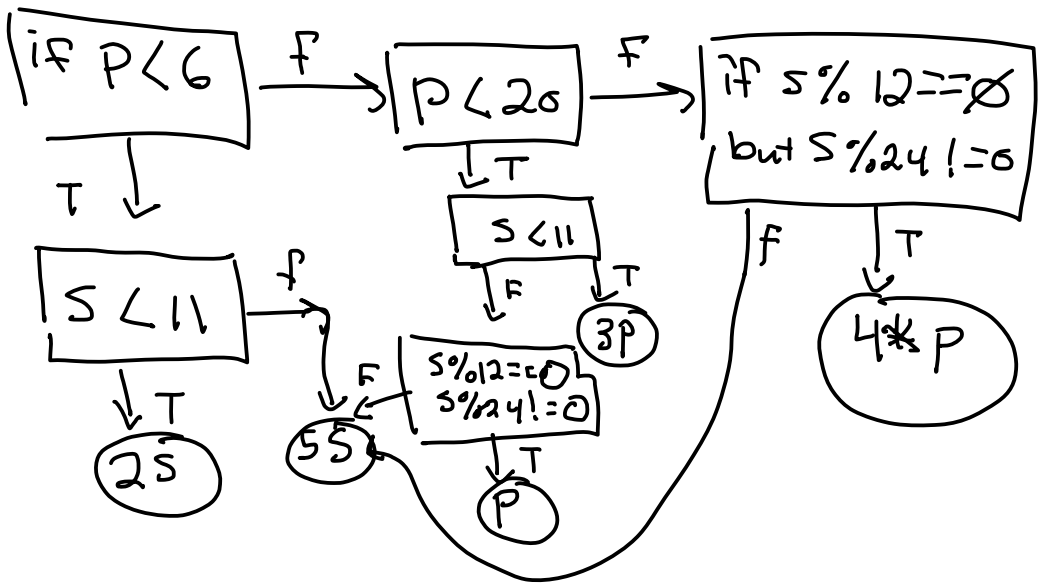
How calc the offer?

Look at table 1 for a moment

easy except...

How many if-else-if

Easy except...
How many if and elif can you use total? (in chat)
You're gonna need a flow chart



This would work, but too many if & elif statements. You'll have to come up with a better one!

Bonus part:

Bonus in sys.argv[5] and then have a whole 'nother adventure of your design.
Plan out the trading system before hand

More flow chart examples : https://www.chartgeek.com/the-complete-hey-jude-flow-chart/

While review

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```
#Figure out, without running the code, what this will output

count = 10
while count <21:
    print(count, end=" ")
    count += 3

#hint: write down on paper what's in the variables at each loop
```

Breakout rooms 2 min (let them choose room)

>> 10
13
16
19

count
~~10~~
~~13~~
~~16~~
~~19~~
22

```
import random
num = random.randint(1,10)#rANDom

#btw lots to import from math!
# ask to import things if you want to use in assignments

while num < 8:
    num = random.randint(1,10)
```

Breakout rooms

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You try it

Exercise: write a program that generates and prints random integers between 1 and 10 (inclusive) until one of the random numbers exceeds 8.

Remember: the documentation says:

`random.`**`randint`**`(`*a*`, `*b*`)`

Return a random integer `N` such that `a <= N <= b`

Printable while exercise

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```
1  #What is M & N after the code is executed?
2  n = 12345
3  m = 0
4  while n!= 0:
5
6      m = (10*m) + (n%10)
7
8      n // = 10
9
10 print(m)
11 print(n)
```

A
B
C
D

Nested While Loops

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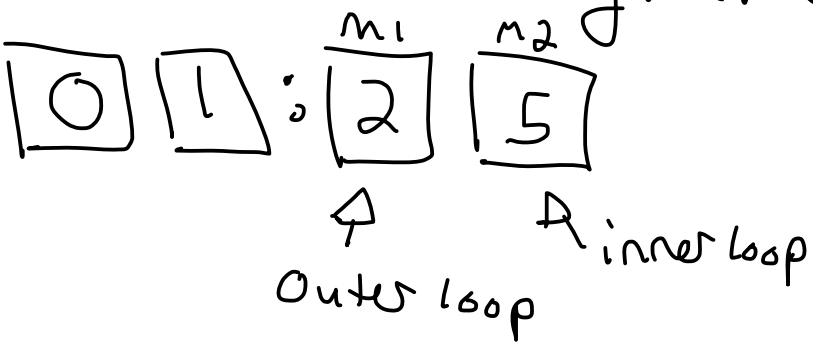
Nested while loops

Think of a digital clock




```
while m1 <= 5:
    while m2 <= 9:
        m2 += 1
    m2 = 0
    m1 += 1
m1 = 0
```

explain while working

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Nesting `while` loops

A B C D

What does this program print?

```
i = 1
while i < 4:
    j = 1
    while i * j < 6:
        print(i * j, end=" ")
        j += 1
    print()
    i += 1
```

A:
```
1 2 3 4 5 6
2 4 6
3 6
```

B:
```
1 2 3 4 5
2 4
3
```

C:
```
1 2 4 6 2 4 3
```

D:
```
2 4 6
2 4
2
```

Answer is A

Turtles 101

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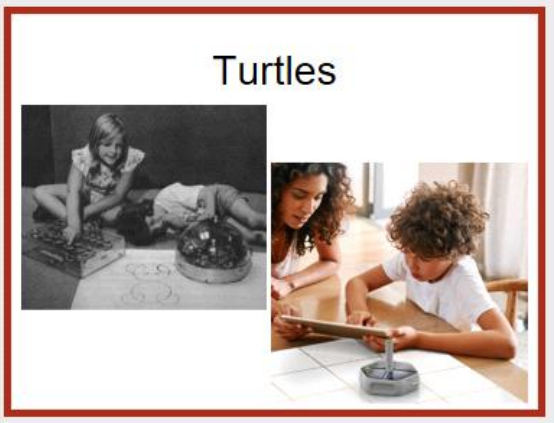


import turtle

tali = turtle.Turtle()

tali: an object

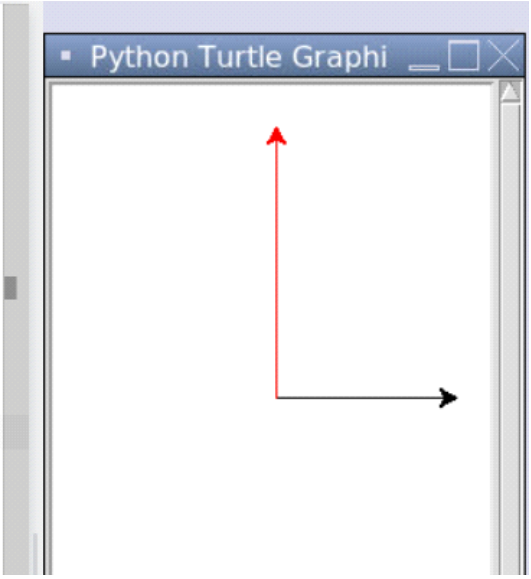
turtle.Turtle(): a constructor for a turtle object

```
1  import turtle
2  tali = turtle.Turtle()
3  print(type(tali))
```

Console Shell

```
<class 'turtle.Turtle'>
>
```

```python
import turtle
tali = turtle.Turtle() #any name you like
print(type(tali))

#tali is a Turtle object
#tali has methods (object functions)

tali.forward(100)

#we can make as many as we like!
#this one I"ll name tim, after the great wizard Tim

tim = turtle.Turtle()
tim.color("red")
tim.left(90)
tim.forward(150)

```



Google python 3 Turtles to find a list of all they can do. Read this: you can use any thing on the list

```python
#you will need:
#forward
#backwards
#left
#right
#pendown
#penup
```

#color
#tracer
#update

When While, For, range

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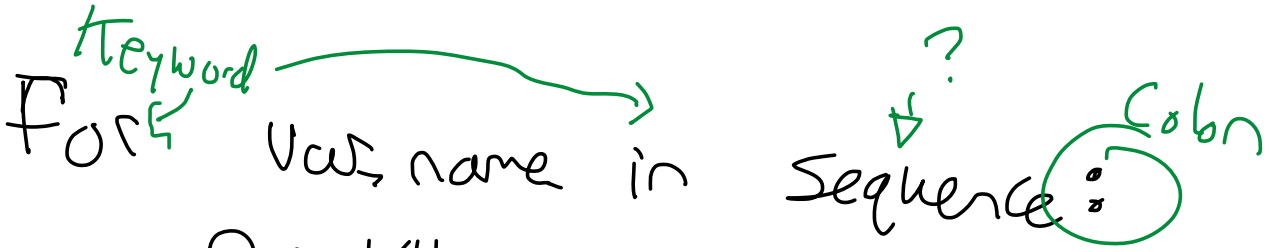
Use while when you don't know exactly how many times the loop will run.

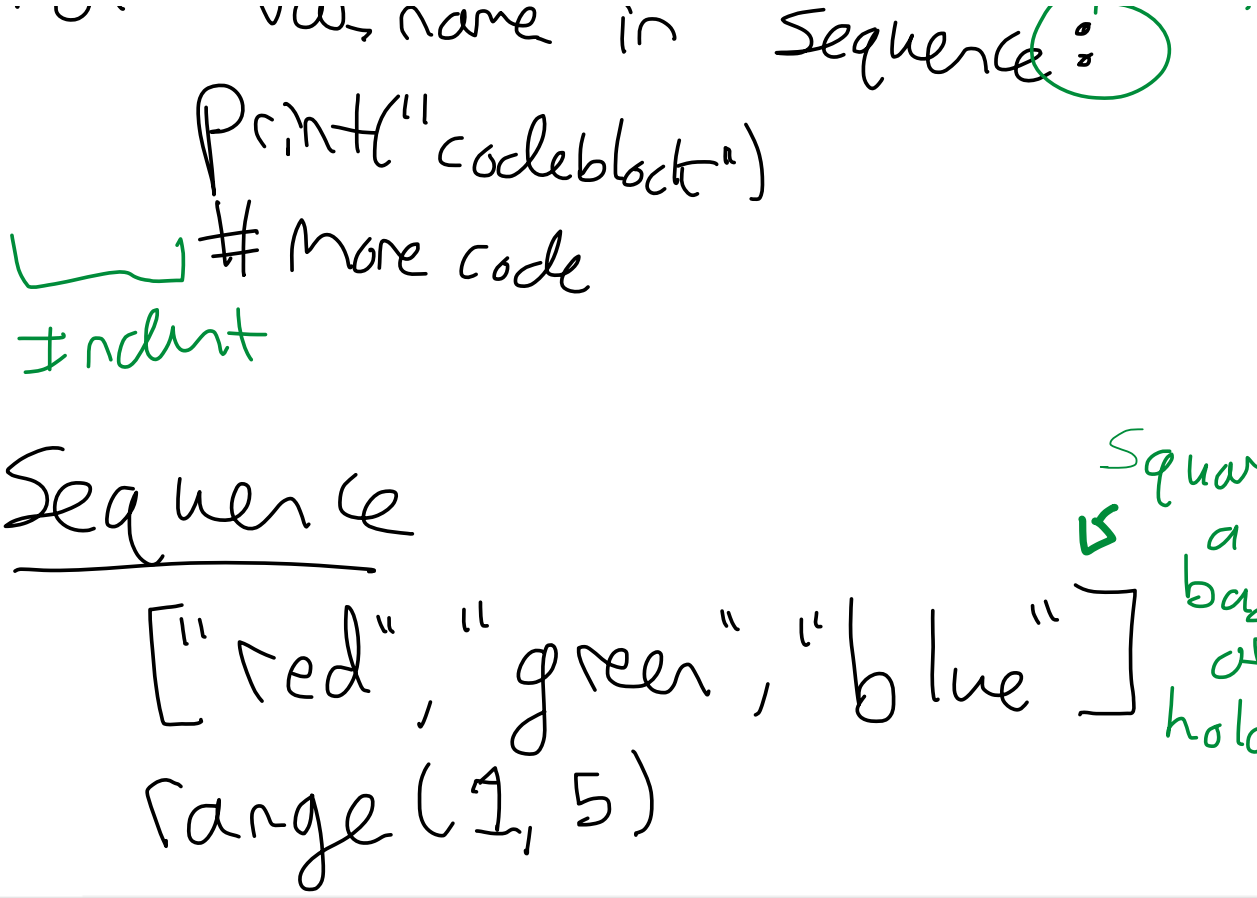
```
1  #sum numbers until user types 'q'
2  mode = input("type a to add, q to quit ")
3  sum = 0
4    ↳ keyword Δ
5  while mode != "q":
6      sum = sum + int(input("enter next number to add "))
7      mode = input("type a to add, q to quit ")
8
9  print("sum is", sum)
```

Shell

```
enter next number to add 4
type a to add, q to quit a
enter next number to add 6
type a to add, q to quit a
enter next number to add 6
type a to add, q to quit q
sum is 19
```

You know exactly How Many times? Use a For loop






```
#what will this do? Make a prediction!

for color in ["red", "green", "purple"]:
    print(color)

#Predict here:
for i in range(1,5):
    print(i)
```

```
#range is up to BUT NOT INCLUDING
#range(1,5): 1,2,3,4
```

We'll go over how to loop through the things in a list in order and randomly next lecture