Code For China
Lesson 6

Review of Lesson 5

- % operator
- While Loops
- Lists

REVIEW

% : the remainder / mod operator

```
5 % 3 = 2
```

1 remainder 2

```
10 % 7 = 3
7 % 8 = 7
18 % 2 = 0
```

How would you use the % operator to check if a number is even or odd?

REVIEW

While Loops

```
now = 1
while now < 6:
    print(now)
    now = now + 1
```

Console

1
2
3
4
5

6

now

REVIEW

while True / break Pattern

```
x = 0
while True:
    print(x)
    x = x + 1
    if x > 10:
        break
```

REVIEW

Lists

```
groceries = ["Candy", "Milk", "Durian"]
groceries.append("Pizza")
print(groceries)
```

Console: [“Candy”, “Milk”, “Durian”, “Pizza”]

REVIEW

Adding to Lists

Option 1: Manually set values in a list:

```
list1 = [10, 20]
```

Option 2: Using the “append” function

```
list1.append(30)
```

REVIEW

Getting Every Item in a List

```
students = [“Frank”, “Alex”, “Charles”,
   “Steven”, “Allen”, “Sunny”, “Albert”]
for student in students:
   print(student)
```

REVIEW

List Size and Values

- Use `len()` to get the number of items in a list:

  `len(list)`

- Can access specific values using:
  `list[0]`

  Why? As computers start counting from 0!
  To access 1st element: `list[0]`
  To access 2nd element: `list[1]`
  To access 3rd element: `list[2]`

CODING TIME!

Lists Review

1) Write a function that takes in a list and returns the number of odd numbers

Ex. list1 = [1, 2, 6, 3, 8, 10, 11, 13, 15, 29] → return 6

Ex. list2 = [9, 3, 10, 11, 15] → return 4

2) Write a function that takes in a list and returns the sum of the list

Ex. list1 = [1, 2, 3, 4, 5] → return 15

Ex. list2 = [3, 8, 2, 1, 6, 3] → return 23

3) Write a function that takes in a list of numbers and returns the max value

Ex. list1 = [1, 3, 9, 10, 4, 6, 2] → return 10

Ex. list2 = [8, 2, 10, 3, 16, 17, 4, 23, 5] → return 23

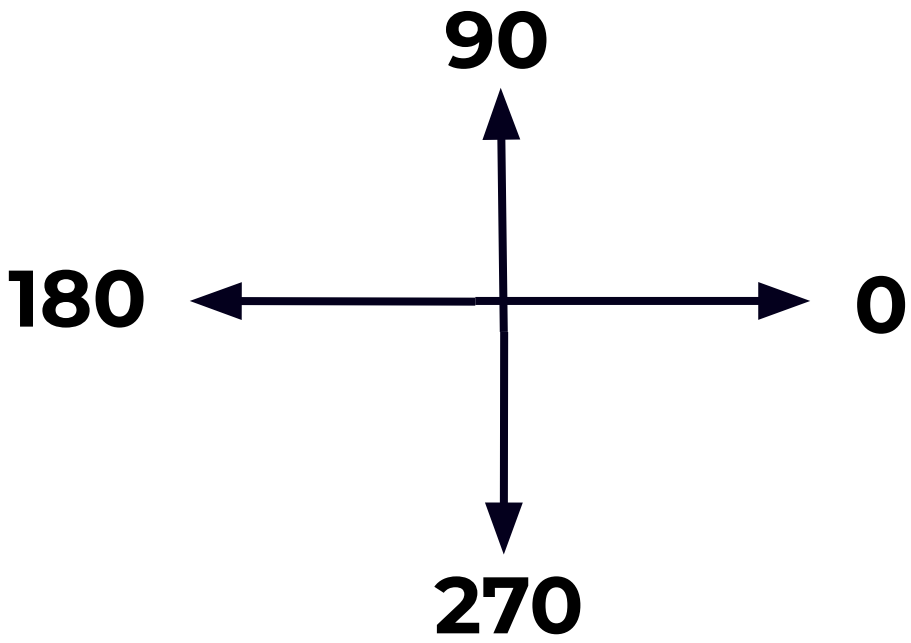
4) Write a function that takes in a list of words and returns a list of only the words that start with 's'

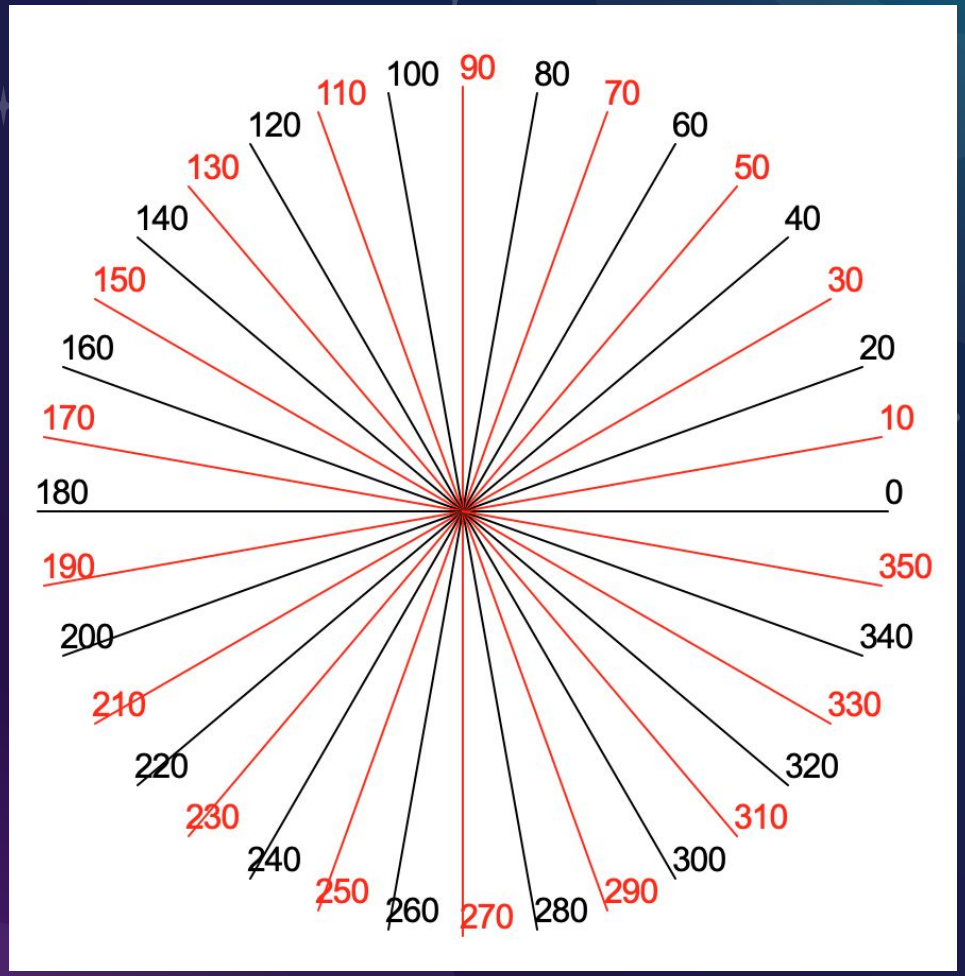
Ex. list1 = ["apple", "strawberry", "banana", "stars", "snake", "bed", "shoe"]
→ return ["strawberry", "stars", "snake", "shoe"]

NEW CONCEPT

Turtle setHeading()

```
turtle.setHeading(angle)
```



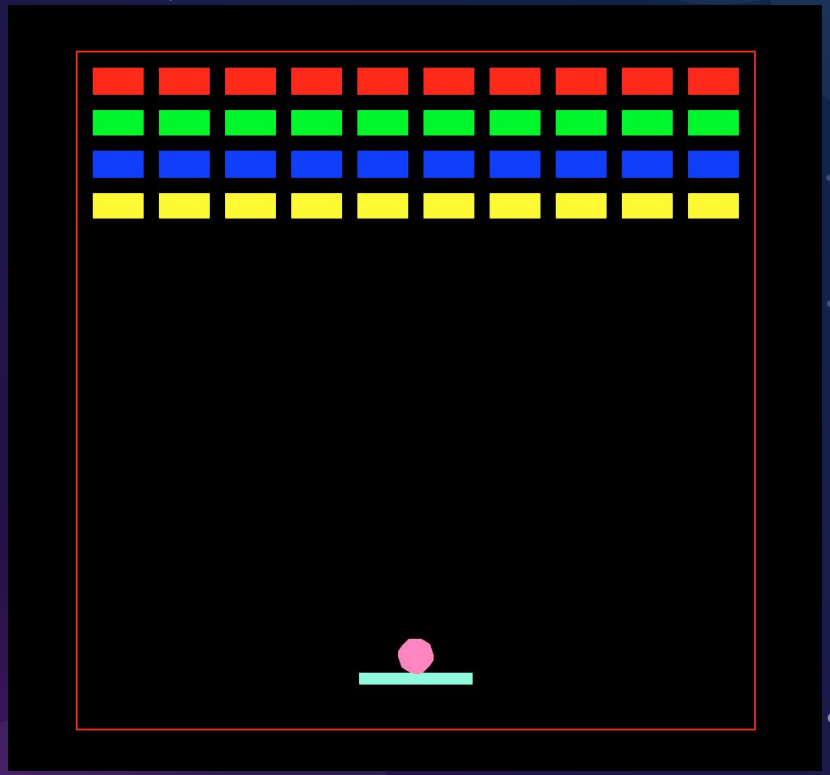

90
80
70
60
50
40
30
20
10
0
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100

Turtle Commands

```
turtle.forward(length)
turtle.backward(length)
turtle.left(angle)
turtle.right(angle)
turtle.goto(x, y)
turtle.setheading(angle)
turtle.shape("turtle")
turtle.pensize(width)
turtle.showturtle()
turtle.hideturtle()
```

For more:
https://docs.python.org/3.3/library/turtle.html?highlight=turtle

Breakout Game

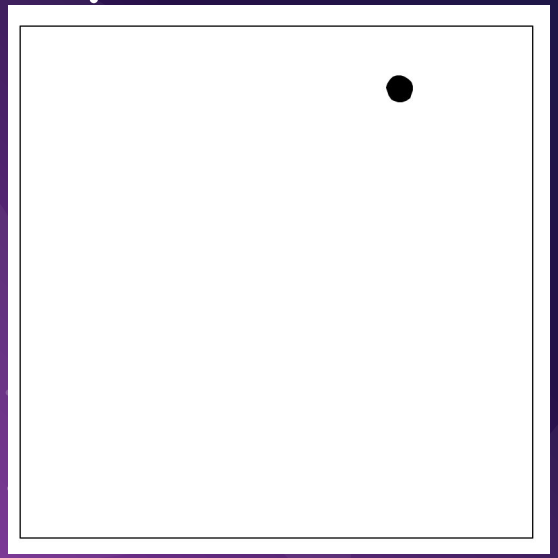


Teams for Breakout

Cindy - Diana
Peter - Frank
Allen - Derek
Jake - Ray
Steven - Sunny
Charles - Alex - Albert

Steps

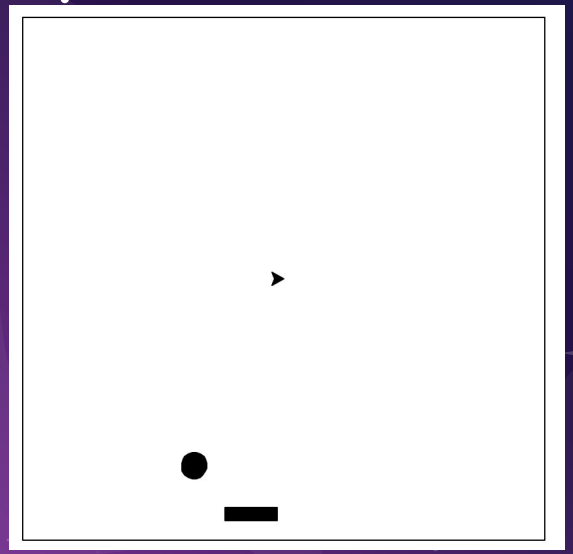
1. **First Make Ball Bounce**



- The ball begins with a random downward-facing angle and continues moving infinitely
- If it collides with the border:
  - If corner: reverse direction
  - If wall: switch angle

Steps

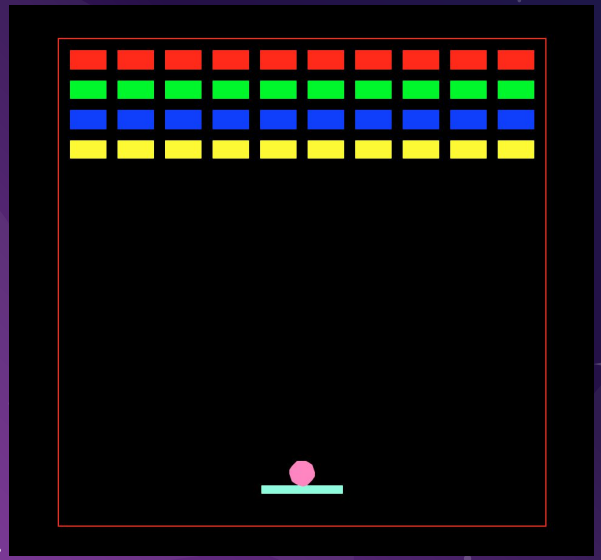
2. Next, add paddle



- Now, add the paddle
- User can move the paddle using the Left / Right keys
- The ball can now collide with the paddle and change direction (switch angle)

Steps

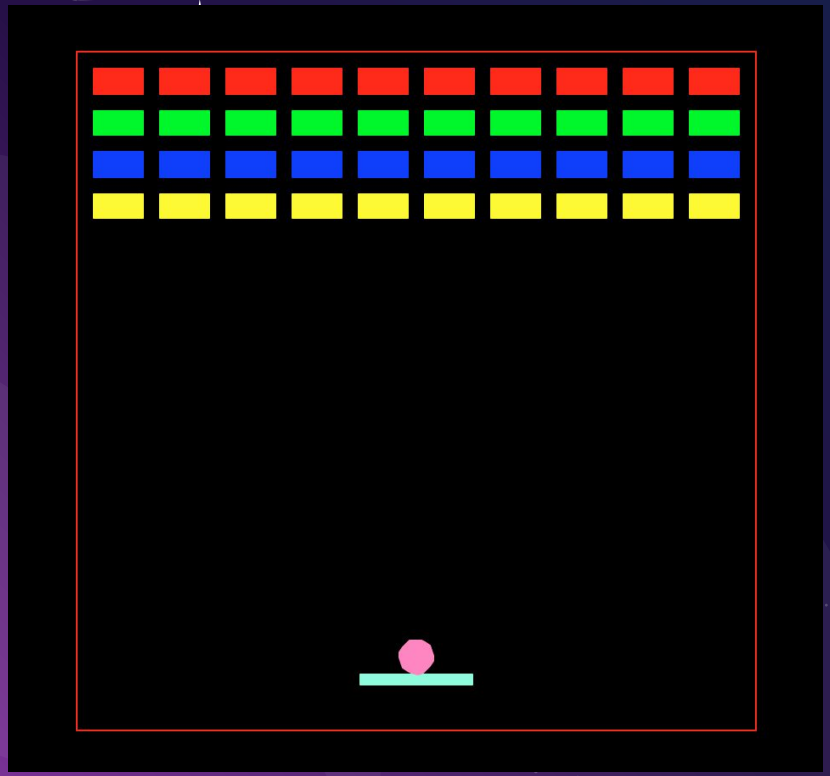
3. Complete Game



- Add the bricks
- Check for collisions with bricks, and remove the brick if hit by ball
- Add colors, other design choices

- *Extra*:
  - Tough bricks that require multiple hits to disappear
  - Add score label
  - Accelerate ball as game continues
  - Any other ideas!

Breakout Starter Code



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Today’s Overview

- Review
- Breakout

15 min break

CODING TIME!

Bouncy Balls

https://repl.it/@jessicae5/bouncyBalls

- Draw border
- Start with numBalls = 10, each given a random heading
- If a ball hits the border:
  - If corner: turn around
  - If wall: switch angle