LAB 08

OOP, Inheritance

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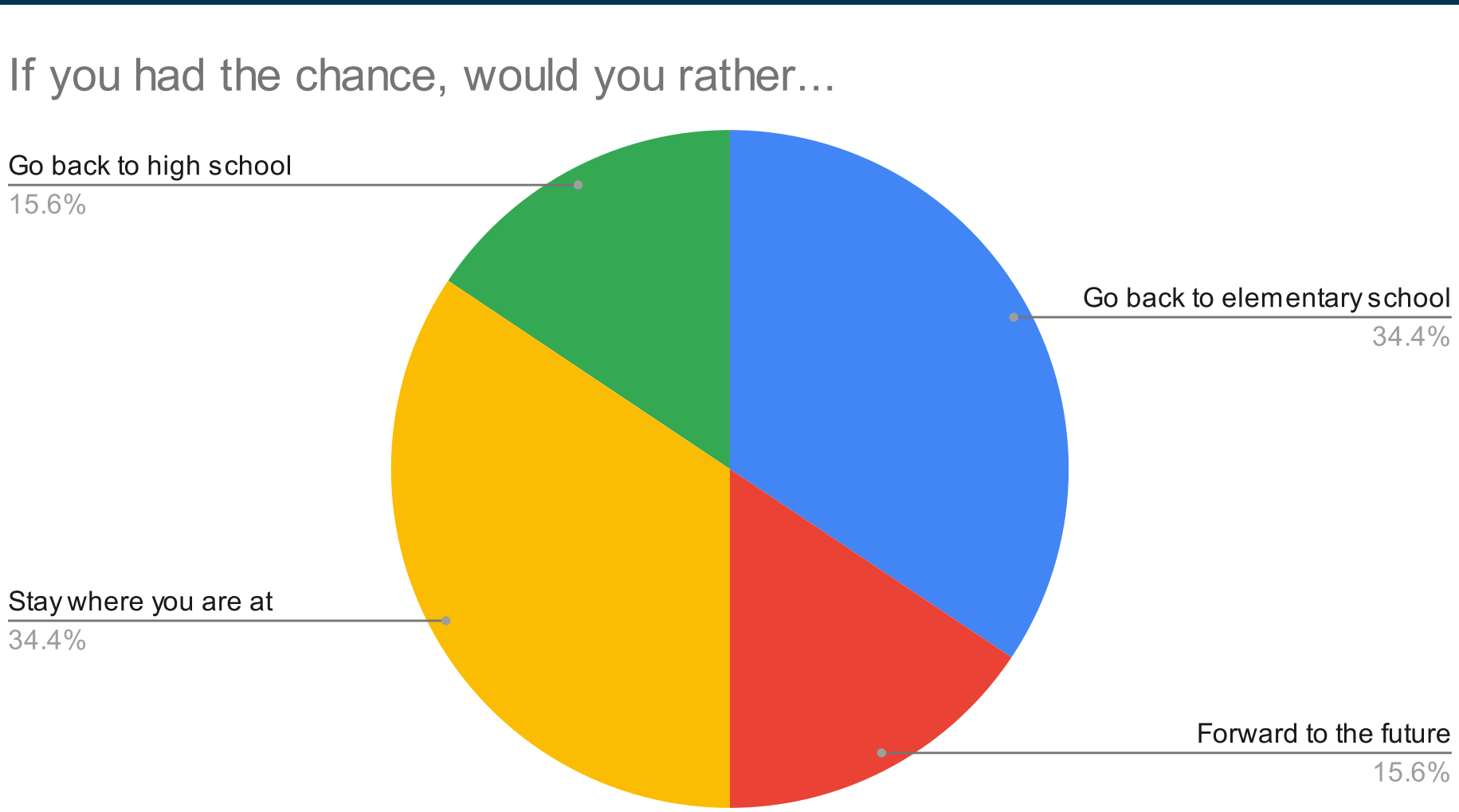
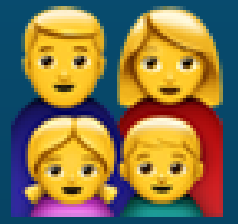
LOGISTICS 

- Lab 08 due tomorrow 03/15
  - PLEASE SUBMIT TWO FILES: `lab08.py` and `classes.py`
  - More instructions here
- ANTS is released!  
  - Checkpoint 1 due Fri 03/17
  - Checkpoint 2 due next Tue 03/21
  - The whole project due next Fri 03/24
  - Submit by next Thu 03/23 for one extra point!
- Homework 06 due this Thu 03/16
- All OH online today in anticipation of the rain 
- CLASS METHOD NO LONGER IN SCOPE ‼️

FROM LAST TIME... 👀



Such a symmetric distribution 😮

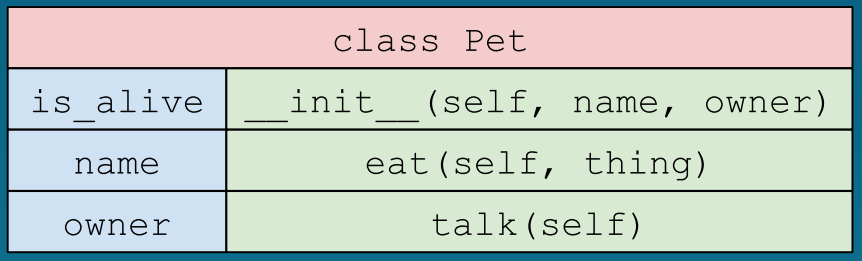
INHERITANCE 

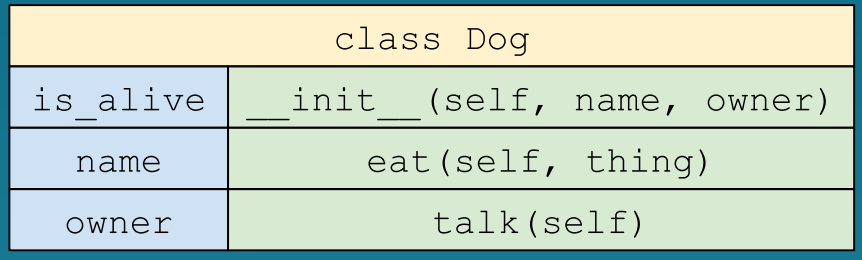
```
class Dog :
    def __init__(self, name, owner):
        self.is_alive = True
        self.name = name
        self.owner = owner
    def eat (self, thing):
        print(self.name + " ate a " + str(thing) + "!")
    def talk (self):
        print(self.name + " says woof!")
class Cat :
    def __init__(self, name, owner, lives=9):
        self.is_alive = True
        self.name = name
        self.owner = owner
        self.lives = lives
    def eat (self, thing):
        print(self.name + " ate a " + str(thing) + "!")
    def talk (self):
        print(self.name + " says meow!")
```

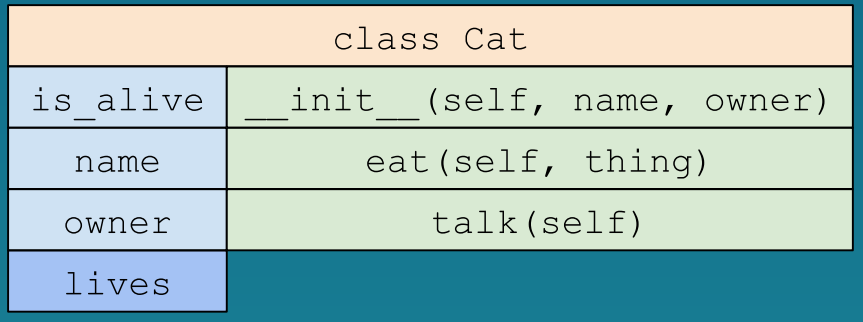
INHERITANCE

- `Dog` and `Cat` have a lot in common - repeated code :(
- Solution - a base class, `Pet`, from which both classes inherit
  - DRY - Don't repeat yourself

superclass







subclass

* super class and base class are used interchangeably

INHERITANCE

```
class Pet :  # base class
        def __init__(self, name, owner):
                self.is_alive = True        # It's alive!!!
                self.name = name
                self.owner = owner
        def eat (self, thing):
                print(self.name + " ate a " + str(thing) + "!")
        def talk (self):
                print(self.name)

class Dog (Pet) :  # A dog is a pet!
        def talk (self):  # overridden bc it's different from the base class
                print(self.name + ' says woof!')
```

INHERITANCE

- `class SubClass(BaseClass):`
- "is-a" relationship - a subclass is a type of base class
- By default, a subclass has the same behavior as its base class
- To make a subclass different from its base class:
    - Add attributes
        - declare additional methods/variables within the subclass
    - Override attributes
        - Class variables - reassign
        - Methods - **redefine the method with the same function signature (name and arguments)**. Use `super()` to call the same method from the base class when necessary

CALLING METHODS FROM THE BASE CLASS

When defining a method, we may want to reuse the method from the base class first, then add more to it

- `super().method(args)`
  - Can only be used inside of a class method
  - no need to pass it in `self`
- `BaseClass.method(instance, args)`
  - Can be used anywhere
  - Need to explicitly pass in the `instance`

```
class Dog(Pet):
    def __init__(self, name, owner, has_floppy_ears):
        super().__init__(name, owner)
        # alternatively, Pet.__init__(self, name, owner)
        self.has_floppy_ears = has_floppy_ears
```

NOW IT'S LAB TIME 

- Get started on the lab and raise your hand whenever you need help!
- Get to know your neighbors and collaborate if you'd like!
- Slides: go.cs61a.org/mingxiao-index
- Leave any anonymous feedback here: go.cs61a.org/mingxiao-anon

AND REMEMBER TO GET CHECKED OFF! 

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go.cs61a.org/mingxiao-att

The secret phrase is ...
(NOT 3 dots! I'll announce it )