

Discussion 01: Control, Environments, and HOFs

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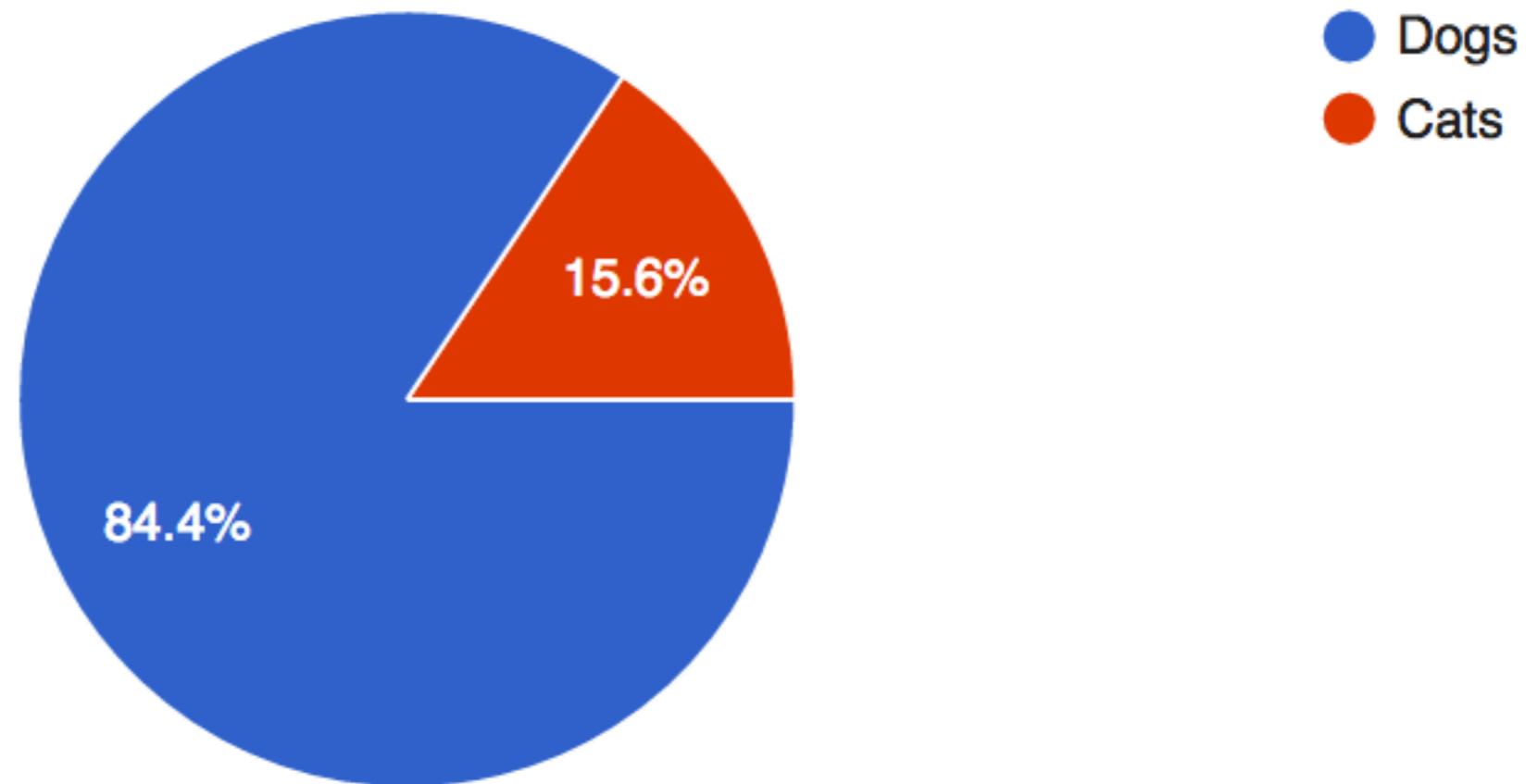
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Agenda

1. Attendance
2. Announcements
3. Booleans & Control (skipped, view slides later)
4. Environments
5. Higher Order Functions

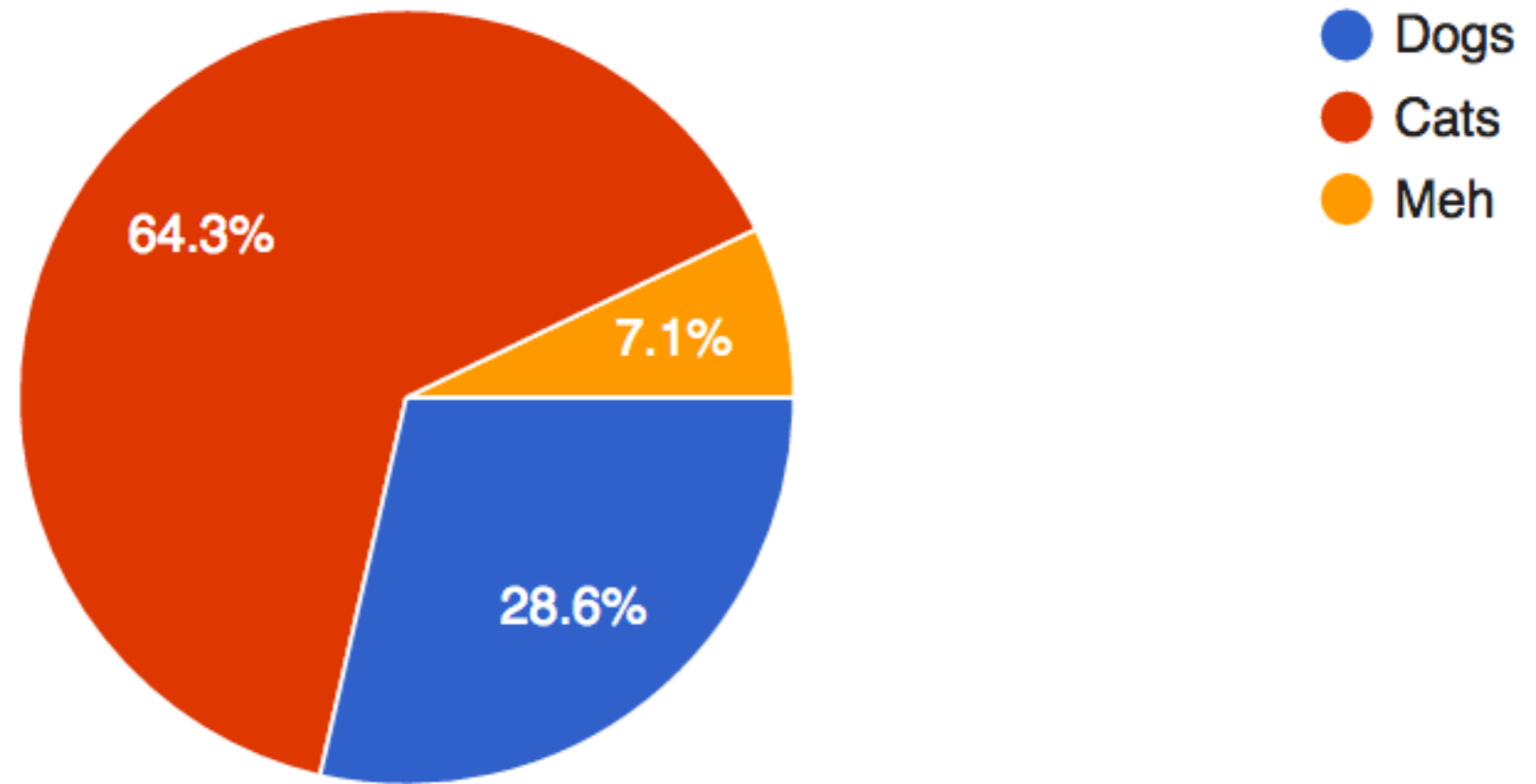
Cats vs Dogs

Dogs or cats? (32 responses)



Last Semester

Dogs or cats? (14 responses)



Attendance

Sign in at tiny.cc/jerrydisc

You won't need a computer/
phone for the rest of section

Announcements

Course calendar and syllabus are up!

Hog (proj 1) is released!

- Proj party Tuesday, Wednesday 6:30-8:30pm in 247 Cory

HW 1 due Monday

- Homework party Monday 6:30-8:30pm in Cory 247

Lab 1 due Friday

Midterm 1 is Fri 2/17, 7-9pm

Check your understanding

```
def test():  
    pop = False  
    quiz = False  
    while not pop or not quiz:  
        quiz = quiz or pop and 10 or 0  
        pop = pop and not quiz or 20 and 30  
        print(pop, quiz)
```

Q: What is the output of test()?

Hint: not 10 == False

Hint: not > and > or (op precedence)

But why...

Booleans and Control?

Environment diagrams?

Higher order functions?

Booleans

- There are “truthy” and “falsy” values:

“Truthy”	“Falsy”	Notes
<code>True</code>	<code>False</code>	
<code>“banana”</code>	<code>”</code>	Empty string
<code>100, -12</code>	<code>0</code>	
<code>[1, 2, 3], { 'a': 1, 'b': 2 }</code>	<code>[], {}</code>	Will see later in the course

Boolean Operators

- **not** (negates),
- **and** (true iff both are true),
- **or** (false iff both are false)
- **Short circuit** and terminate early once the **result of a expression is known**

Control

If statements

```
if <exp>:  
    <suite>  
elif <exp>:  
    <suite>  
...  
elif <exp>:  
    <suite>  
else:  
    <suite>
```

Careful!

```
if x > 4:  
    print ("High")  
if x == 5:  
    print ("Five")  
else:  
    print ("Low")
```

Control

While statements

- The **expression is checked before** executing the suite

```
while <exp>:  
    <suite>
```

FizzBuzz

Write a program that prints the numbers from 1 to n.
But:

- For **multiples of three** print **“Fizz”** instead of the number.
- For the **multiples of five** print **“Buzz”**.
- For **numbers which are multiples of both three and five** print **“FizzBuzz”**.

FizzBuzz

Solution might look something like this:

```
def fizzbuzz (n) :  
    i = 1  
    while i <= n:  
        if i % 3 == 0 and i % 5 == 0:  
            print ("FizzBuzz")  
        elif i % 3 == 0:  
            print ("Fizz")  
        elif i % 5 == 0:  
            print ("Buzz")  
        else :  
            print (i)  
        i += 1
```

FizzBuzz

EnterpriseQualityCoding / FizzBuzzEnterpriseEdition

Watch 132

Star 4,846

Fork 269

Code

Issues 119

Pull requests 22

Wiki

Pulse

Graphs

Tree: 00097f...

Find file

Copy path

FizzBuzzEnterpriseEdition / src / main / java / com / seriouscompany / business / java / fizzbuzz /
packagenamingpackage / impl / parameters / DefaultFizzBuzzUpperLimitParameter.java

emiln Merge branch 'feature/Dependency-injection'

00097ff on Apr 19, 2015

2 contributors

17 lines (10 sloc) | 519 Bytes

Raw

Blame

History



```
1 package com.seriouscompany.business.java.fizzbuzz.packagenamingpackage.impl.parameters;
2
3 import org.springframework.stereotype.Service;
4
5 import com.seriouscompany.business.java.fizzbuzz.packagenamingpackage.interfaces.parameters.FizzBuzzUpperLimitParameter;
6
7 @Service
8 public class DefaultFizzBuzzUpperLimitParameter implements FizzBuzzUpperLimitParameter {
9
10     public int obtainUpperLimitValue() {
11         return DefaultFizzBuzzUpperLimitParameterValue;
12     }
13
14     private final int DefaultFizzBuzzUpperLimitParameterValue = 100;
15 }
16
```

Environments

Q: What is an **environment**?

A: Free points on an exam! (kind of)

Environments

Q: What is an **environment**?

A: Environments represent a **context** for execution.

- Environments store things such as name-value bindings
- Visualize environments using **environment diagrams**

Environment Diagrams

Consists of many frames that track program state

Some rules:

- **Function call: create and number new frame** (f1, f2, etc.)
— always start in global frame
- **Assignment:** write variable name and expression value
- **Def statements:** record function name and bind function object. Remember parent frame!
- **Frames return values** upon completion (Global is special)

Higher Order Functions

Big idea: **Functions can be treated as “variables”**
— **a powerful tool for abstraction!**

- Can pass as arguments or returned
- Analogy is a bit limited, can't necessarily “add” two functions

Functions that manipulate other functions are **higher order**

Higher Order Functions

Packager Example

```
def make_packager():  
    def packager(item):  
        return "[[" + item + "]" ]"  
    return packager
```

```
p = make_packager()  
print(p("toothbrush"))
```

Higher Order Functions

Id Example

```
def id(x):  
    return x  
  
print(id(id)(id(13)))
```