



# Welcome to 61A Lab!

---

We will begin at **5:10!**  
Slides: **[cs61a.bencuan.me](https://cs61a.bencuan.me)**

# Announcements

---

- CSM signups open tomorrow (Weds) 7pm!
- Midterm next Monday 8-10pm
  - Logistics are on Piazza
  - **No lab next week**
  - Come to discussion for some exam prep :)
- Hog/HW2 exists, checkpoint due Thurs.
- Exam prep Fridays 9:30-11

# The Plan

---

- Some (more!) lab info
- Midterm Info
- Higher Order Functions + Lambdas
- Work time!

# Meet our AI's!

---

- AI = Academic Intern
- Will be helping to answer your questions!

# Midterm Info

---

- 8-10pm, Mon. 2/7, location TBD
- Bring ID, mask, water bottle, cheat sheet, pen(cil)s
- Look out for CSM/HKN review sessions!

# Midterm Content

---

- Control statements (if, while)
  - Digit chopping (``%`` and ``//`` to process large integers using ``while``)
- Booleans and conditional statements (and, or, not; short circuiting)
- Environment diagrams
- Higher order functions (passing in or receiving another function as a parameter)
- Lambda functions
- WWPD

# Midterm Tips

---

- Exam guide on [cs61a.bencuan.me](https://cs61a.bencuan.me)
- Midterm tips from the AI's

# Lambdas

---



# What lambda?

---

- A lambda function is an “anonymous function” (it has no name)
- Very useful for making short, simple functions
- Only has parameters and a return value

lambda <sup>parameters</sup> wom, bat : <sup>return value</sup> wom + bat

# Converting lambdas <-> defs

---

Lambda too confusing? Turn them into normal def statements!!

```
f = lambda ox: ox + 1
```

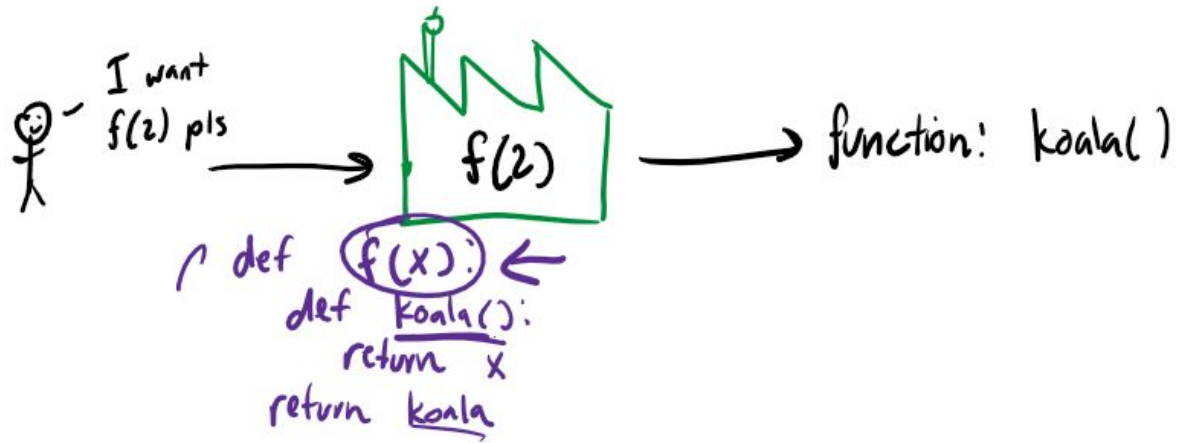
```
def f(ox):  
    return ox + 1
```

# Higher Order Functions

---

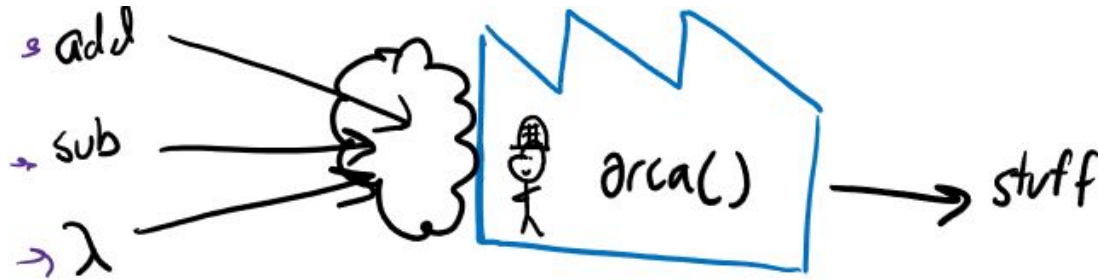
# Conceptualizing HOF's

HOF's are like factories that produce made-to-order functions



# Conceptualizing HOF's pt. 2

They can also take functions in as parameters!



```
def kangaroo(orca):  
    return orca() + 100
```

# Lambda HOFs

---

Lambdas can return functions too!

```
b = lambda ox: lambda turtle: ox + turtle
```

```
def b(ox):  
    def anonymous(turtle):  
        return ox + turtle  
    return anonymous
```

# Lab Hints

---

# Lab Hints

---

- Remember, **functions are not called until you see parentheses!!**
  - `f` vs `f()`
- Write one-liner lambdas as `def` statements first
- General format for HOF Factory:
  - ```
def outer(...):  
    def inner(...):  
        return ...  
    return inner
```



# Errors

---

| Error Types       | Descriptions                                                                                                                                 |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| SyntaxError       | Contained improper syntax (e.g. missing a colon after an <code>if</code> statement or forgetting to close parentheses/quotes)                |
| IndentationError  | Contained improper indentation (e.g. inconsistent indentation of a function body)                                                            |
| TypeError         | Attempted operation on incompatible types (e.g. trying to add a function and a number) or called function with the wrong number of arguments |
| ZeroDivisionError | Attempted division by zero                                                                                                                   |

# Debugging Tips

---

- **Remember to save the file!! (ctrl/cmd+S)**
- Use debug print statements! `print('DEBUG:', x)`
- Test often! (no penalty for submitting n times)
- It's ok to be stuck! Pls ask for help and work collaboratively!

# Work Time!

---



[go.cs61a.org/ben-queue](https://go.cs61a.org/ben-queue)

**Want a lab partner/group?**

Come to the front!