Lecture 1: Introduction

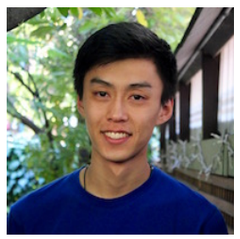
Marvin Zhang
06/20/2016

Welcome to Berkeley Computer Science!

Humans of CS 61A

Humans of CS 61A

2 Lecturers

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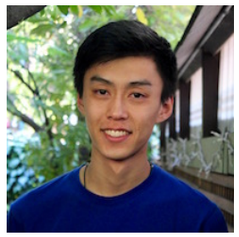
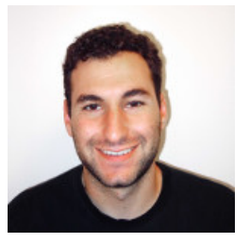
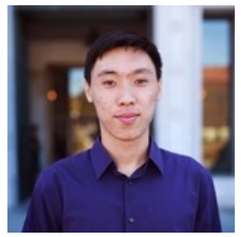
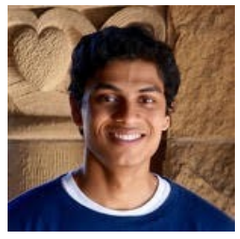
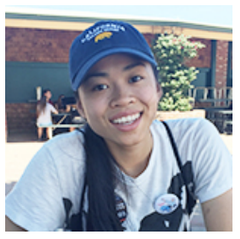



12 TAs



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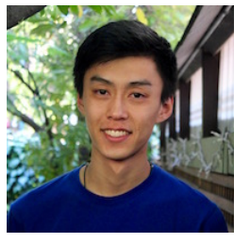


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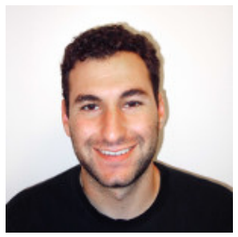
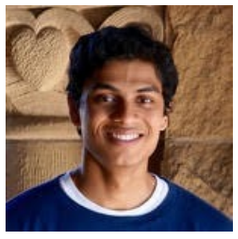
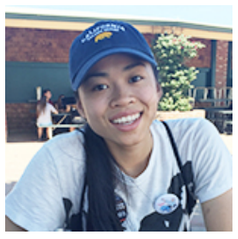
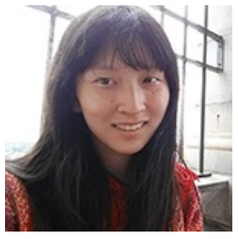


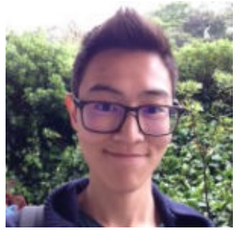


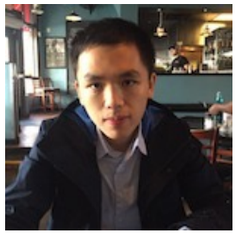
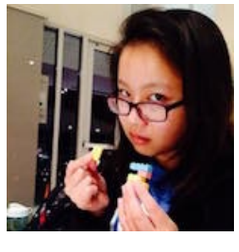
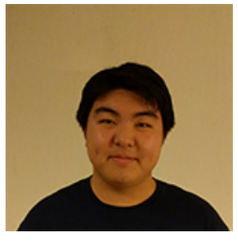
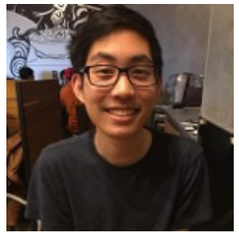
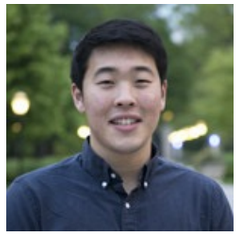


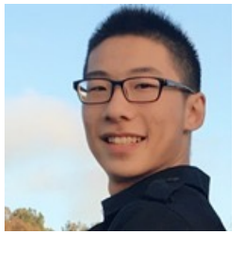
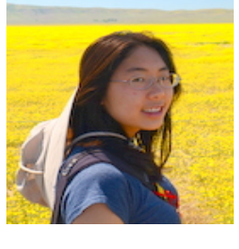



13 Tutors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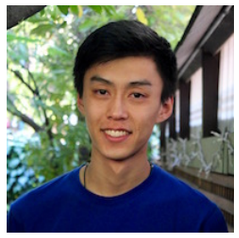


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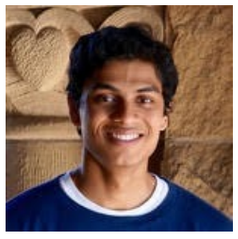


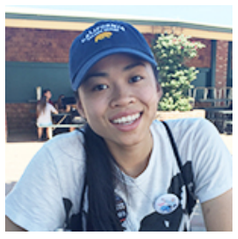
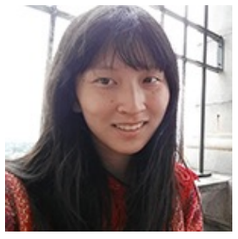


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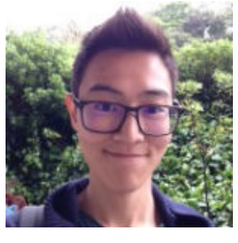


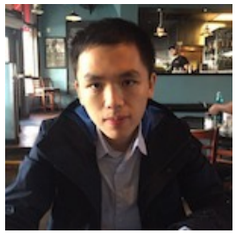
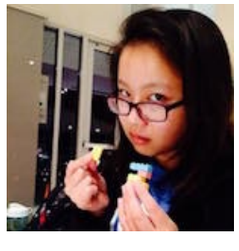
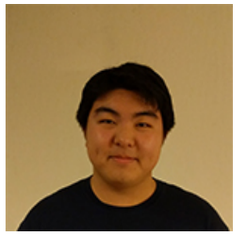
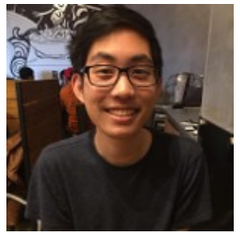
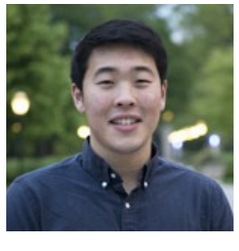

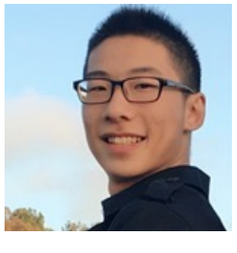
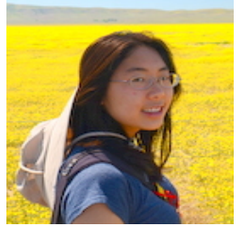


100+ Lab assistants!

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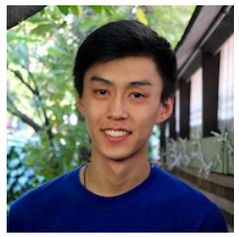


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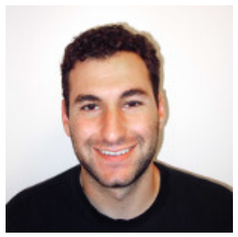





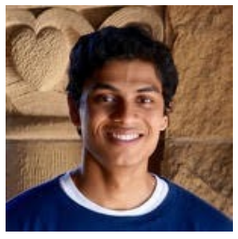


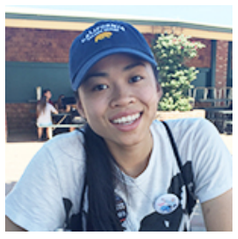
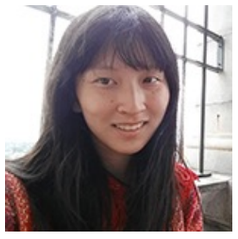


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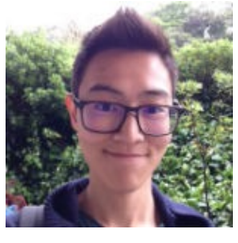


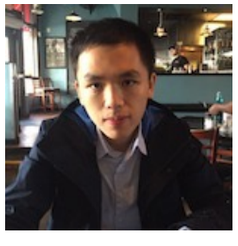
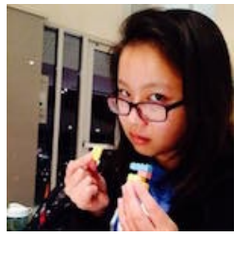
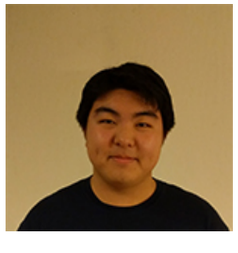
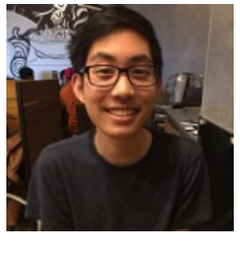
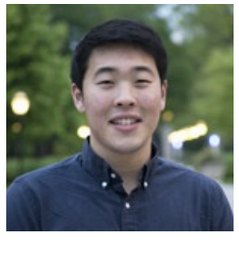

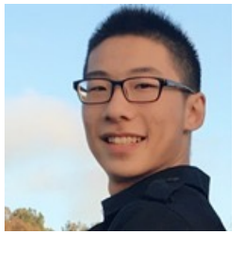
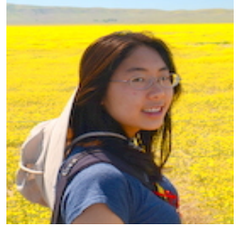


100+ Lab assistants!

400+ Students!!!

Computer Science in one slide

Computer Science in one slide

- What problems can computers solve?

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- What problems can computers solve?
- How do we get computers to solve these problems?

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Systems

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Systems

Artificial Intelligence

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Artificial Intelligence

Security

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Theory

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Artificial Intelligence — Natural Language Processing

Security

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Artificial Intelligence
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- Planning

Security

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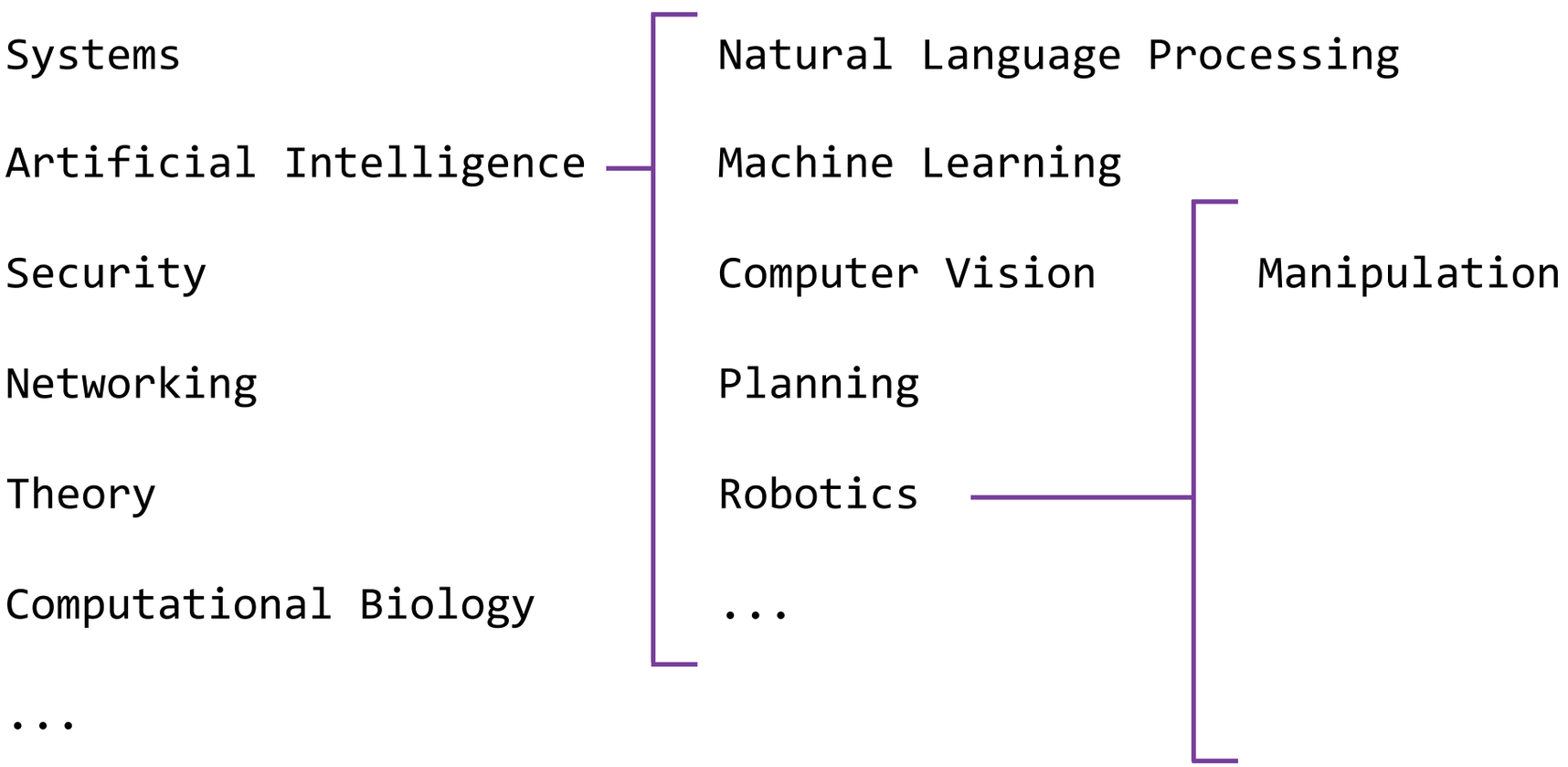

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Systems

Artificial Intelligence
- Natural Language Processing
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  - Navigation and Locomotion
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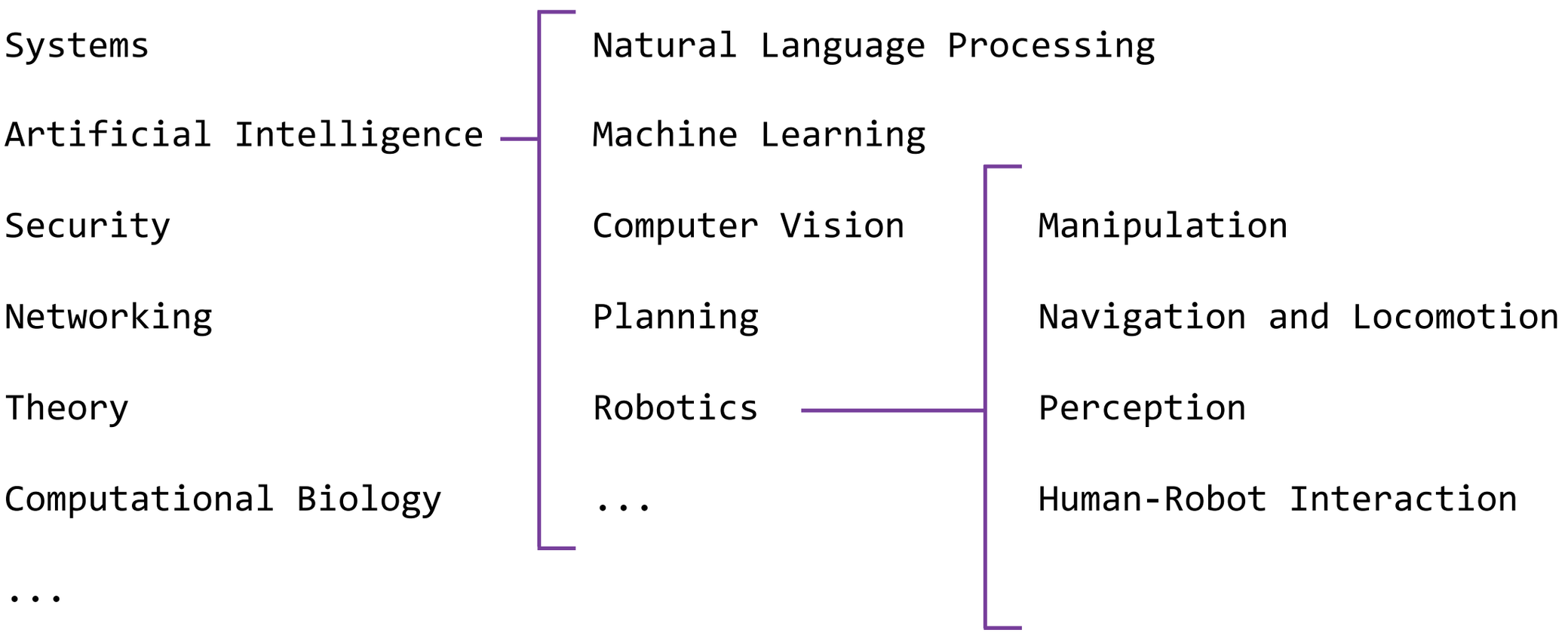

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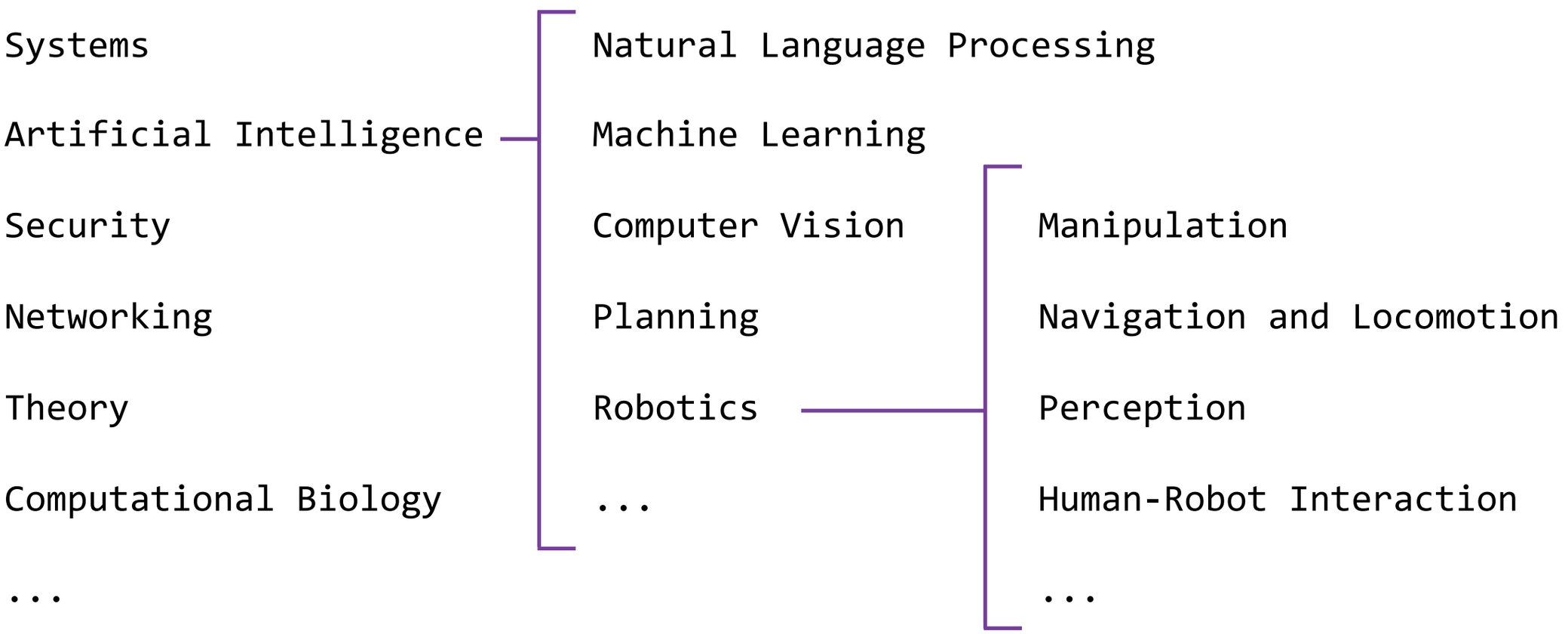

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Theory

Computational Biology

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Natural Language Processing

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Planning

Robotics

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Manipulation

Navigation and Locomotion

Perception

Human-Robot Interaction

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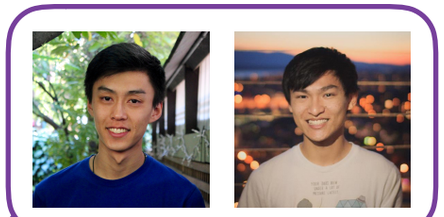

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- High-level ideas in computer science:

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  - *Abstraction*: manage complexity
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  - *Paradigms*: utilize different approaches to programming

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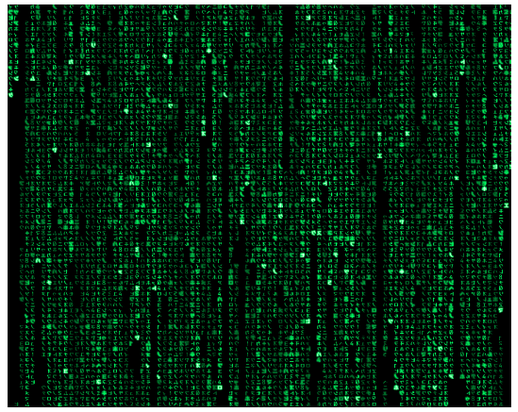

CS 61A in one slide

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- A challenging course that will demand a lot from you

Alternatives to CS 61A

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CS 10: The Beauty and Joy of Computing

cs10.org

Offered this summer!

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Data Science 8: Foundations of Data Science

data8.org

Course Policies

Details on cs61a.org

Course overview

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- Lots of special events!

Grading

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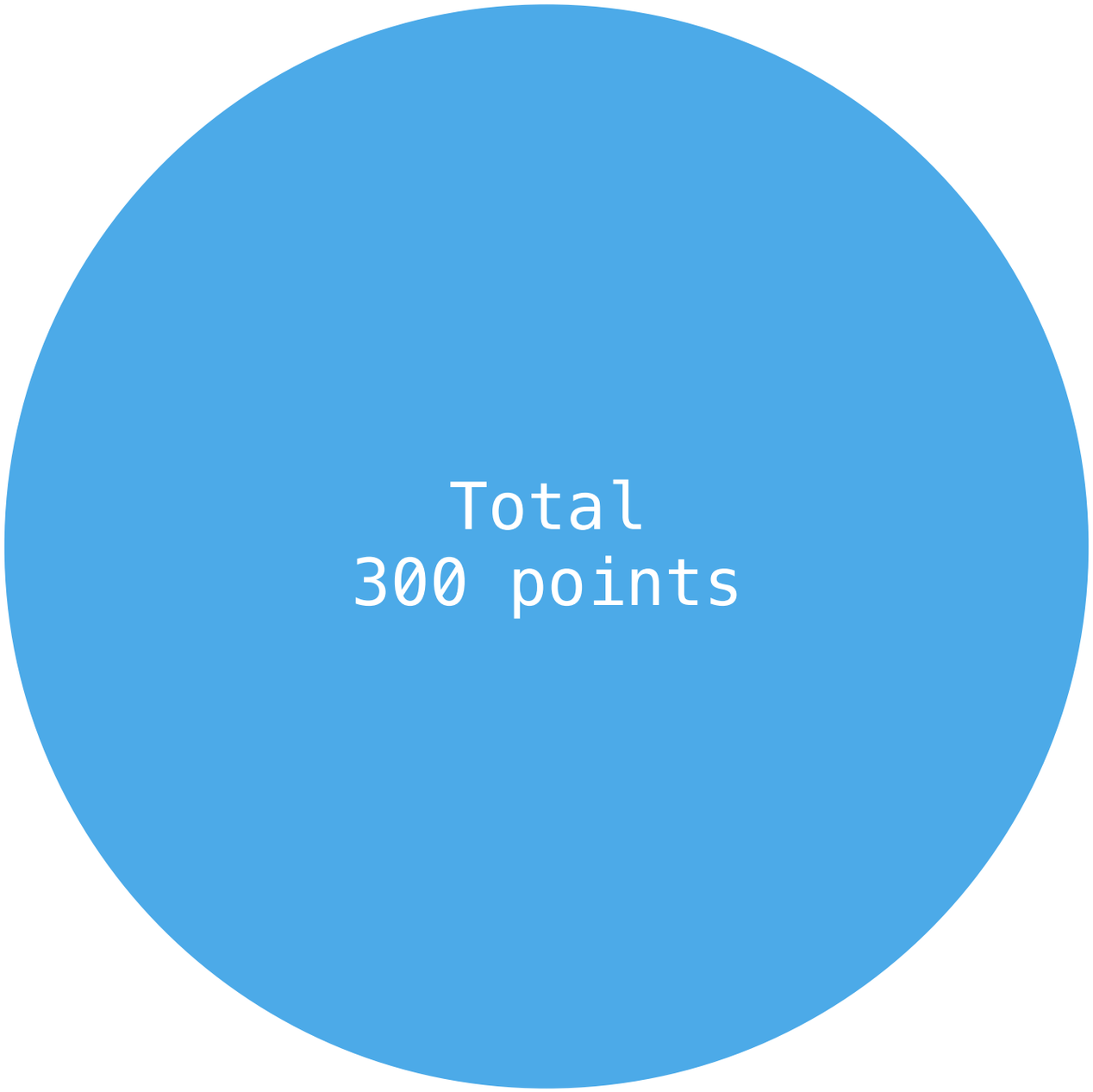

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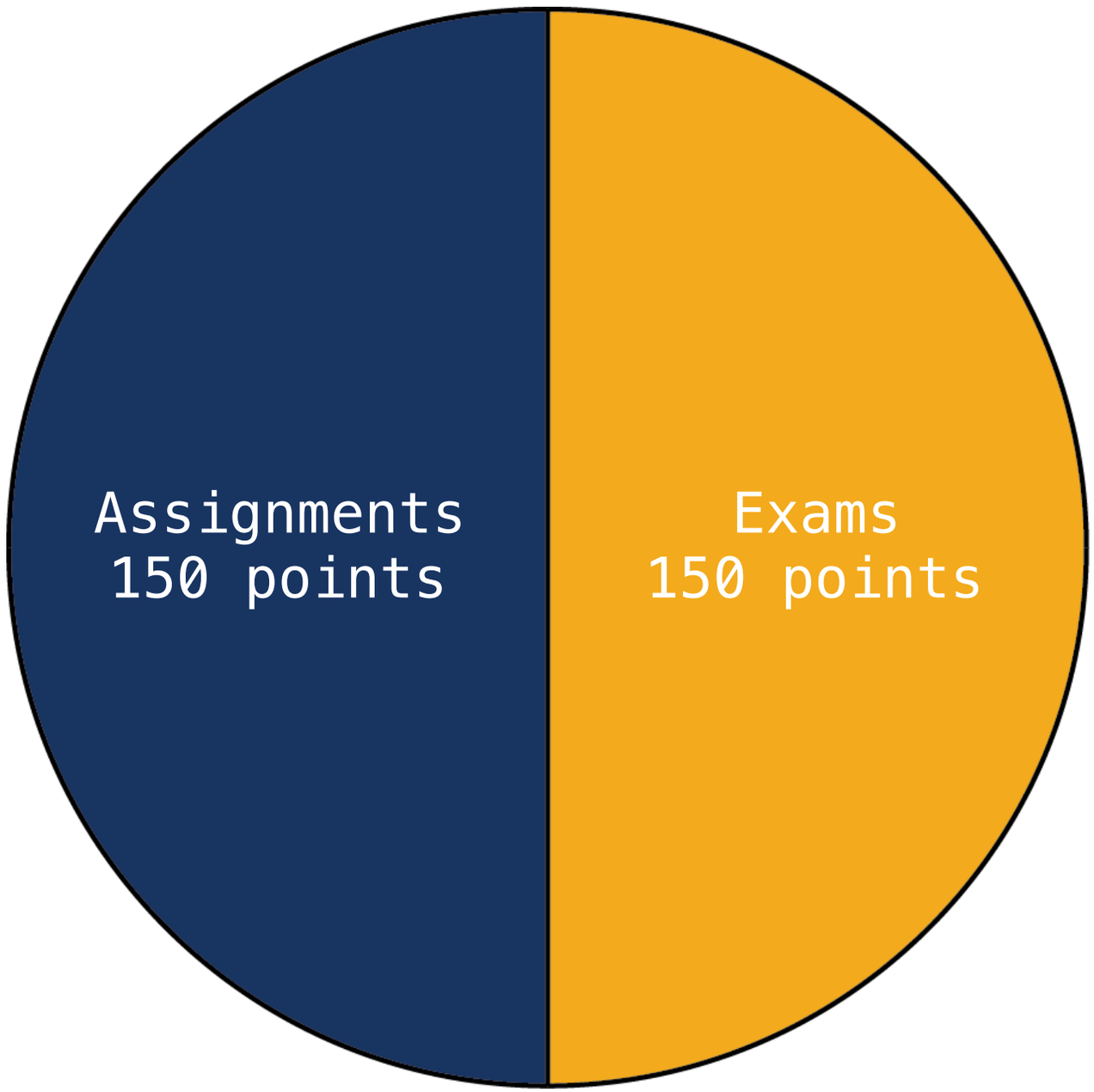

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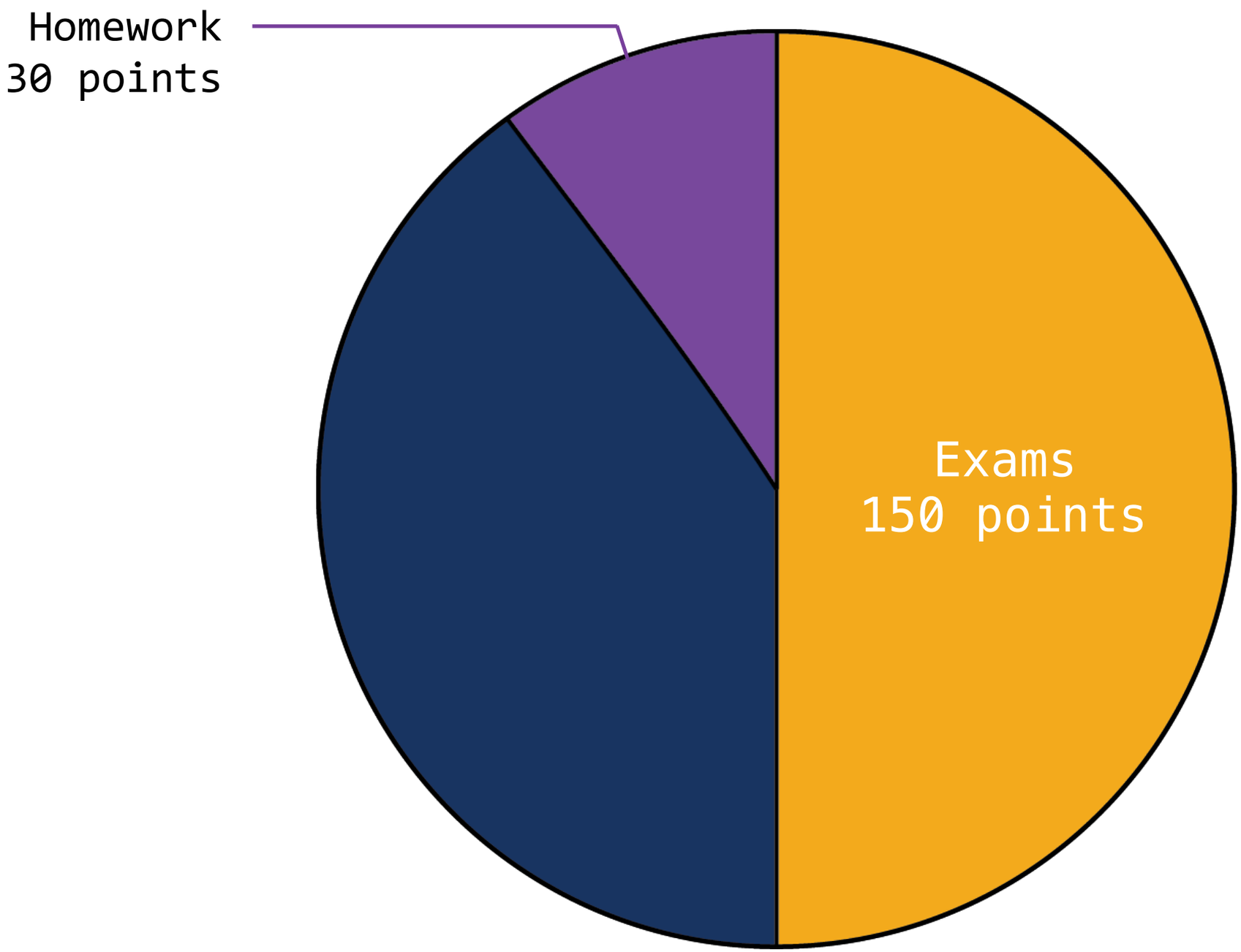

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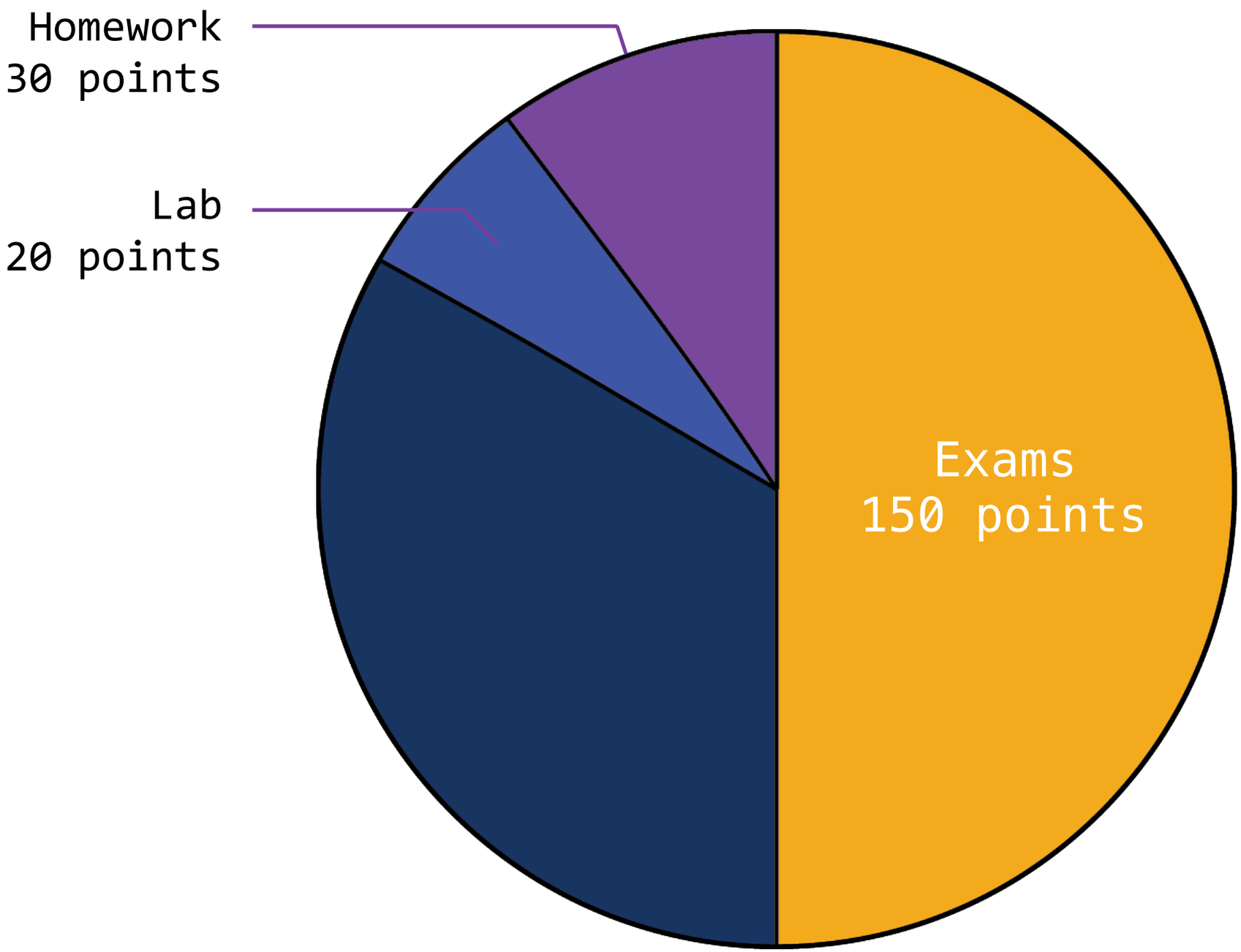

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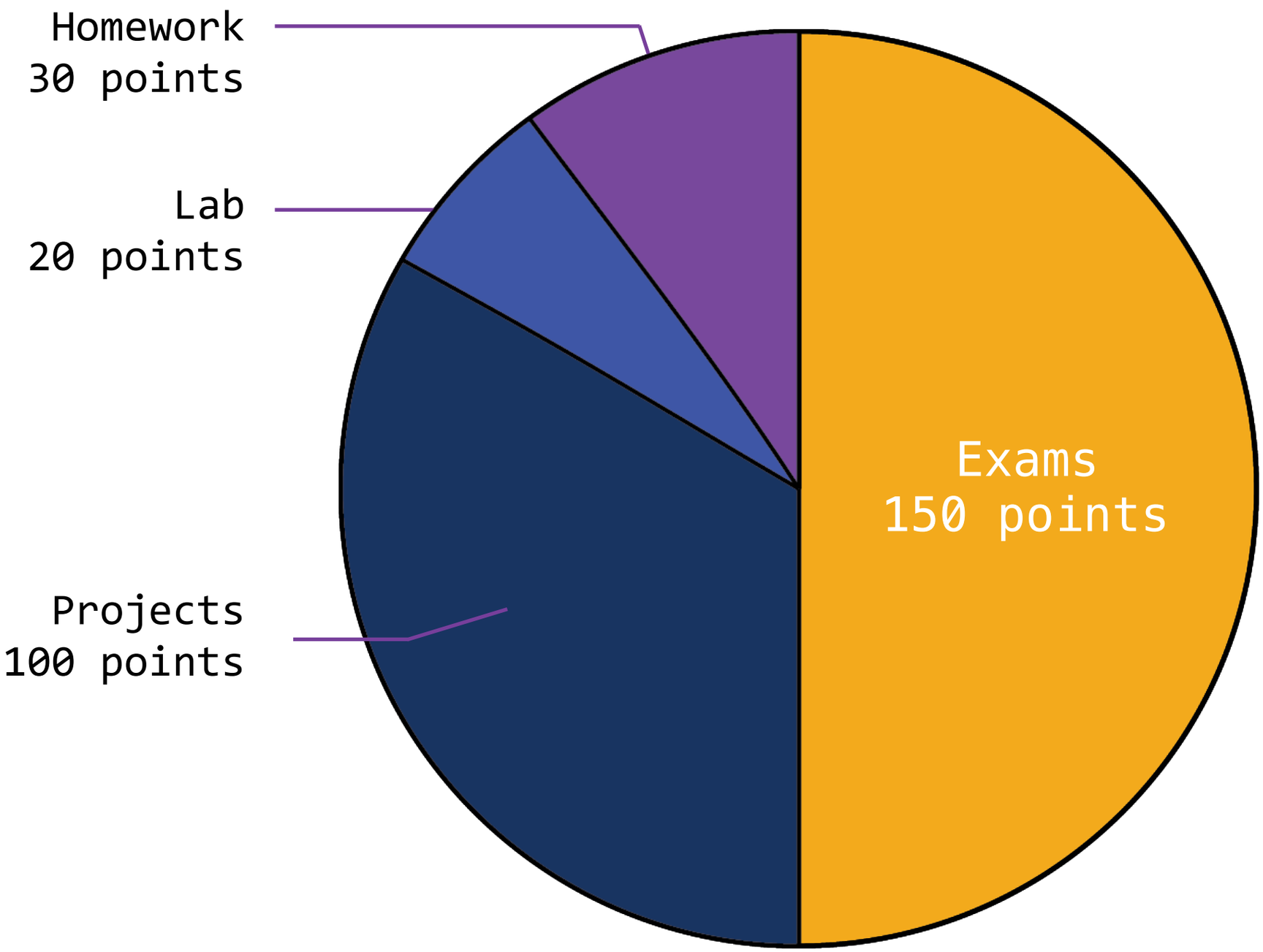
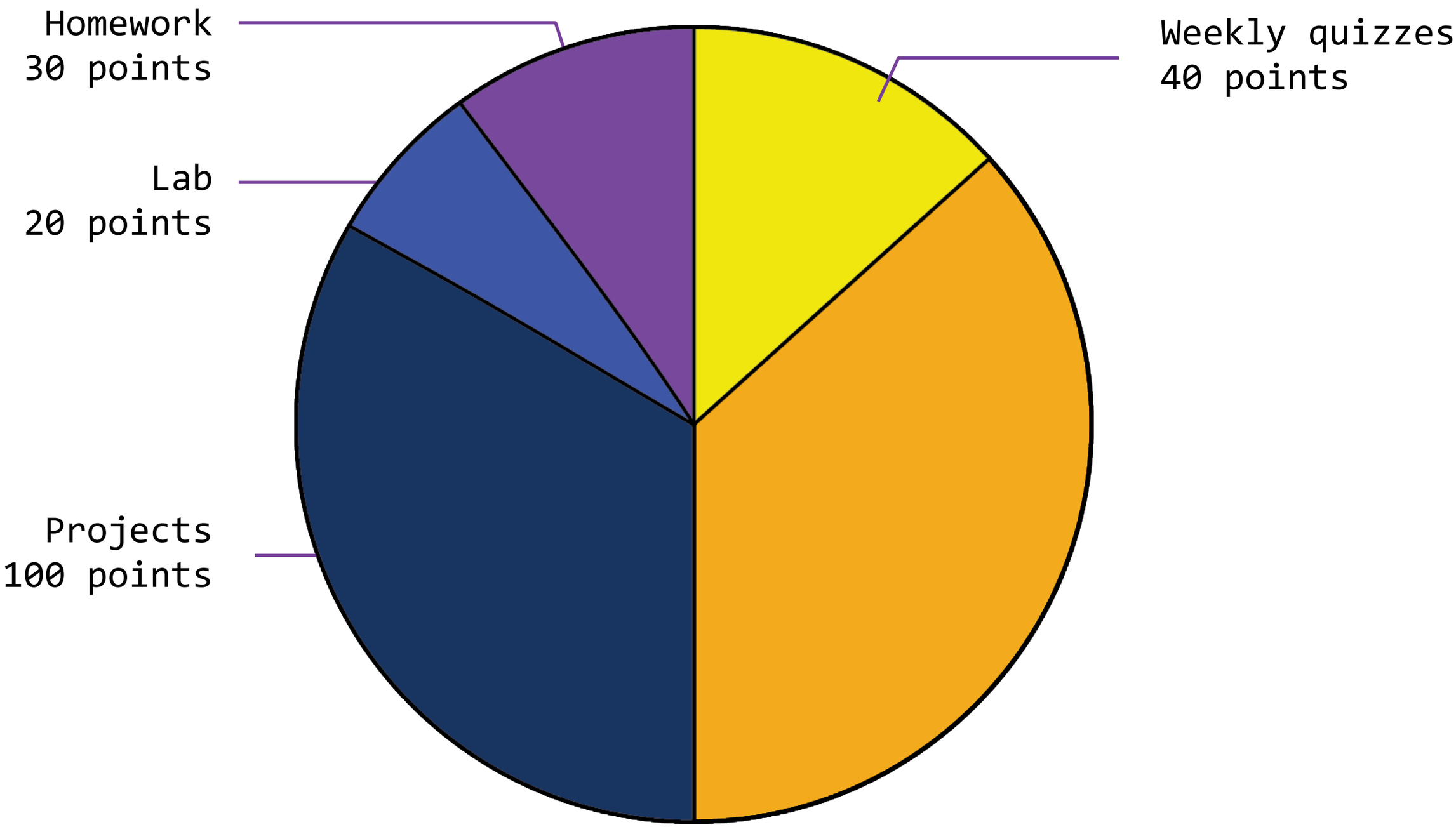

Homework
30 points
Lab
20 points
Projects
100 points
Exams
150 points

Grading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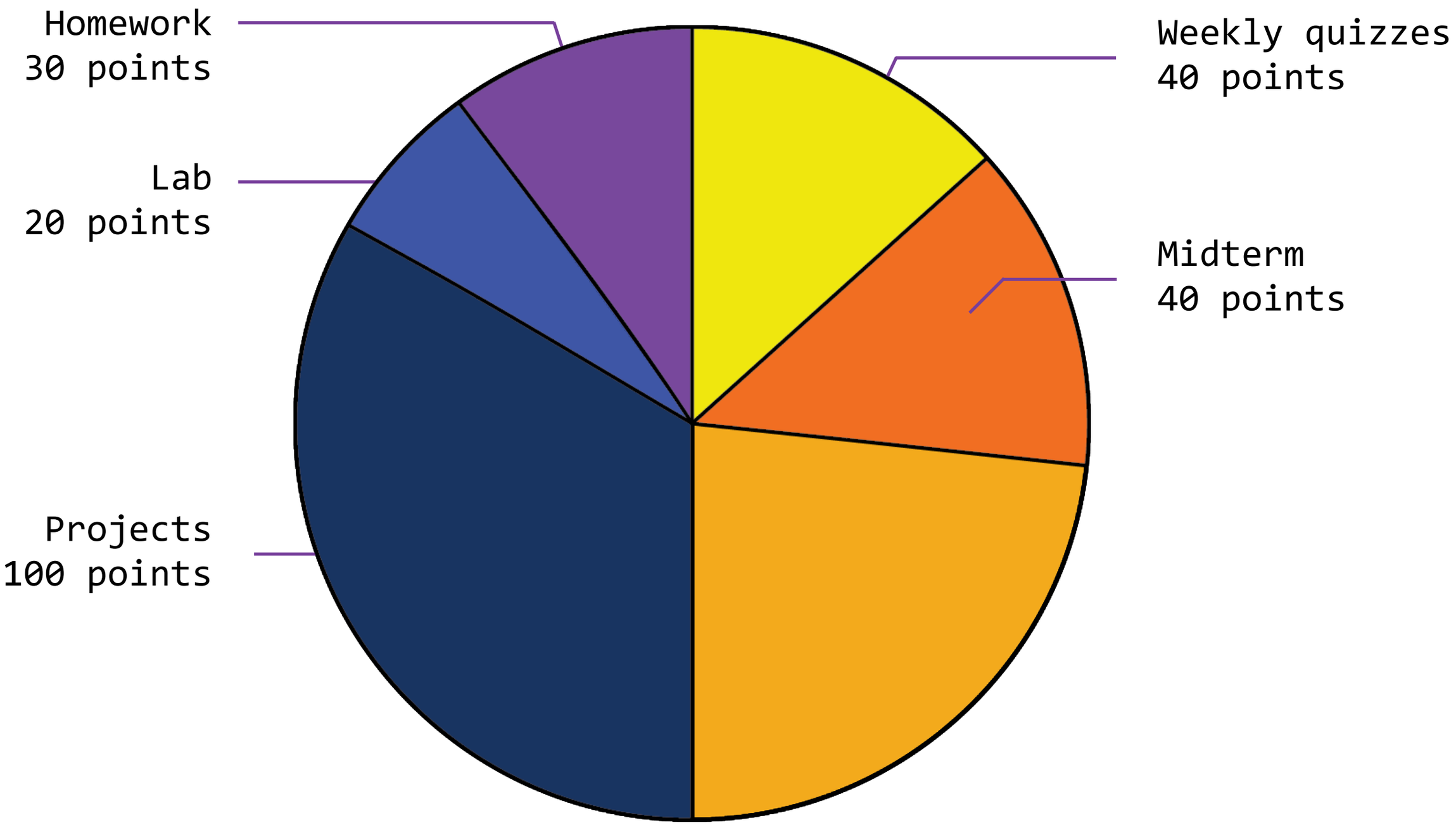
100 points
Weekly quizzes
40 points

Grading


Homework
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Lab
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Projects
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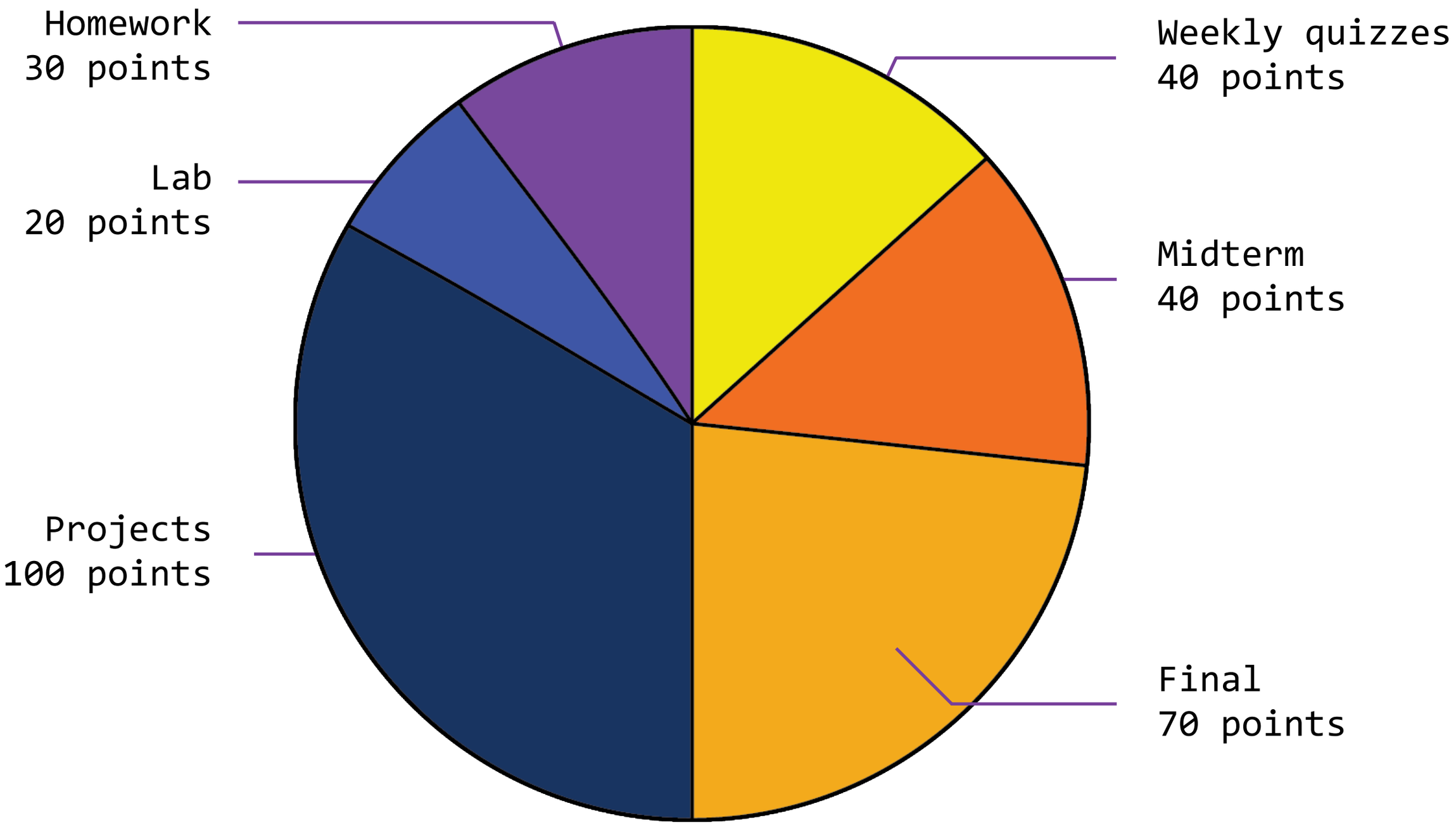
Weekly quizzes
40 points
Midterm
40 points

Grading


Homework
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Lab
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Projects
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Weekly quizzes
40 points
Midterm
40 points
Final
70 points

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The limits of collaboration

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  - Lab assistants will also be available for *checkoffs* during labs

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- Learn a lot, have fun, and welcome to 61A!

An Introduction to Programming

And, conveniently, an introduction to Python

Course organization

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Introduction

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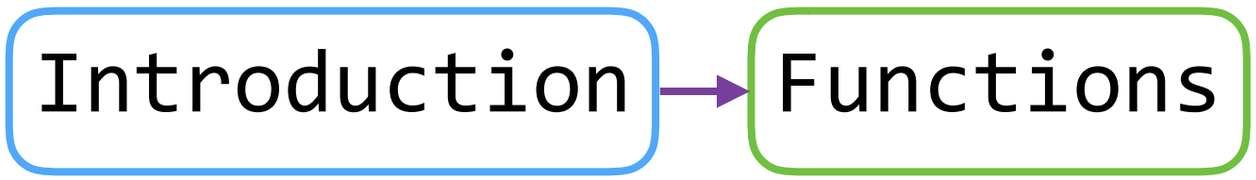

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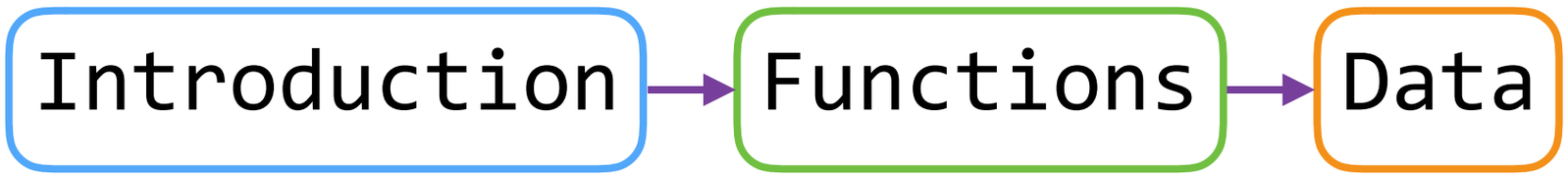

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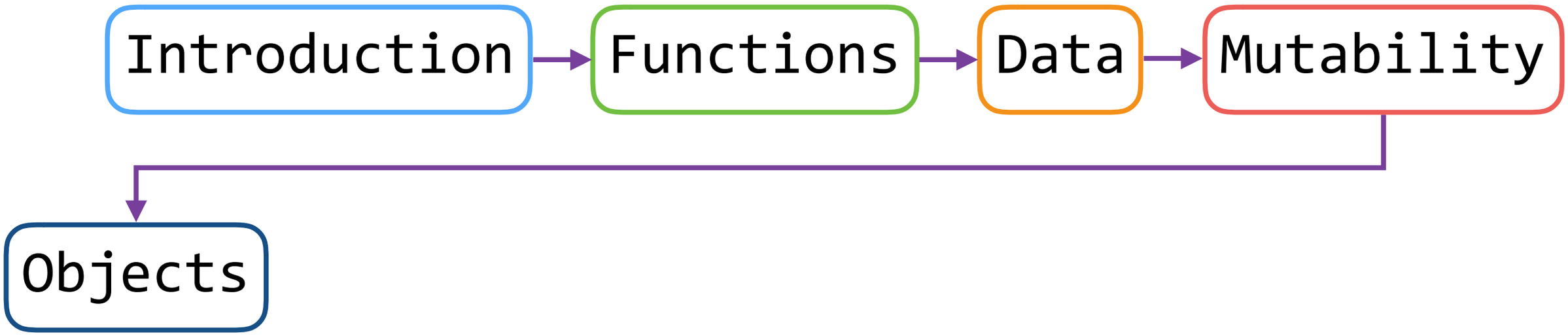

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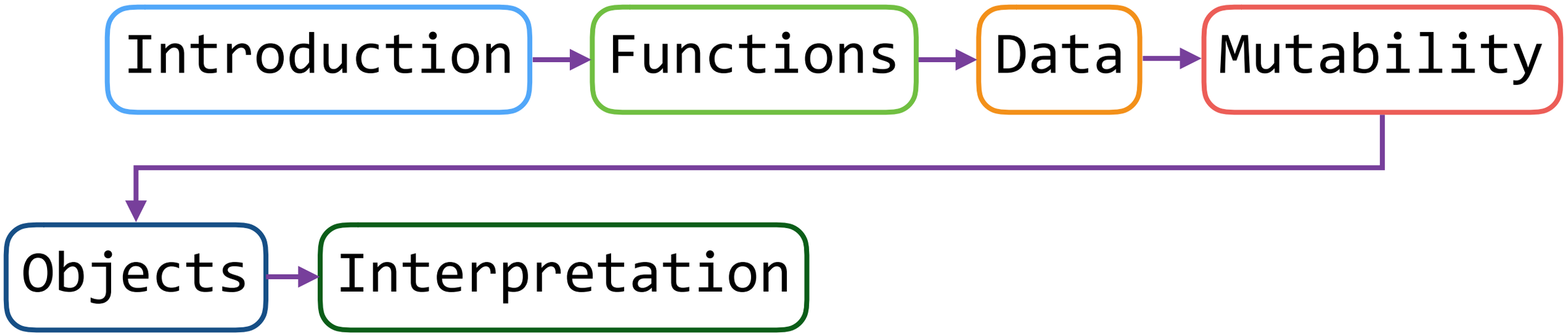

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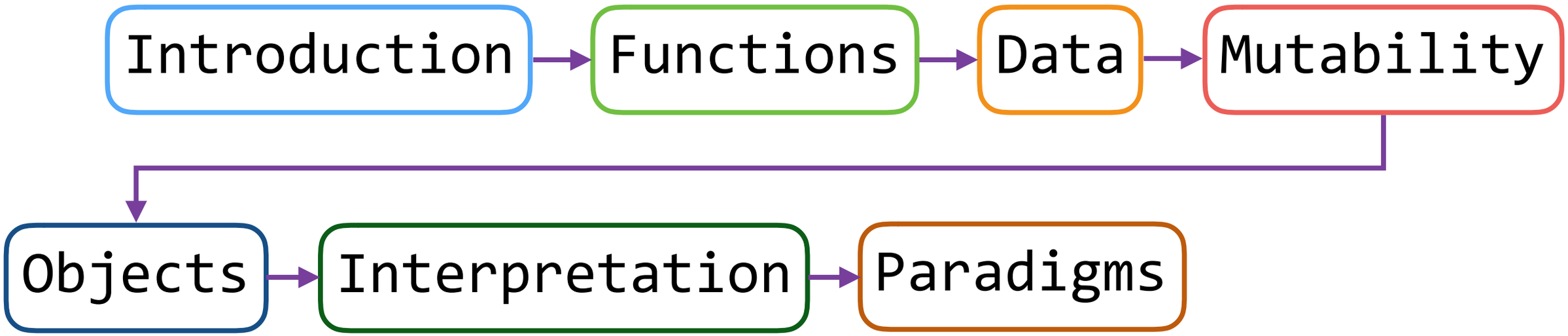

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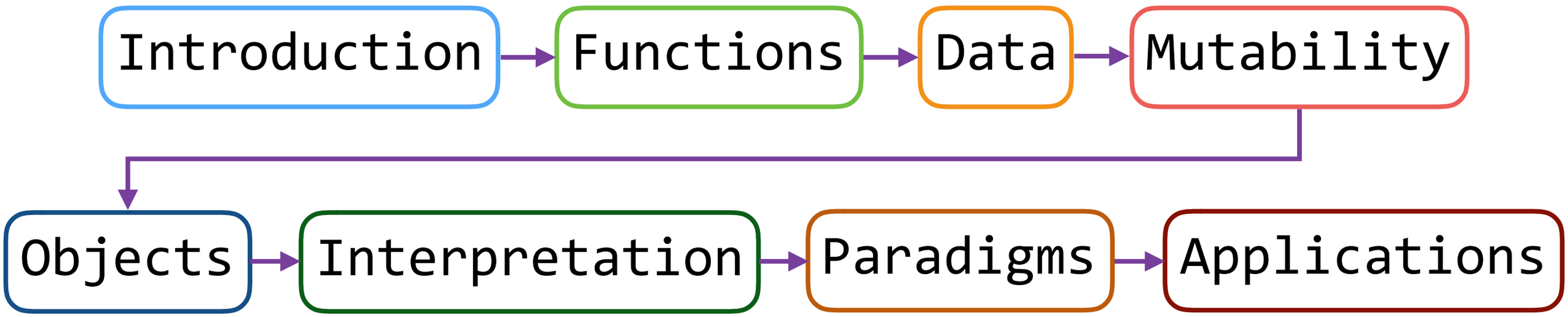

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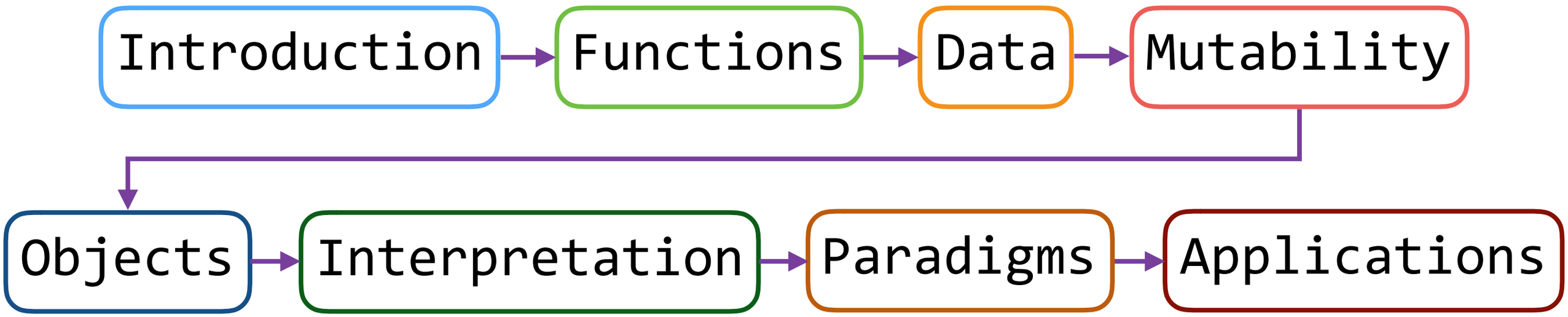

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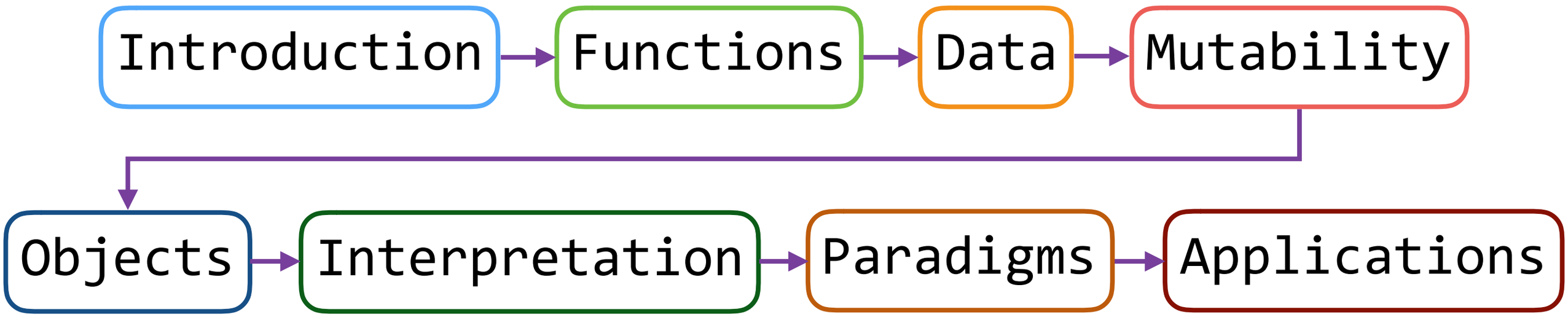

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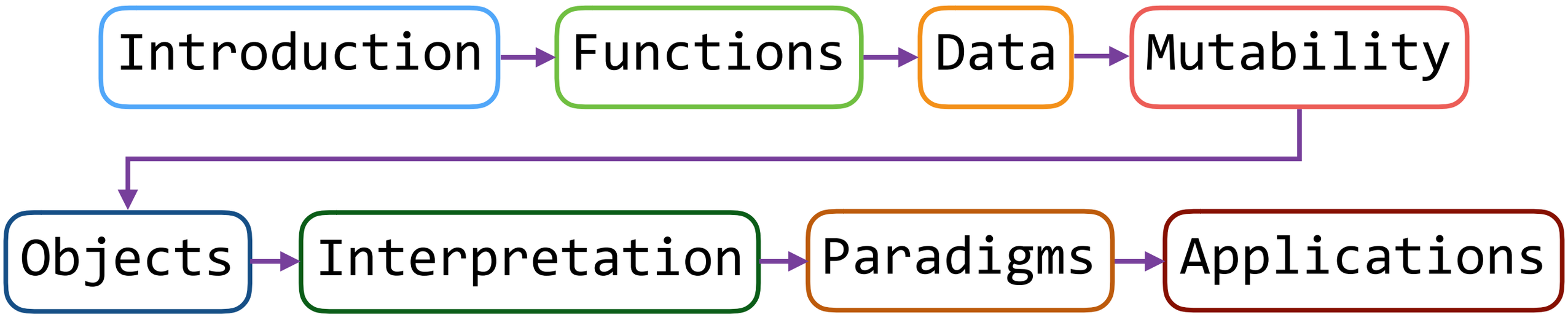

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  - To learn the fundamentals of programming
  - To become comfortable with Python

What’s in a program?

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What's in a program? (demo)

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Mathematical expressions

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$$x + y$$

Mathematical expressions

$$\frac{x}{y}$$

$$x + y$$

Mathematical expressions

$$\sqrt{x}$$

$$\frac{x}{y}$$

$$x + y$$

Mathematical expressions

$$\sin x$$

$$\sqrt{x}$$

$$\frac{x}{y}$$

$$x + y$$

Mathematical expressions

$$sgn(x)$$

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Mathematical expressions

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$$\frac{x}{y} \qquad |x| \qquad x + y$$

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Mathematical expressions

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Mathematical expressions

$$\lim_{x \to \infty} \frac{1}{x}$$

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Mathematical expressions

$$\lim_{x \to \infty} \frac{1}{x} \qquad sgn(x) \qquad \sin x$$

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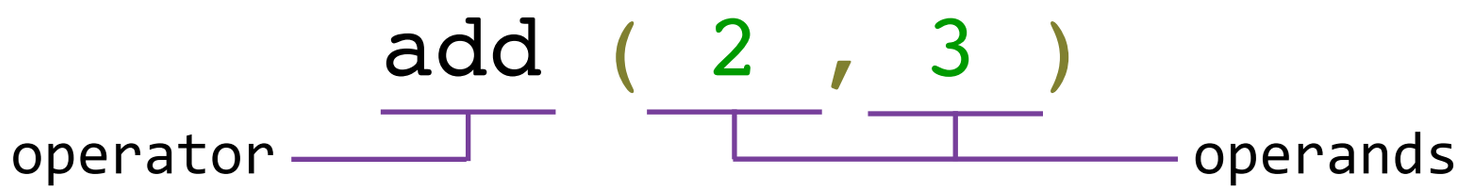
Call expressions

Call expressions

```
add ( 2 , 3 )
```

Call expressions

Call expressions



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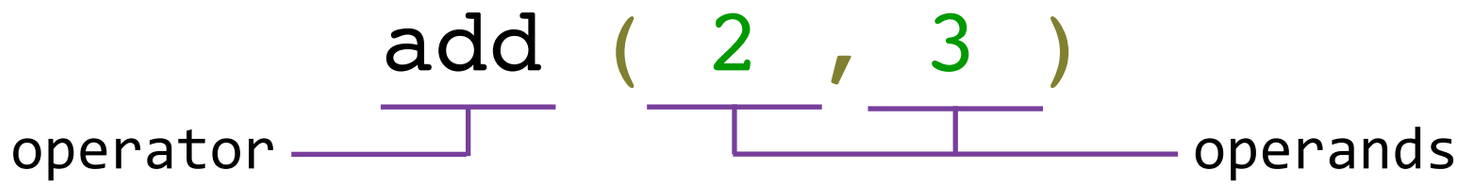

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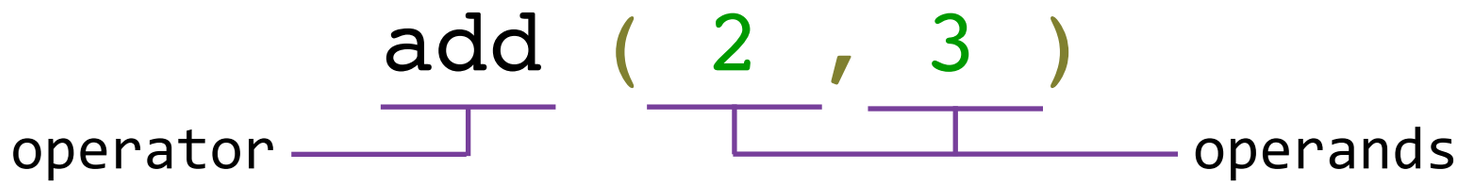
Call expressions



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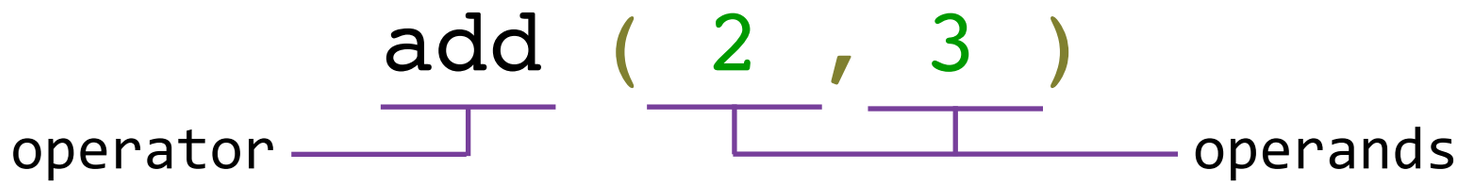

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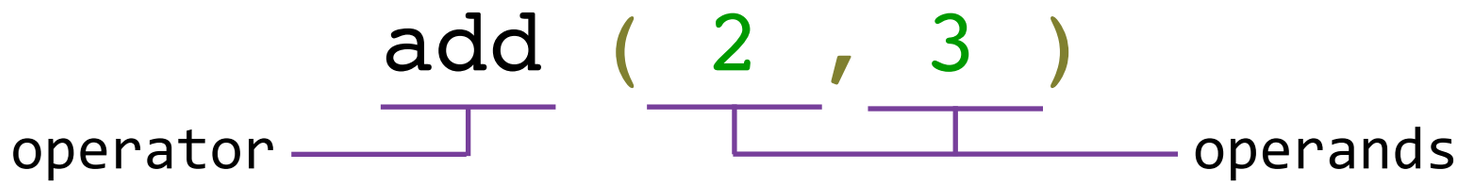
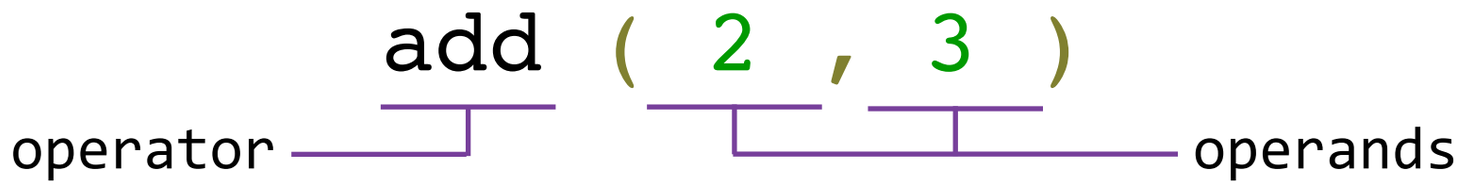
  1. *Evaluate* the operator to get a function

Call expressions



- In a call expression, the operator and operands themselves are expressions
- To evaluate this call expression:
  1. *Evaluate* the operator to get a function
  2. *Evaluate* the operands to get its values

Call expressions



- In a call expression, the operator and operands themselves are expressions
- To evaluate this call expression:
  1. *Evaluate* the operator to get a function
  2. *Evaluate* the operands to get its values
  3. *Apply* the function to the values of the operands to get the final value

Nested call expressions

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```
add(add(2, mul(4, 6)), mul(3, 5))
```

Nested call expressions

```
add(add(2, mul(4, 6)), mul(3, 5))
```

- What does this call expression evaluate to?

Nested call expressions

```
add(add(2, mul(4, 6)), mul(3, 5))
```

- What does this call expression evaluate to?

- What are the steps that the Python interpreter goes through to evaluate this expression?

The Power of Python

Shakespeare demo!