

Preparing for and Teaching Kira's High School Course



Housekeeping Items

REC ●

Webinar is recorded



Slides available along with the recording



Enter your questions in the Q&A box

Watching On Demand, and have questions?



tn@kira-learning.com for platform/course

ashe@battelle.org for anything else

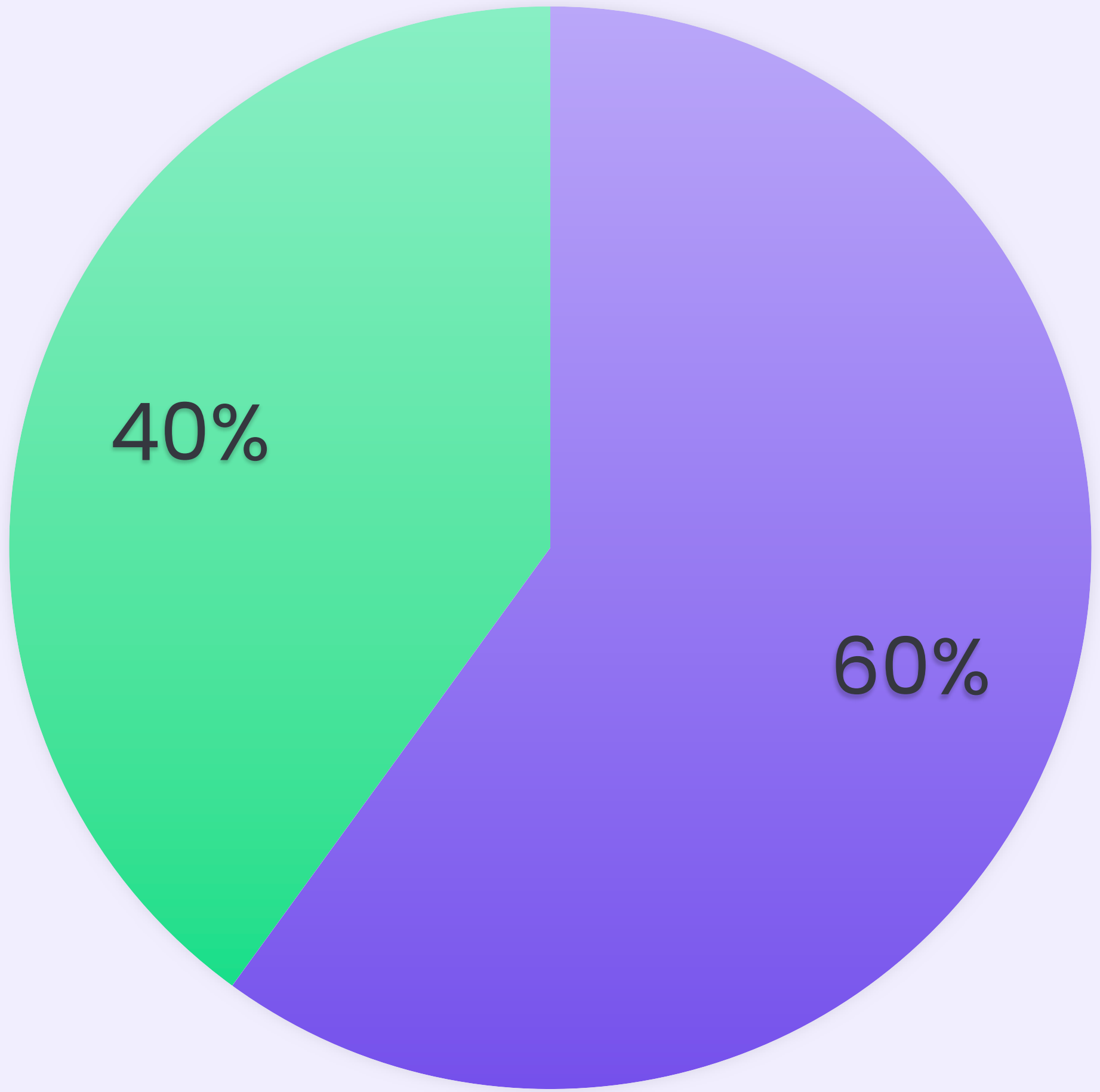


Douglas Kiang, Menlo School

- ❖ Started teaching kindergarten in 1991
- ❖ Currently teach AP CSP, and App Design with Swift
- ❖ Working with Kira on CSP course since 2022
- ❖ Moved from Hawaii to Bay Area, 2020
- ❖ AP CS Principles Development Committee

● Male ● Female

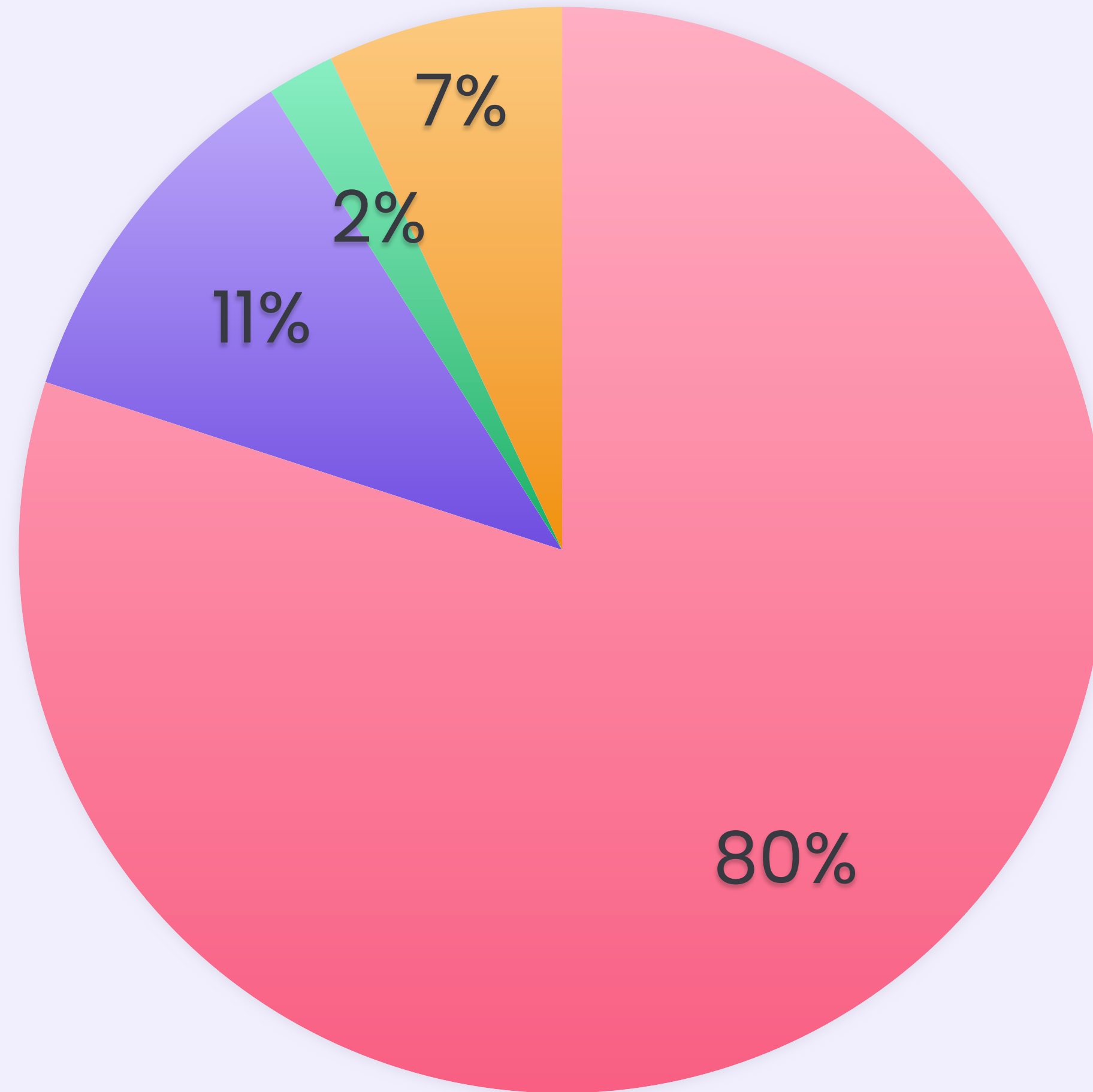
Gender



AP CSP 22-23 (83 students)

● 9 ● 10 ● 11 ● 12

Grade



AP CSP 22-23 (83 students)

belonging in cs

model lesson

teaching tips

belonging in cs

model lesson

teaching tips

WELCOME!

you belong here

PLEASE
DO NOT ERASE
FAVOR DE
NO BORRAR

I am smart.

I am resourceful.

I belong here.

You are smart.

You are resourceful.


You belong here.

Foster a **growth mindset**

We found that students' interpretations were **influenced** by experiences in their environments and beliefs about **ability** as being **fixed** or **malleable**.

Foster a growth mindset



how I got better
at debugging

Julia Evans
@b0rk 

Remember the bug is happening
for a logical reason

It's never magic. Really. Even when it makes no sense.


Be confident I can fix it

before:  "maybe this is too hard" now  "well I've fixed a lot of hard bugs before"

Talk to my coworkers

know my debugging toolkit.

before  "I want to know \$THING but idk how to find out" now  "I know! I'll use topdump!"

most importantly ; I learned to like it more

before  "oh no a bug" now  "I think I'm about to learn something" facial expression:

How To be a Wizard
Programmer

* takes a
very long
time !!

who can do anything *

① ASK QUESTIONS. As long as there are people around you who know things you don't, ask them how to do things. Dumb questions. Scary-to-ask questions. Your questions will get less dumb fast.




② Run into problems your coworkers don't know the answer to.

③ DECIDE JUST BECAUSE OTHER PEOPLE DON'T KNOW A THING IT DOESN'T MEAN YOU CAN'T FIGURE OUT HOW TO DO THE THING ANYWAY *

this is very hard and sometimes requires knowing unknown unknowns. But sometimes it works.

The more programming I do, the more things I run into where

- I don't know
- Google doesn't know
- my colleagues don't know
- we gotta do it anyway

When this happens, I think "Right, this is why they pay a human with a brain who can investigate and learn"   
!! !! !! !!

by: Julia Evans
@b0rk
jvns.ca

how I got better at debugging

Julia Evans
@b0rk



- Remember the bug is happening for a logical reason

It's never magic. Really. Even when it makes no sense.

- Be confident I can fix it

before:



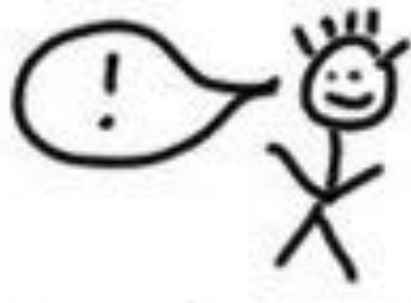
maybe this is too hard

now

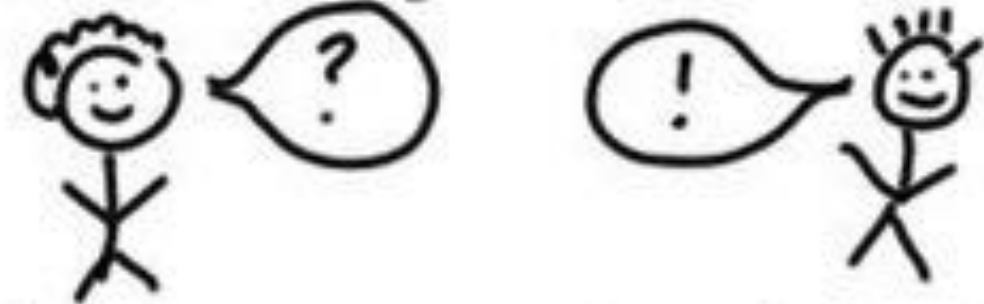


well I've fixed a lot of hard bugs before

- Talk to my coworkers



Talk to my coworkers



before

know my debugging toolkit.

now

before



I want to know \$THING but idk how to find out



I know!
I'll use tcpdump!

most importantly ; I learned to like it more

before



oh no
a bug

now



facial expression:
determination

I think I'm about to learn something

Introduction to Fundamentals of Computer Science in Python *

Format and Learning Targets

Target Learners

High school students with no prior coding background

Learning Outcomes

- Computer science fundamentals
- Python programming
- Data analysis, processing, and visualization techniques
- AI Applications + Ethics

Course Format

- ~150 hours, 1 year
- 9 units, 3 projects, Midterm + Final exams
- Each unit consists of:
 - 3-5 lessons
 - Each lesson consists of:
 - Video instruction
 - Practice activities (coding, reflection, and multiple choice)
 - Lesson Assessment
- Each unit ends with a unit assessment

Introduction to Fundamentals of Computer Science in Python

Course Overview

Course Outline

Unit 1 Fundamentals of Communicating with a Computer

Unit 2 Decision Making & If-Else Statements

Unit 3 Functions & Libraries

Unit 4 Representing Data with Lists & Tuples

Unit 5 Repetition & Iteration with Loops

Unit 6 Representing Data with Dictionaries

Unit 7 Building a Custom Data Type with Classes

Unit 8 Data Analysis and File Systems

Unit 9 Data Visualization

Projects

Mini Project 1 (Units 1-3)

Implement a Game

Mini Project 2 (Units 1-6)

Song or Poem Generation

Final Project 2 (Units 1-9)

Movie Recommendation &
Data Analysis / Visualization

Part 1: Processing & Understanding the Data

Part 2: Exploring and Visualizing Data

Part 3: Making a Recommendation

Course at a Glance

Mapped to CSTA, AP CSP, and
Tennessee CS Standards

4–6 lessons per module

Designed for beginners

150 hours of content



Lesson Structure



Do Nows

Unplugged Activities

Concepts



Platform

Learning with Kira

Concepts
Skills
Application



Project

Show what you know

Application

My CS classes are 45 minutes and meet every other day

Do Now Unplugged

10 min.

Kira Learning

35 min.

Lesson Assessment

35 min.

Review

10 min.

Lesson Structure

Do Now (Unplugged Activity)

Complete Lesson Steps

Watch video / Do Activity

Watch video / Do Activity

Watch video / Do Activity

...

Final Assessments

Review Answers / Check for Understanding

Lesson Steps

The lesson is broken up into **short 5–10 minute steps**. The steps in this lesson consist of instructional videos, practice activities, and assessments. We have grouped steps together into **two parts**:

Lesson Part A (35 min.)	Warmup	Do Now, Overview
	Step 1	Introduction
	Step 2	If Else Statements
	Step 3	Decision Trees
	Step 4	Your Turn!
Lesson Part B (40 min.)	Steps 5–7	Lesson Assessment
	Wrap-up	Reflections and Review

Lesson Plan – TEACHER ONLY

The attached lesson plan will only be visible to the teacher.



Lesson Plan - 1.2 Communicating with a Computer.pdf

pdf

[Download](#)

[Preview](#)

The attached lesson notes will only be visible to the teacher.



Unit 1 Lesson 2 Notes.pdf

pdf

[Download](#)

[Preview](#)

The attached guided notes will only be visible to the teacher.



Guided Notes 1.2.pdf

pdf

[Download](#)

[Preview](#)

Unit 1 Lesson 3

Data Types

Data in computer programs can be classified into different types. Two common data types are strings and integers.

Strings:

- Strings are sequences of characters, including letters, numbers, and symbols, enclosed in quotes.
- Used for representing text or any combination of characters.
- Example: "Hello, hello there."

Integers:

- Integers are whole numbers without decimals.
- Used for mathematical operations.
- Example: 42

Combining Data Types:

- You can combine strings with strings and integers with integers using the plus sign (+).

Step 2: Strings and Integers

_____ was the year the first woman went to space.

As long as it's surrounded by quotes the computer interprets it as a _____.

An integer is a datatype you can do _____ with.

You can't do math with _____.

A phone number should be stored as a _____ because you don't need to do math with it.

1963 was the year the first woman went to space.

As long as it's surrounded by quotes the computer interprets it as a **String**.

An integer is a datatype you can do **math** with.

You can't do math with **Strings**.

A phone number should be stored as a **String** because you don't need to do math with it.

belonging in cs

model lesson

teaching tips

Lesson Structure

→ Do Now (Unplugged Activity)

Complete Lesson Steps

Watch video / Do Activity

Watch video / Do Activity

Watch video / Do Activity

...

Final Assessments

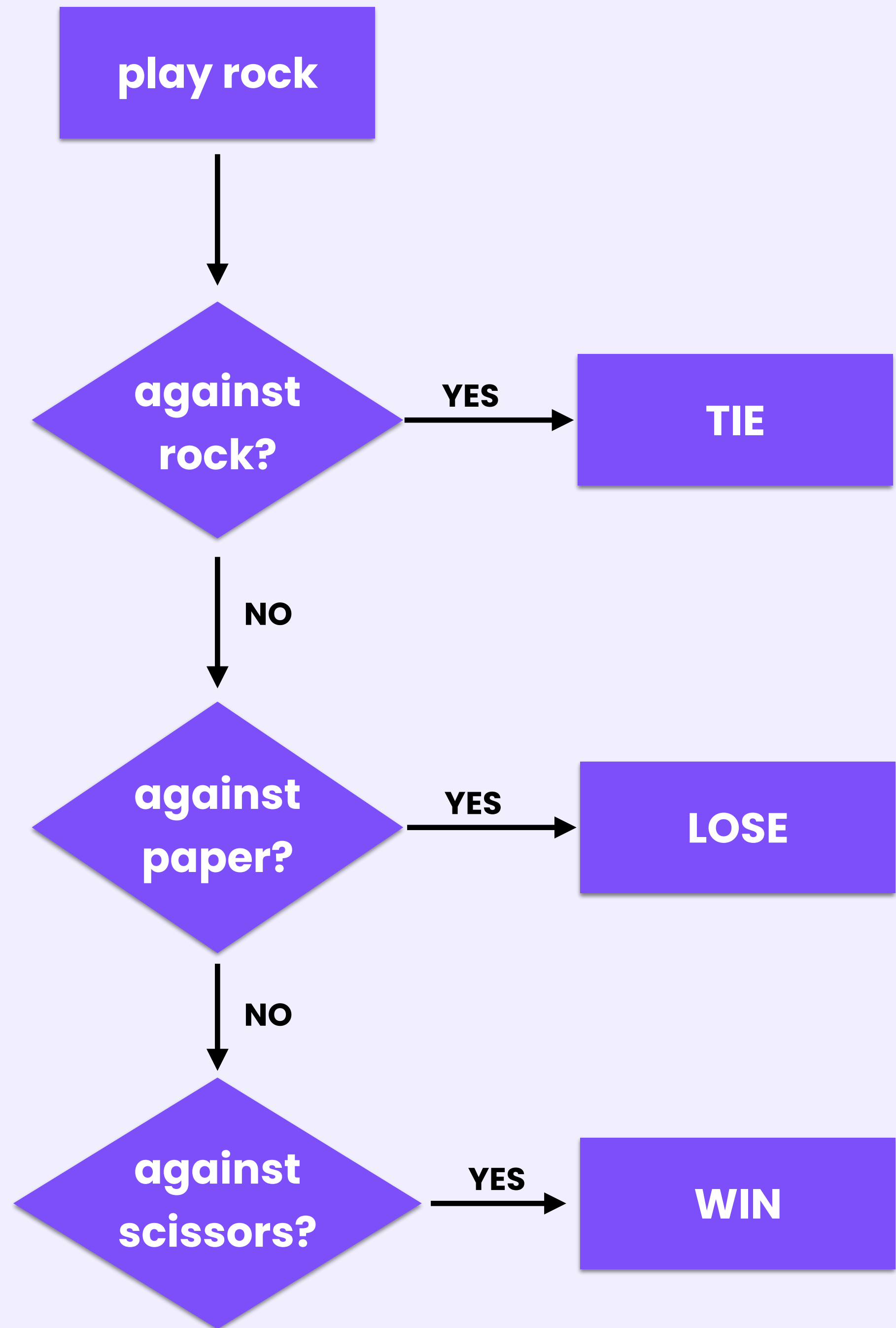
Review Answers / Check for Understanding

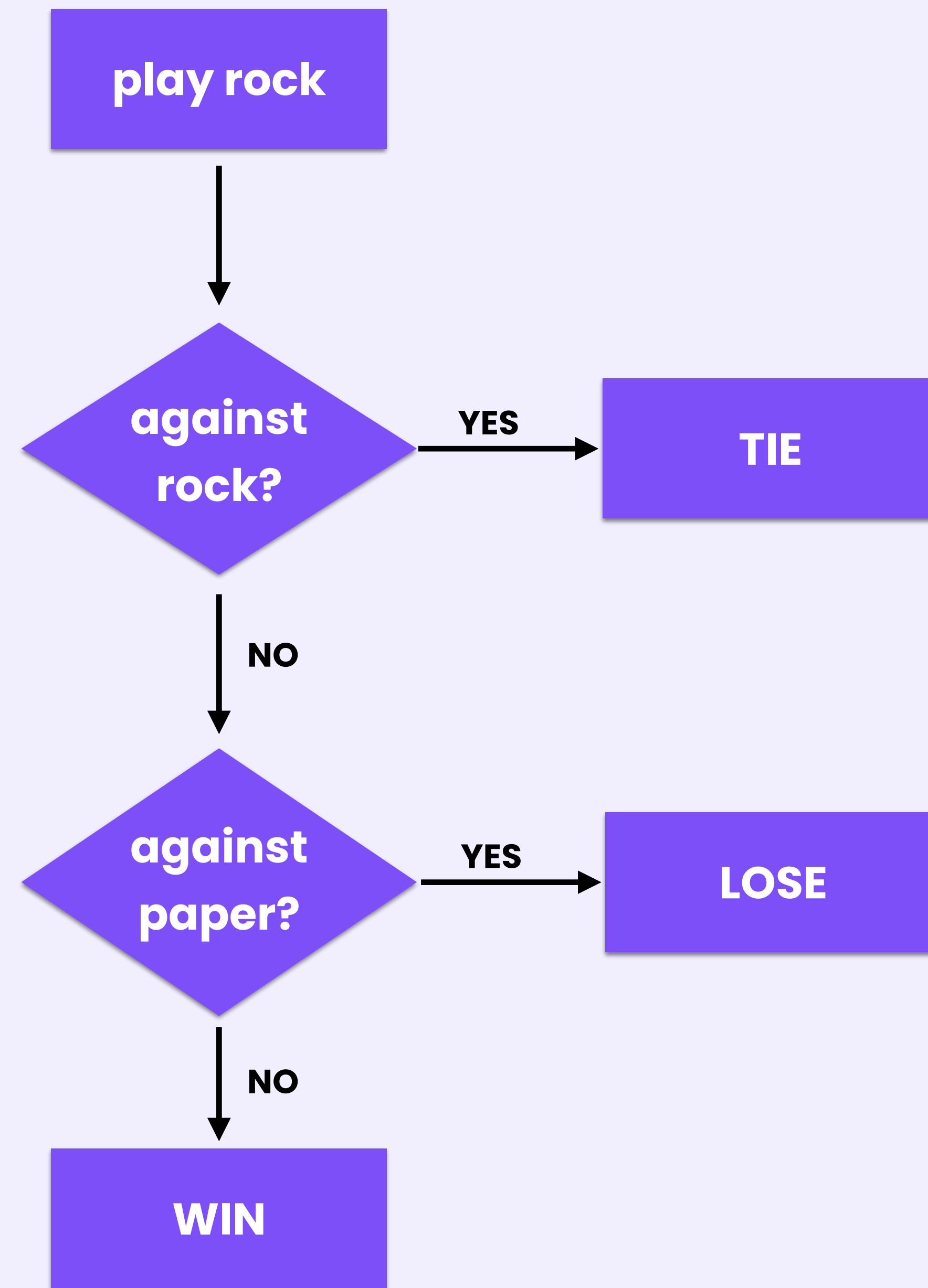
What are the rules?

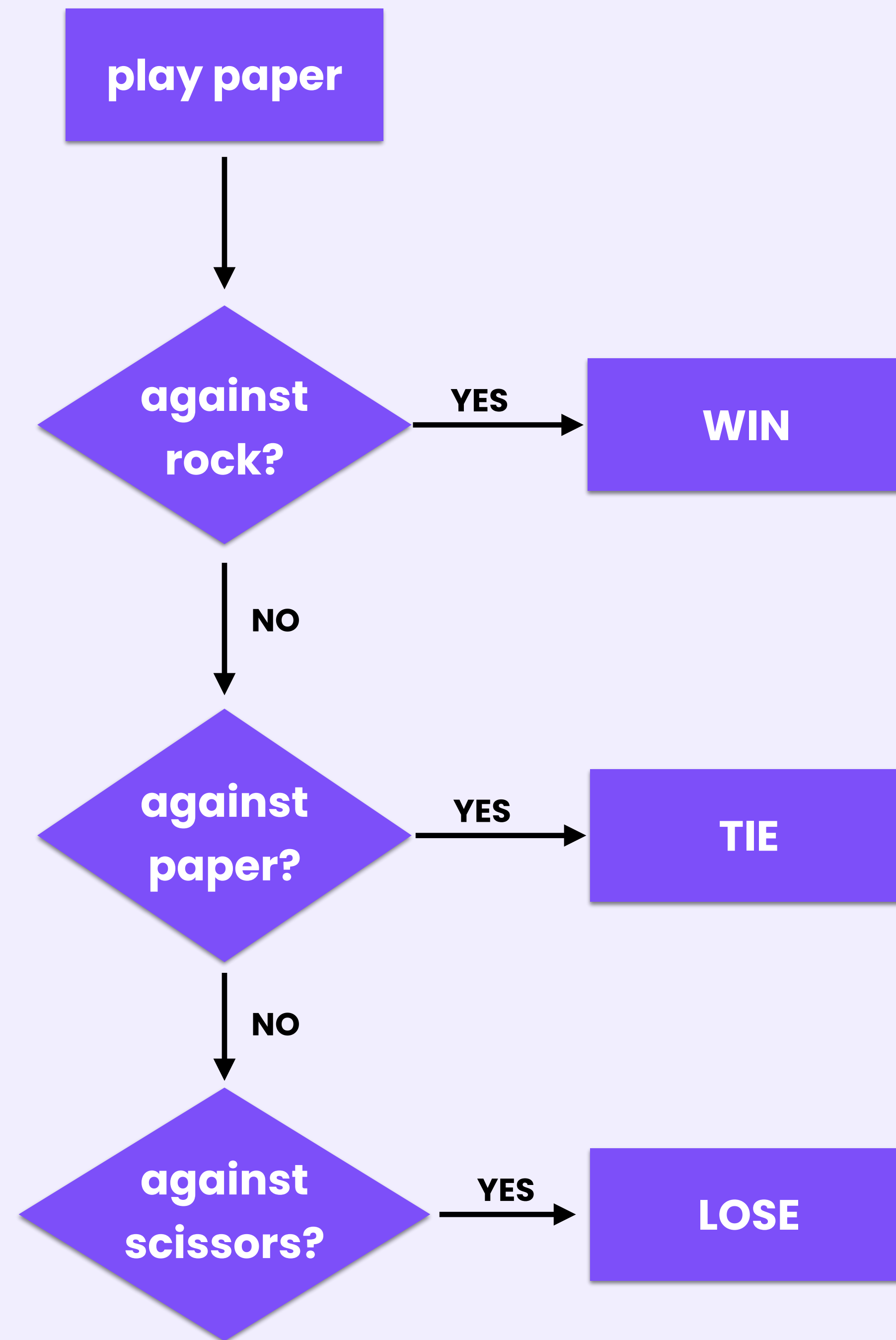
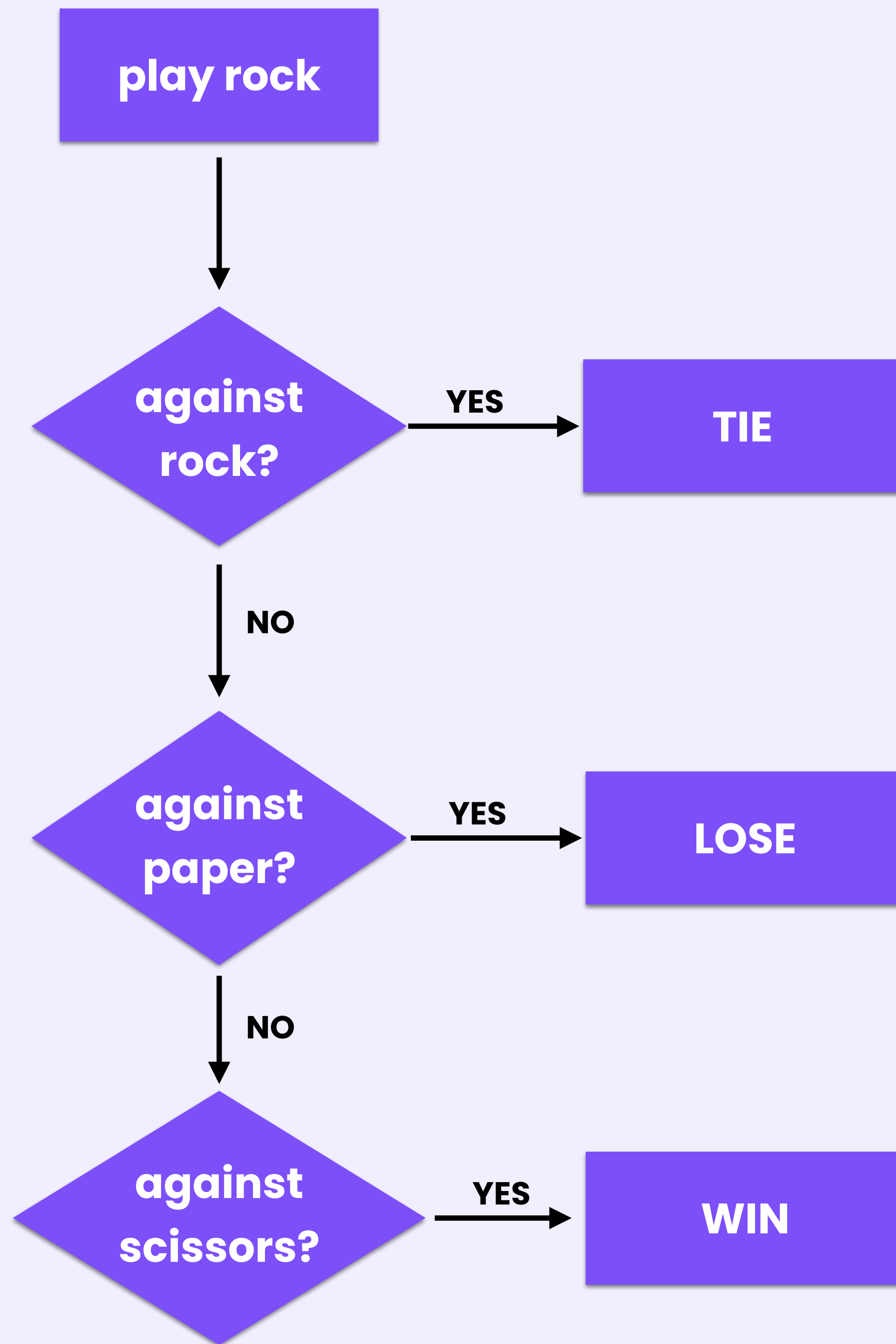
Rock Paper Scissors

Simon Says

(Simple) game of your choice







if opponent's move is rock

then we tie

if opponent_move is "paper"

then we lose

if opponent_move == "scissors"

then we win

Lesson Structure

Do Now (Unplugged Activity)



Complete Lesson Steps

Watch video / Do Activity

Watch video / Do Activity

Watch video / Do Activity

...

Final Assessments

Review Answers / Check for Understanding

Section 2: Activity

(25 min.)

Estimated times may vary based on individual students and whether they are working together. The estimated difficulty is relative to the other activities in the lesson.

Step	Activity	Estimated time	Relative difficulty
1. Introduction	Reflection	5 min.	★
2. If Else Statements	Coding- Fix the error	3 min.	★
3. Decision Trees	Coding- Add else	7 min.	★
4. Your Turn!	Coding- Fix the errors	10 min.	★★

Module 2

Unit 2: Decision-Making with ...

Lesson 1

If Statements and Ope...

Lesson 2

Decision Trees and Flo...

Lesson Plan - ...

Introduction

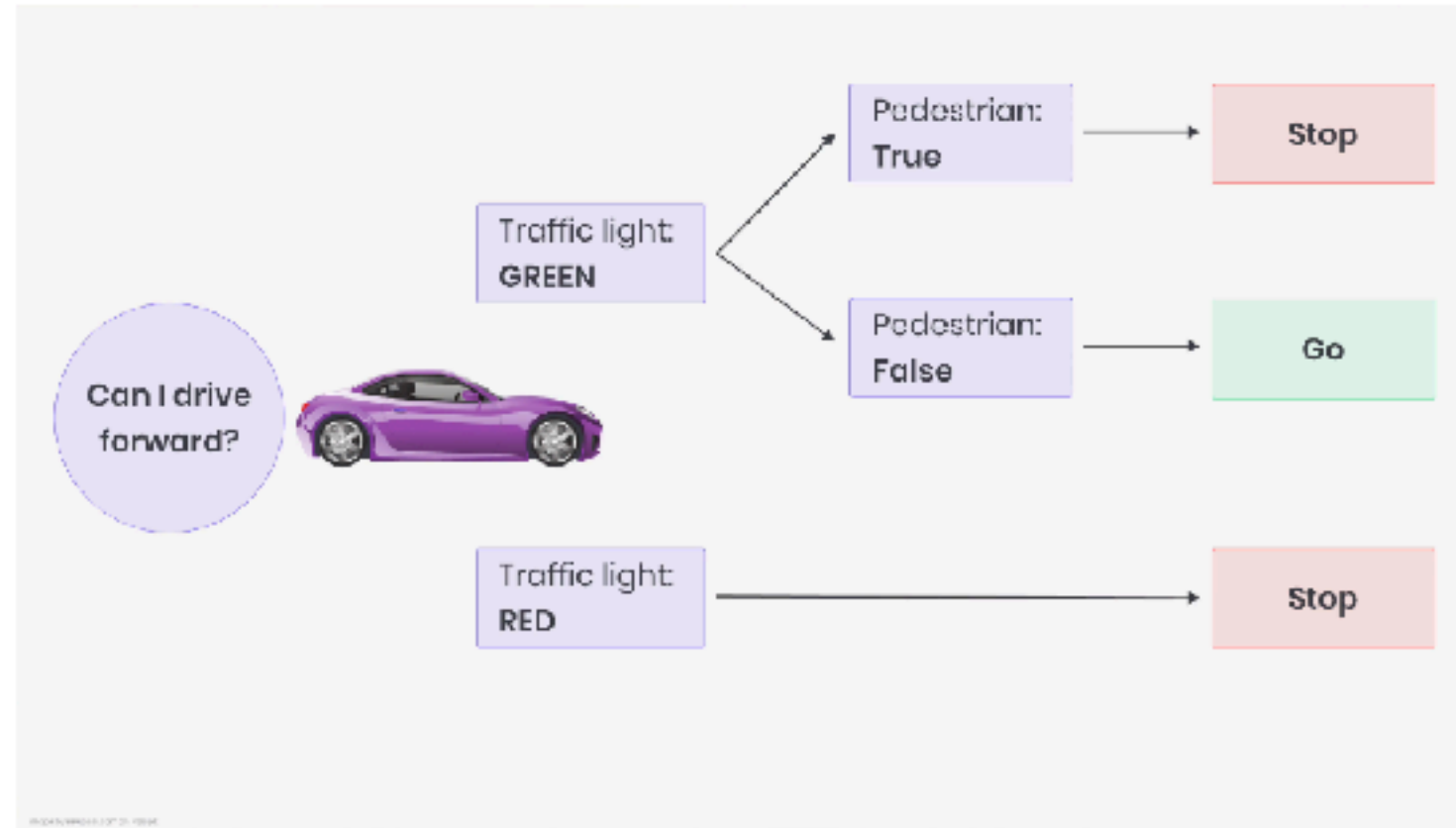
If-Else Statements

Decision Trees

Your Turn!

Lesson Assessment...

Lesson Assessment...



Your Task: Write an else statement to print the alternative outcome: "The game is not over!"

```
1 dice_roll = 4
2
3 if (dice_roll == 6):
4     print("It's game over!")
5 # write your else statement below
6
7
```



Demo

Lesson Structure

Do Now (Unplugged Activity)

Complete Lesson Steps

Watch video / Do Activity

Watch video / Do Activity

Watch video / Do Activity

...

Final Assessments



Review Answers / Check for Understanding

Part 4: Lesson Assessment Solution Reference

The reference solutions and explanations below are for **Unit 2 Lesson 3: Elif Statements**. Consider selecting a subset to review together with the students before moving onto lesson reflections, if any.

Lesson Assessment Part 1

Q1: Which of the following changes will NOT affect the results when the code segment is executed?

```
if a == 0: # Line 1
    b = a + 10 # Line 2
else: # Line 3
    b = a + 20 # Line 4
```

A: Changing line 2 to `b = 10`


```
print("Car has stopped")
elif current_speed > speed_limit:
    print("Slow Down")
elif current_speed <= speed_limit:
    print("You may speed up")
else:
    print("Continue")
```

A: "Slow Down"

Q3: The code snippet below is supposed to notify drivers of changing stop lights on the road. light is a variable that holds a string. All of the following values of light will cause the program to print "Go" EXCEPT:

```
if light == "red":
    print("Stop")
elif light == "yellow":
    print("Slow down.")
else:
    print("Go")
```

A: "red"

Hide Navigation

Getting Started

View rubric

Step 2 pts

lesson 2pts

Next >

Module 5
Miniproject 1:
Sticks

Lesson 1
Let's play sticks!

Getting Started

How do you play?

Some game play...

Lesson 2
Building your first bot!

Lesson 3
Build a Troublesome B...

Lesson 4
Built a Surprising Bot!



Let's Begin!

In this mini-project, we'll be playing a popular childhood number game called sticks. Except instead of using our hands, we'll be using computers!



In this mini-project, **you will be implementing your own sticks player.**

Grades 0 /12

Code editor

1

2

Code output

[Hide Navigation](#)

How do you play?

lesson 2pts

[Next >](#)

Module 5

Miniproject 1:
Sticks

Lesson 1

Let's play sticks![Getting Started](#)[How do you play?](#)[Some game play...](#)

Lesson 2

Building your first bot!

Lesson 3

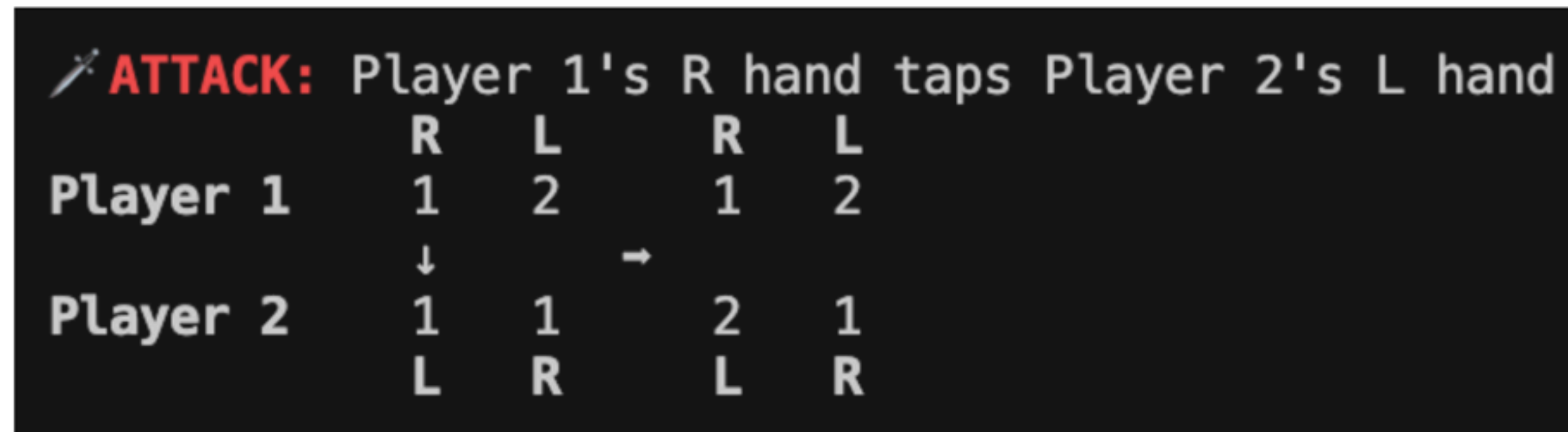
Build a Troublesome B...

Lesson 4

Built a Surprising Bot!

Attack

- If the player chooses to attack, they tap one of the opponent's hands with their own hand.
- For example, if Player 1 has one stick on their right hand and chooses to tap Player 2's left hand with one stick, Player 2 adds one stick to their hand - ending with 2 sticks on their left hand. Thus, Player 1's Right Hand Attack on Player 2's Left Hand looks like this:



Split

- If the player chooses to split, there is no damage incurred to the opponent. Instead, the player transfers sticks from one hand to another. For example, if Player 1 with 0 sticks on their right hand and 2 sticks on their left hand chooses to split, they can split to 1 stick on each hand, as shown below.
- The player can split their sticks in almost any configuration, as long as there is a change in the number of sticks on each hand after the transfer.
- A player cannot switch the number of fingers on each hand (ex. left hand has 2 fingers, right hand has 1 finger --> left hand has 1 finger, right hand has 2 fingers).

Hide Navigation

Some game play vocab

lesson 2pts



Next

Module 5

Miniproject 1:
Sticks

Lesson 1

Let's play sticks!

Getting Started

How do you play?

Some game play...

Lesson 2

Building your first bot!

Lesson 3

Build a Troublesome B...

Lesson 4

Built a Surprising Bot!

For example, at the very beginning of any sticks game, we can write the game state as the following:

	///	///	///	START GAME	///	///	///
		R		L			
Player 1		1		1			
Player 2		1		1			
		L		R			

If the first move is Player 1's left hand attacking Player 2's left hand, the following game state can be written as:

	⚔	ATTACK:	Player 1's L hand taps Player 2's L hand				
		R		L		R	L
Player 1		1		1		1	1
Player 2		1	↙	1	→	2	1
		L		R		L	R

Build a bot: 'Ol Faithful

[View rubric](#)

Step 2 pts

lesson 9pts



[Next](#)

Module 5

Miniproject 1:
Sticks

Lesson 1

Let's play sticks!

Lesson 2

Building your first bot!

Build a bot: The...

Build a bot: 'Ol...

Build a bot: Practice...

Build a bot: Ol'...

Build a bot: Practice...

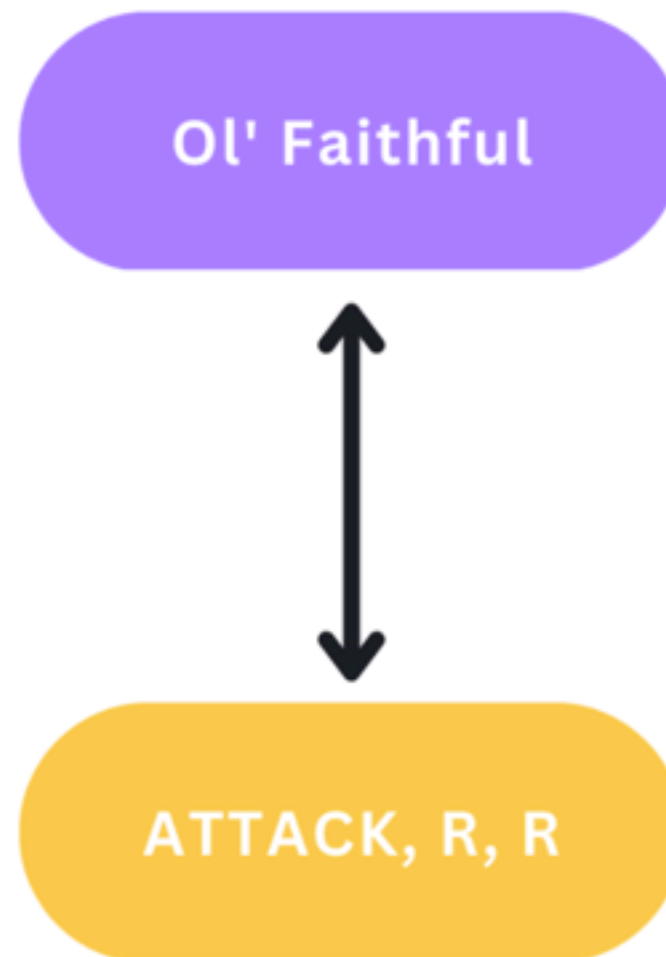
Build a bot: Play a...

Lesson 3

Build a Troublesome B...

Let's build our first simple bot together to get started.

Ol' Faithful is a sticks-playing bot that returns the same move as much as possible.



For no particular reason, let's make Ol' Faithful always

Grades 0 / 12

Code editor

Hints

```
1 def ol_faithful(your_right, your_left,
2   opp_right, opp_left):
3   # FILL IN YOUR CODE HERE
4   # return an ATTACK with your RIGHT
5   # hand, to your opponent's RIGHT
6   # hand
7   return "", "", ""
```

Code output



Return to Dashb

Build

Module 5
Miniproject
Sticks

Lesson 1
Let's play st

Lesson 2
Building you

Build a b

Build a b

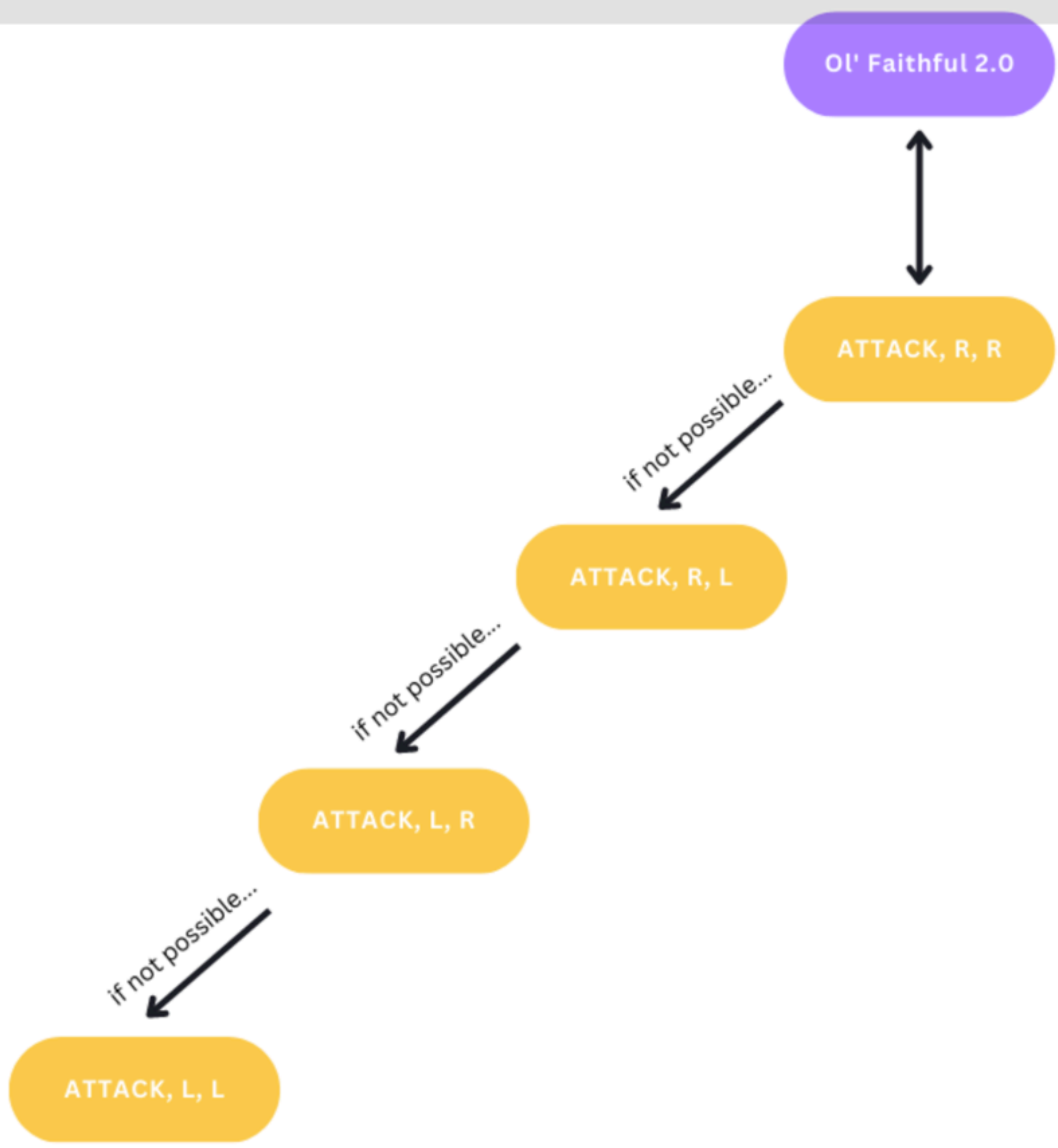
Build a b

Build a b

Build a b

Build a b

Lesson 3
Build a Trou



Roster

Next >

Hints

```
our_left,  
k ""  
h your  
s right
```

CK with
nent's

Legal

Boolean Values

Step 1/1 pt

lesson 9 / 16 pts



Next >

Module 1

Unit 1: The Fundamentals ...



Module 2

Unit 2: Decision-...



Lesson 1

If Statements and Ope...

Welcome to Unit 2!

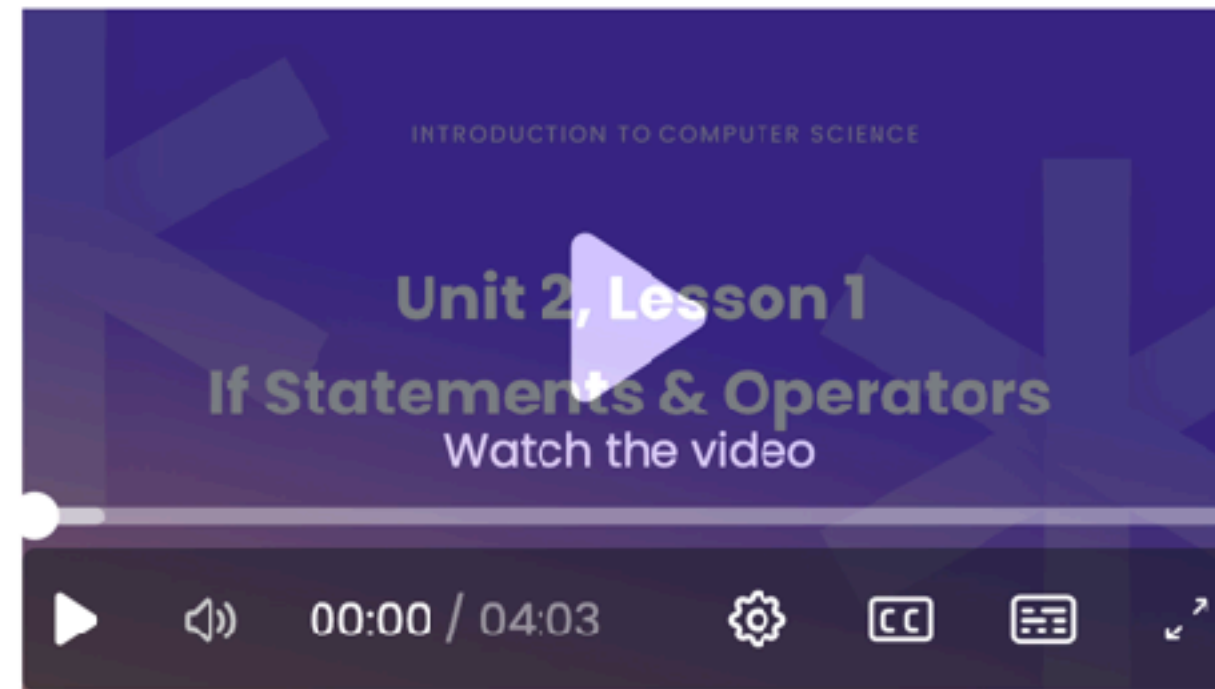
Introduction

Conditions to Make...

Boolean Values

Comparison...

Your Turn!



Gassy Decisions!

There is a logic bug in the code! We want the code to print the following:

"You need more gas!"

if the gas is below 5 gallons.

Your task: Can you figure what is wrong with the code and fix it?

Code editor

Feedback

Hints

```

1 # gas in
2 gas = 3
3
4 if gas < 5:
5     print(f"You need more gas!")
6

```

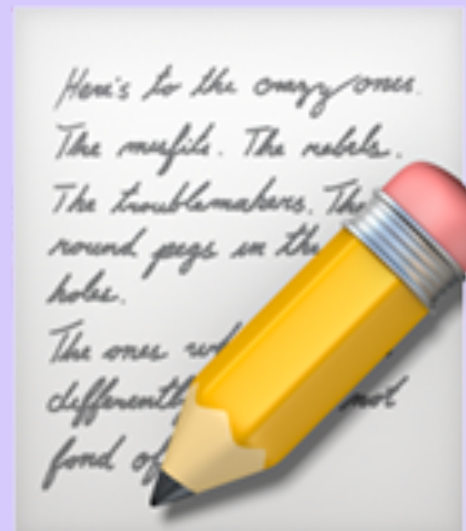
Your feedback is there! The teacher has reviewed your work.

OK

Code output

You need more gas!

Some Thoughts About the Create Task



The score comes mostly
from the writeup



Start early and get it out
of the way



Apply to be a Reader

AP CSP Create Performance Task

Requirements:

- 12 hours in-class time
 - Video
 - Written responses
 - Code segments
-
- Input and output
 - List or collection
 - Procedure with parameter(s)

Create Task Rubric

Row 1

Video showing app's **input, functionality,** and **output.**

Writeup describes app's **input, functionality,** and **output**

Row 2

Shows how data is **stored and used in a list** and what data **represents**

Row 3

Explanation of how list **manages complexity**

Row 4

Shows and describes use of a **procedure** with a **parameter**

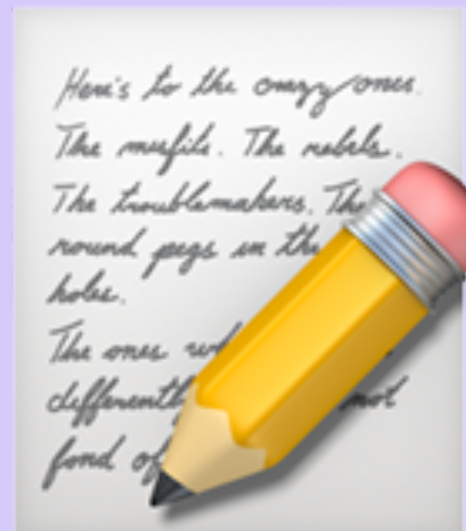
Row 5

Shows student-developed algorithm with **sequencing, selection,** and **iteration;**
describes **how** it works

Row 6

Describes **two** different **calls** to procedure, **conditions,** and **results**

Some Thoughts About the Create Task



The score comes mostly
from the writeup



Start early and get it out
of the way



Apply to be a Reader

belonging in cs

model lesson

teaching tips

Tardies / Lates

Tardy



Turned in by next school day
Automatic extension
3 per semester / don't stack

Late



Turned in by next week
Must check-in face-to-face
3 per semester / don't stack


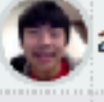


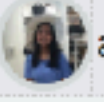
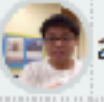
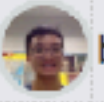
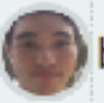
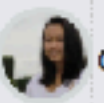

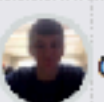
-  Account
-  Admin
-  Dashboard
-  Courses
-  Groups
-  Calendar
-  Inbox 17
-  Help

AP Comp Sci Fall > Grades

Individual View Showing All Sections ▾

Filter by student name or secondary ID

Import Export ⚙

St..	Se..	3.3 - Fifteen (Part 3) Out of 20	3.5 - Analyze This Out of 14	Tardies Out of 3	Lates Out of 3	Q1 Quiz Out of 20	Q1 Test Out of 10	Submit Topic Choices Out of 10	Turn i
	achek		-	3	3	20	9	T	
	anaga			4	3	20	10	T	
	asane		-	4	1	17	9	10	
	ayour		-	2	3	19	9	10	
	bqua		-	3	3	19	10	10	
	bwils		-	3	3	18	10	10	
	chuar		-	5	3	19	10	T	
	cloug		-	4	3	20	10	T	
	clove		-	1	3	20	10	-	

St...	Se...	✍ 3.3 - Fifteen (Part 3) Out of 20	✍ 3.5 - Analyze This Out of 14	Tardies Out of 3	Lates Out of 3	Q1 Quiz Out of 20	Q1 Test Out of 10	✍ Submit Topic Choices Out of 10	Turr
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	bquac		-	3	3	19	10	10	
	bwilse		-	3	3	18	10	10	
	chuar		-	5	3	19	10	T	
	cloug		-	4	3	20	10	T	
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Sample Independent Project Prompt

“Show what you know”

Something **Old**

Sample Independent Project Prompt

**“Learn something on
your own”**

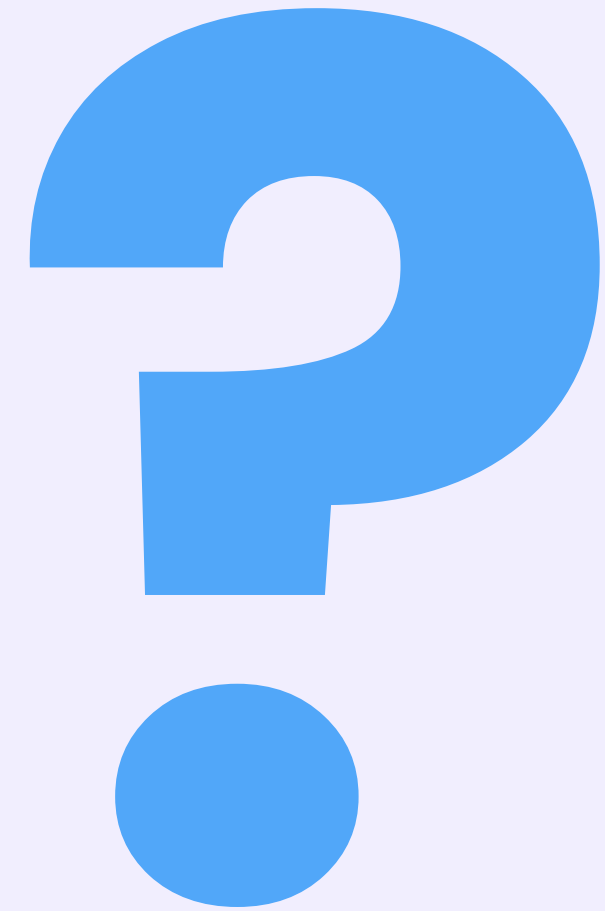
Something **New**

Sample Independent Project Prompt

```
1  
2 import math  
3 import random  
4 import seaborn  
5 import matplotlib  
6  
7 def main():
```

Something **Borrowed**

Sample Independent Project Prompt



Something **Blue**

Independent Project Work

- ❖ Team and Personal Goals
- ❖ Conferences
- ❖ Work Logs (3x per week; no lates)
- ❖ Record of Thinking (1x per week)
- ❖ Final Narrative



Work Log

App Working Title:

Icon


Brief Description:

Screen shots


WL#	Date	Minutes	Did Stuff
	sample	45	Worked on & finished exercise 18 (took roughly 45 min). Finished exercise, resolved unknown problem with UIButton object by simply re-creating it. Error remains unknown.
	sample	120	Worked through Wenderlich Tutorial on SwiftUI https://www.raywenderlich.com/28797163-your-first-ios-swiftui-app-an-app-from-scratch
1	3/27	90	Completed Part 3 and worked through all of Part 4 of PersonalityQuiz, should finish next class



2	3/29	30	(3/28) Completed PersonalityQuiz (3/29) No work due to being sick
3	3/31	0	No work due to being sick
4	4/3	30	No work in class (milkshake day) Read through Apple's AVAudioRecorder documentation
5	4/5	70	Worked on placeholder views
6	4/7	100	(4/5, 30 mins) Finished reading through Apple's AVAudioRecorder documentation , and started reading through the AVAudioSession documentation . Also found some posts on stack overflow that I may be able to use as a reference when I start coding my app. (4/7, 25 mins) Finished reading the AVAudioSession documentation. I will spend some time during break figuring out how exactly I want to implement AVAudioSession and AVAudioRecorder. (10 mins) Read through parts of the UserDefaults documentation that apply for <u>Bools</u> (if I use UserDefaults, it will be to save settings) (35 mins) Researched the Codable Protocol, following this tutorial to get a better understanding.
			Break

 **Douglas Kiang**
11:26 AM Mar 31

Yay! You can show it to me when you are back.

 **Douglas Kiang**
12:40 PM Apr 7

Your work logs are too short.

 **Douglas Kiang**
11:56 AM Apr 8

This work log is very good.

8	4/19	0	No work due to being sick (I will work more outside of school to make up this time)
9	4/21	0	No work due to being sick (I will work more outside of school to make up this time)
10	4/25	90	(40 mins) Completed the startRecording function, which initializes the Audio Recorder and stops recording instantly if it fails to initialize the recorder. (50 mins) Worked on getting the recording to work and updating the time shown to the average after an interval. Current issues are labels not updating and time being minimum.
11	4/27	30	Missed class due to having an appointment, but looked on the app developer forums for a solution to the issues. I wasn't able to find anything unfortunately, but I will continue looking tomorrow.
12	4/28	60	(15 mins) Fixed the recording UI; the labels now update properly when recording starts. (15 mins) FINALLY got the sound to record and update properly. Now working on adjusting levels to ones we understand. (10 mins) Adjusted power levels to decibel amounts that we would use. (20 mins) Worked on stopRecording, now it stops recording when



Douglas Kiang

5:36 PM Apr 20



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Step 0 pt

lesson 5pts



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Let's Share Out

Work Log #1

*** No Tardies or Lates on Work Logs ***

Please fill out a work log on the right. Be brief. Please list:

What you worked on, Date when you worked on it, and how much time you worked on it.

Examples of Work Log entries:

3/27: 1hr. Worked on Part 4 of Personality Quiz, Models and Outlets. Added data model. Updated buttons with label text.

5/21 1 hr. Working on graphics based off of sudoku code.

- Completed the dots and title graphics

- Adjusted coordinate input format because program wouldn't compile.

Written Reflection

! Written Reflection

1.

ungraded

Worked on & finished exercise 18 (took roughly 45 min). Finished exercise, resolved unknown problem with object by simply re-creating it. Error remains unknown. 15 min. Checked in with Mr. Kiang to ask a question about views.

2.

ungraded

Write your answer here

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Record of Thinking #2

Look back over your last three work logs to remind yourself of the work you have done on your project so far. Then, write a 150 - 200 word report on the progress of your thinking about this project.

We are about to go on break.

How are you feeling about the project so far? Optimistic? Worried? Inspired? Anxious? Why?

Written Reflection

! Written Reflection

1.

So far, I am feeling pretty optimistic about my project. At the beginning of the week, I thought that after having missed the majority of last week, and because of the large amount of research I needed to do, that I would end up having to turn some of my main goals into stretch goals, but now that I have actually done most of my research, the project looks much more doable. There is some very good documentation on most of what I

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Final Narrative

- Tell the story of your final project and your progress toward your goals
- Read through all of your Record of Thinking entries, Work Logs, Conference Notes, and online entries.
- Cite evidence in your narrative.
- **Clarity, Specificity, Logic, Breadth, Depth**

“Making a project like this on our own is really fun because it can be frustrating, but we're **frustrated together and whenever we solve a problem ... we experience a great feeling of **success and happiness**. In fact, there were a couple of times, like ... when we first got a dot to follow you, when we both **jumped up** and **high-five'd** each other as hard as we could and just yelled in success. Each step is like a terrible, horrible, twisted forest. But when you **finally work your way out** and look back at what you did, you can look at the path that you hacked through your problem(s) with **pride**.”**

What's the Purpose?





(kira*)





Noah's Lemonade Recipe



We used:

- 3 Large lemons
- 4 scoops of White sugar (about 1/3 cup each)
- 35 ounces of Water

We serve the lemonade over ice in a tall glass.

QUESTIONS?

Visit www.kira-learning.com or www.computersciencetn.org



**For questions about the Kira platform
or courses:**

tn@kira-learning.com

For all other questions:

ashe@battelle.org