

Social Engagement in Online Learning

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   #WolframTechConf



SYLVA

Learning made for **you.**

Abstract

Interaction, competition, and collaboration are valuable educational tools, underutilized in online education

Sylva specializes in advanced dynamic, interactive content powered by a variety of technologies - particularly Wolfram Language

We will go over an example of how we can run, with SYLVA, an advanced Game Theory educational series, with interaction and an automated tournament, and analyze the results in WL.



How it Works

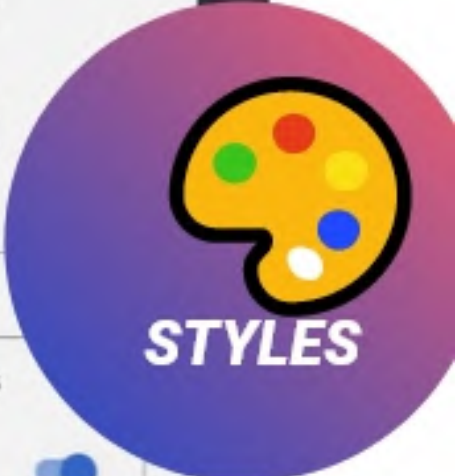
You play with another person. Both of you choose secretly to **Cooperate** or **Defect**.

The matrix shows the outcomes for each possible outcome. Your outcome is displayed in orange, your opponent's outcome is white.

1	1	5	0
0	5	4	4



Dynamic Game/Competition Editor



Pitch

The screenshot shows a web-based editor for creating a game. On the left is a sidebar with a vertical list of icons for navigation and editing. The main area is titled "Round 1" and contains a game board. The board has a central table with scores for two players: "SPLIT" (top row) and "STEAL" (bottom row). The scores are: SPLIT vs SPLIT: 20 vs 20; SPLIT vs STEAL: 0 vs 40; STEAL vs SPLIT: 40 vs 0; STEAL vs STEAL: 0 vs 0. Below the table is a text prompt "What do you want to do?" and two buttons labeled "SPLIT" and "STEAL". At the bottom of the board is a right-pointing arrow. Below the board is a section for "Round End 1" and a "Results" section. On the right side, there is a "Selector Options" panel with settings for Label, Alignment, Orientation (Horizontal), Type (Text), and Text Color (Orange), along with a "Reset To Default" button. At the bottom right are navigation arrows and a help icon.

Code Answers

We are now going to write a program in WL which solves the example Prisoner's Dilemma from the game.

Each round is represented by a List of two strings, yours and your opponents, saying "Betray" or "Cooperate".

Your function will be provided an Array of these rounds, in order, representing the previous rounds.

For example, the string:

```
1 [{"Betray", "Cooperate"}, {"Cooperate", "Cooperate"}, {"Betray", "Betray"}]
```

Represents a three-round game in which your opponent chose "Cooperate", "Cooperate", "Betray".

For example, the strategy of "Always Betray" is given by the function:

```
1 Function[rounds, "Betray"]
```

Write a Prisoner's Dilemma Solver

Please write a function which plays the prisoner's dilemma, with the same values from the game.

1	1	5	0
0	5	4	4

Your code will play 20 rounds of the Prisoner's Dilemma versus the other participants, in a round robin tournament.

The top 3 scorers will receive extra credit.

Your answer:

Immediate, Intelligent Feedback

```
1 (*  
2  The "Friendly Copycat" Strategy  
3  - Starts with Cooperate  
4  - Does whatever the Opponent did last  
5 *)  
6 Function(  
7   rounds,  
8   Last@Last[rounds, {"Cooperate"}]  
9 )
```

✔ Correct

★ 6 / 6

Your Submission:

- Doesn't throw an error
- Returns the correct values
- Handles the empty-list first case
- In a 5-round match up vs a fixed, random strategy:

Player	1	2	3	4	5	Score
You	Cooperate	Betray	Betray	Cooperate	Cooperate	11
Opponent	Betray	Betray	Cooperate	Cooperate	Cooperate	11

- In a 5-round match up vs a steadfast traitor:

Player	1	2	3	4	5	Score
You	Cooperate	Betray	Betray	Betray	Betray	21
Opponent	Betray	Betray	Betray	Betray	Betray	16

- In a 5-round match up vs a steadfast cooperator:

Player	1	2	3	4	5	Score
You	Cooperate	Cooperate	Cooperate	Cooperate	Cooperate	5
Opponent	Cooperate	Cooperate	Cooperate	Cooperate	Cooperate	5

Analyzed in Aggregate

Prisoner's Tournament Live Analytics

Evaluate Download

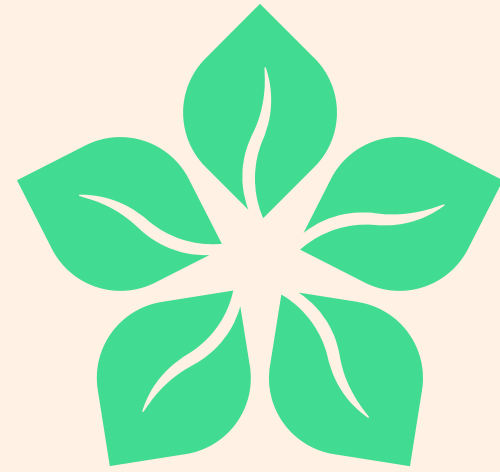
```
1 (* Results app consumes an Association as first parameter, full of data *)
2 Function[
3   resultsData,
4   (* Create function which consumes two player functions, and returns the score *)
5   ScorePlayers = Function[
6     {
7       player,
8       opponent
9     },
10  (* Block variables for isolation from running session *)
11  Block[{result},
12    result = {};
13    For[
14      i = 0,
15      i < 20,
16      i++,
17      AppendTo[
18        result,
19        {
20          player[result],
21          (* Reverse the players for the opponent *)
22          opponent[result[[All, {2, 1}]]]
23        }
24      ]];
25    Total@Map[Grades]@result
26  ]
27 ]
28 Block[{
29   users,
30   scoreGrid.
```

Prisoner's Tournament Live Analytics

Refresh Edit Download

	Total	Vs. Kirk	Vs. Picard	Vs. Janeway	Vs. Sisco
Kirk	204	80	0	76	48
Picard	192	100	20	20	52
Janeway	172	81	20	20	51
Sisco	181	91	10	38	42

Questions?

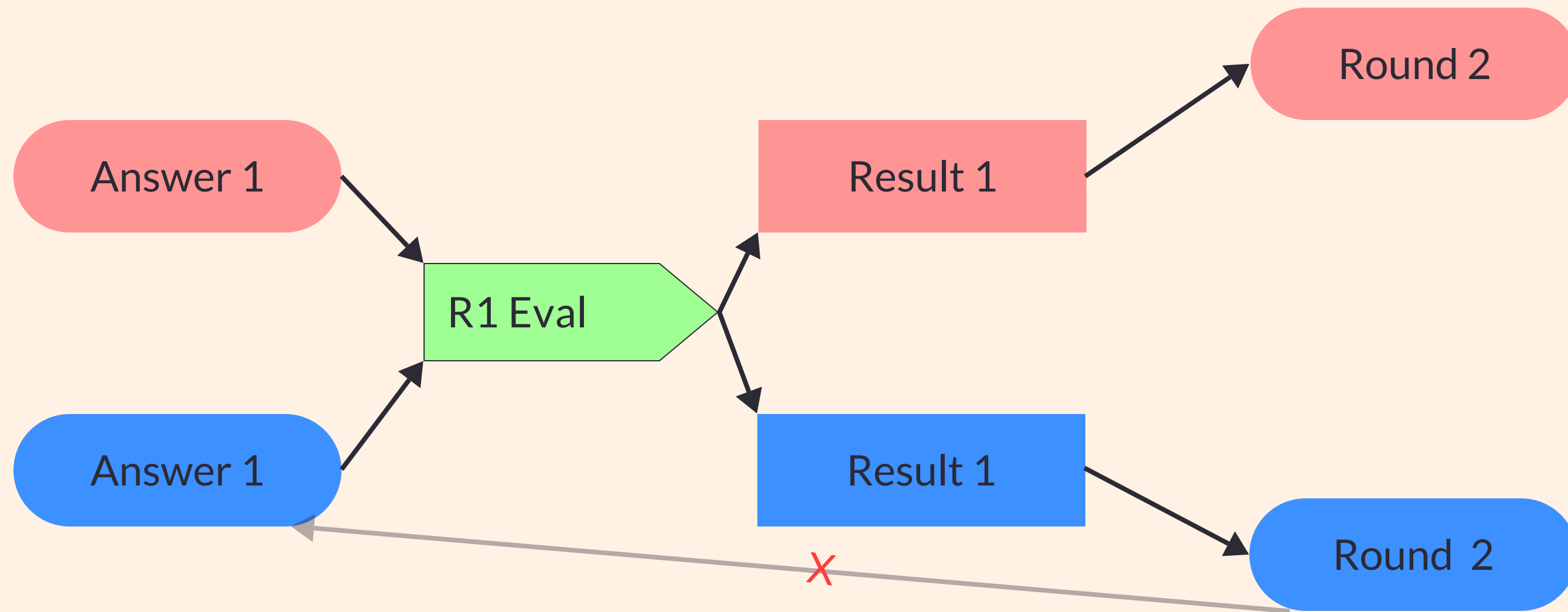


- SYLVA
- Advanced assessment LMS
- Wolfram Powered
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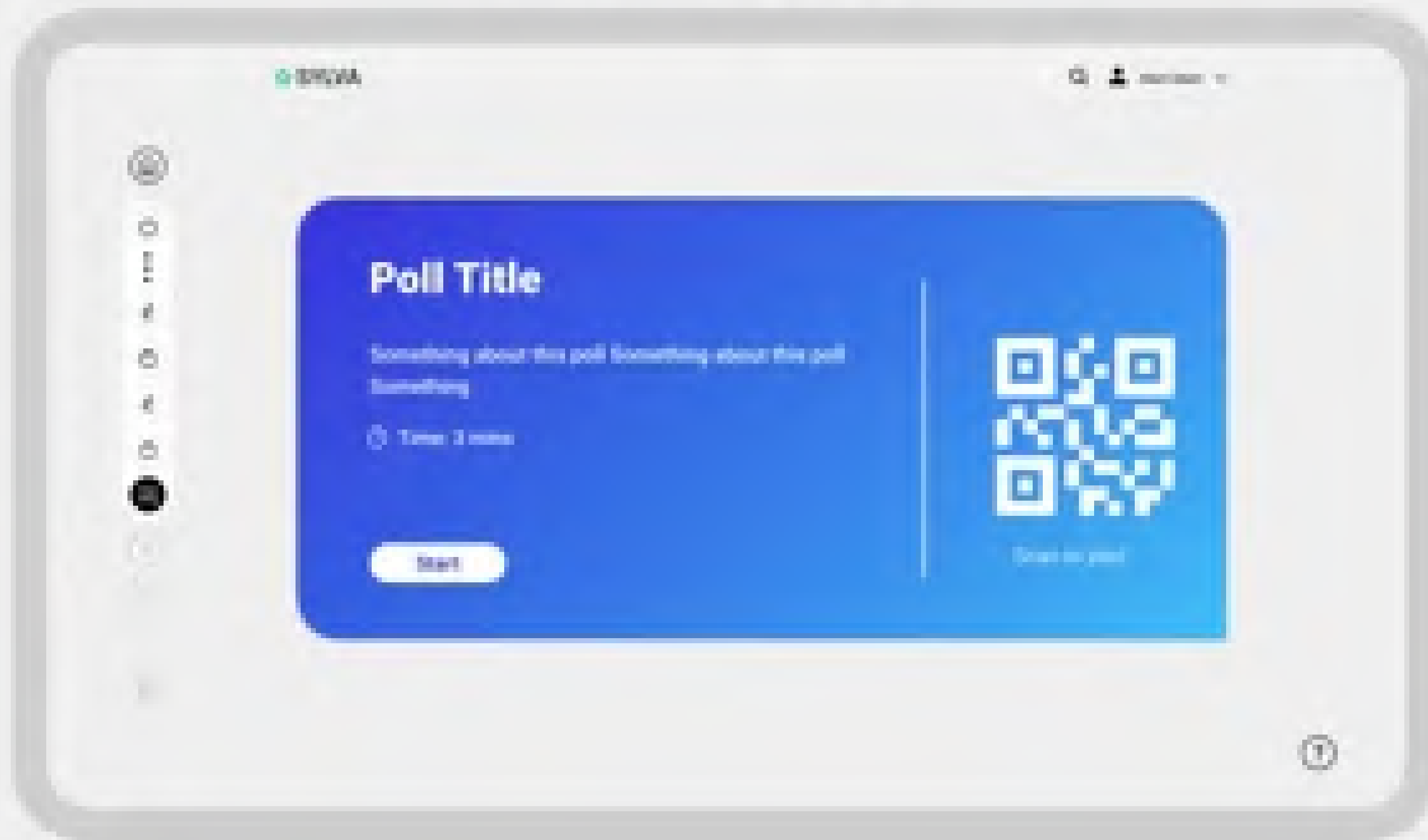
- Dr. Clinton Bradford
- PHD @ Purdue, 2021
- Analytic Number Theory /
Quadratic Form Algorithms
- STEM Outreach Enthusiast
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Directed Acyclic Graphs for interactives

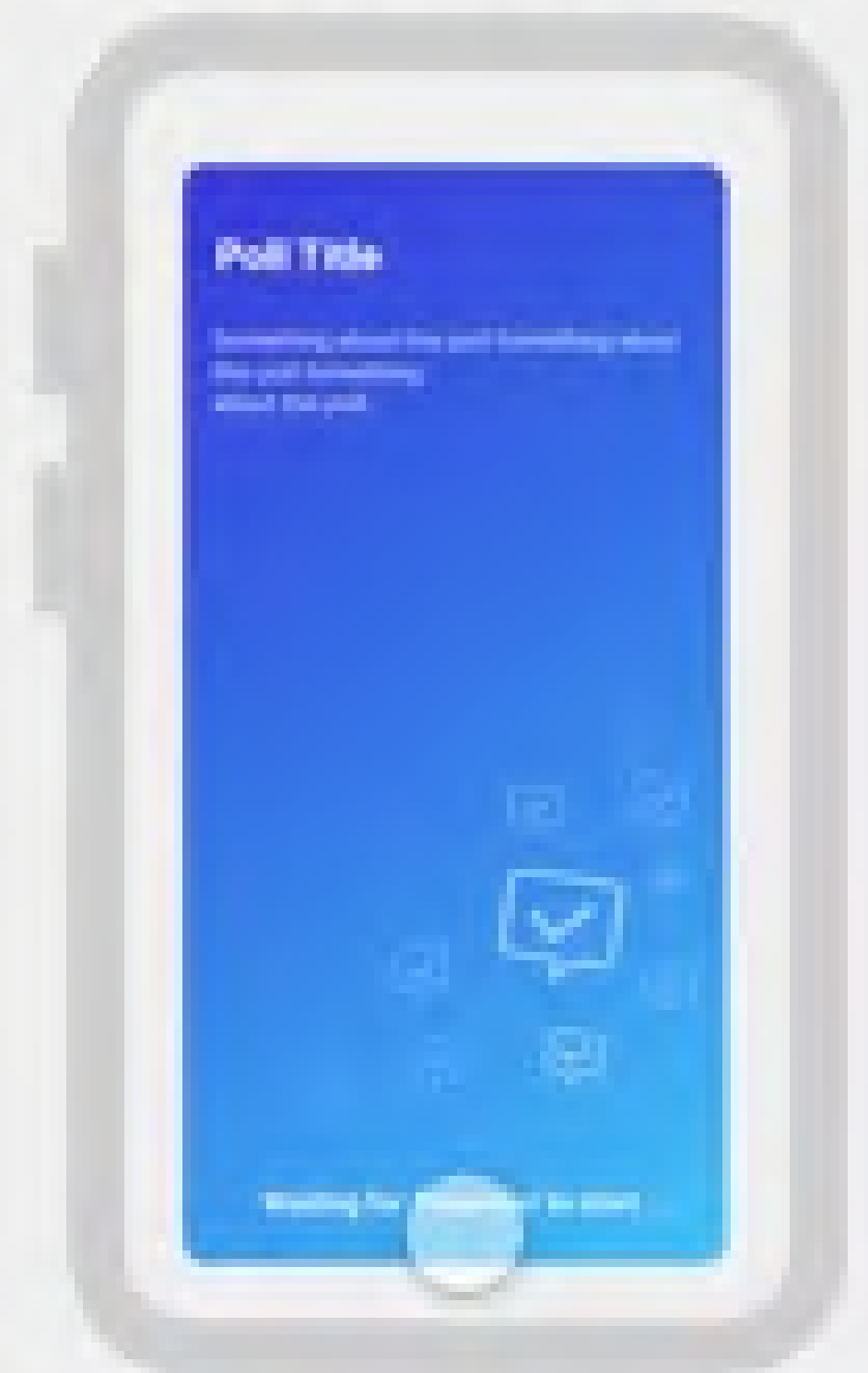


Polls

Presenter screen



Audience screen



Item Response Theory

Differentiation

Trig Reduction

$$\frac{dy}{dx} x^3$$

$$\frac{dy}{dx} \cos^2(x) - \sin^2(x)$$

$$\frac{\sin(x)}{1 + \cos(x)}$$

$$\frac{dy}{dx} \cos^7(x)$$

?

