

Name That Summation

“Some Sick Sums”

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Last Update: 2/10/2021

GAME OVERVIEW

As a learning tool for COMP 550 Algorithms and Analysis, Name That Summation seeks to help students better understand inductive reasoning. It will be used in the class's recitation period by the students. The game follows a familiar paradigm of "Name that Tune"-style games, which the client believes will be useful for learning. Genres include, but are not limited to trivia, quiz, and educational.

GAMEPLAY

The player is tasked with using inductive reasoning to select the correct summation formula quicker than their peers. As the player progresses through the course, the summation levels/challenges will increase in difficulty. If the player selects an incorrect answer, then they will receive feedback detailing why a particular solution is correct. The game's core mechanic blends together Rollings and Adams' inference, intelligence, and knowledge challenges.

Alternatively, a stretch goal mechanic works as an inverse to the above mechanic. In this new case, the player is given the formula for the summation, and is tasked with constructing a graph representing the formula. The player's construction is compared with the ground truth.

MECHANICS

Rules:

- For each question, the player has a predefined time limit (variable) to select a summation that corresponds to the graph shown.
- Players must use reasoning, rather than external sources of information, to solve the problem.

Layout:

- Players are presented with a graph, which updates at specific time intervals to reveal outputs of the summation.
- Somewhere next to the graph is a set of summation choices for the player.
- There is also a timer showcasing the time remaining for the player.

Character actions:

- Guess summation from graph:
 - The player's only action is to select a summation corresponding to the graph.

- If the choice is correct, the player receives points proportional to how quickly they answered.
- If the choice is incorrect, the player receives appropriate feedback.
- Construct graph from summation:
 - The player can increase the y-value at discrete, incremented x-values using up/down arrow keys, the mouse, etc.
 - Error is calculated between their input and the actual summation function.
 - Scores are calculated based on how close the player is to the function.

Screen flow:

- Main menu -> game level screen
- Game level screen -> dashboard screen -> another level screen
- Final dashboard -> feedback screen
- Any screen -> main menu

Game options:

- Light and dark theme

Replaying and saving:

- Players don't need to manually save, their responses are automatically recorded.

LEVELS

- Learning inductive reasoning
- Level templates are repeated, and increase in challenge
- Levels can be reviewed, along with explanations

Two level types:

1. Guessing a summation formula from a graph
 - Objective is to guess a formula quickly from a graph being incrementally drawn
2. Guessing a graph from a summation formula (stretch goal)
 - Objective is to guess/form the shape of a graph in real time based off of a provided summation formula

USER INTERFACE

- The game itself is a menu interface, which the player navigates like any other. Buttons from the game level screen to the dashboard screen, then to the next game level screen, then finally to the feedback screen, all with the option to return to the main menu.

- Jeopardy-style music will play while the timer counts down, and feedback sound effects will play in response to a player's input.
- From the main menu, the player can access settings and a help page detailing how to play the game.
- Settings allow the player to change background color, or (stretch goal) to choose from a set of color themes.

CONTENT ADDITIONS

Adding a summation level is as easy as appending a .csv/.json file.

FEEDBACK

- The dashboard screen displays the top performers in the game thus far.
- The feedback screen (at the end of a series of summation challenges) will display all of the summation challenges in a listview, along with their explanation. Each item in the listview will be flagged as answered correctly/incorrectly.

DATA COLLECTION

Information about the players' responses is recorded, and can be kept by the administrator.

Options:

- Data can be logged to a file during play, then deleted once the session is finished.
- At the start of a recitation game session, the administrator gives a name for a file, and the players' data is output to that file.

DEPLOYMENT

The project will be deployed on AWS. Mainly, AWS S3, CodeDeploy, Route 53, EC2, and VPC services will be used. On the front-end, the game will use HTML, CSS, JavaScript, and other necessary frameworks. On the back-end, we will use Python: Flask as a framework. AWS CodeDeploy will handle the code maintenance

automatically and notify the administrator upon deployment failures or any maintenance issues.