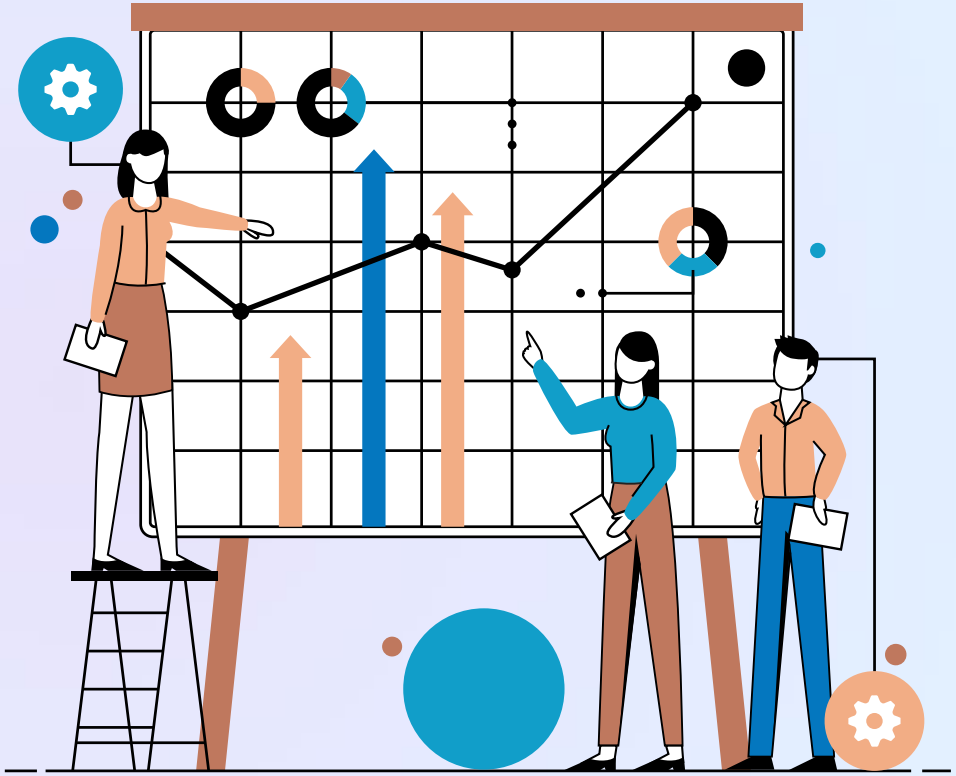
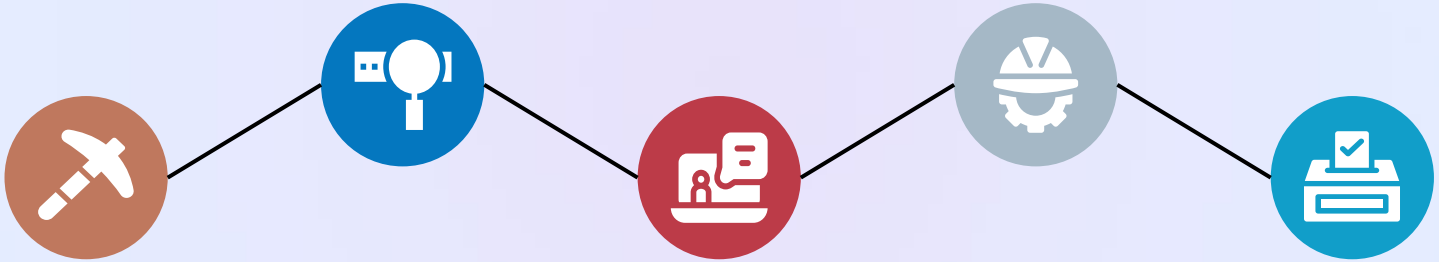
Virtual Internships

Internships at Nephrotex, a biomedical engineering company



Presentation Overview



BackGround Information

Understanding the problem we have

Exploratory Analysis

Understanding the features of the data

Text Analysis

Natural language processing on the chat content

Modelling

Predicting the outcome score using features

Final Outcome

Were we able to predict the outcome using the this data?

Nephrotex Virtual Internship

Interns in a fictitious biomedical engineering design firm

Idea of virtual Internships

Opportunity to develop skills, gain industry knowledge, and build a professional network

Target age group

College freshmen & sophomores

Time to complete

18 hours

FEEDs

Form for Electronic Experimental device simulation

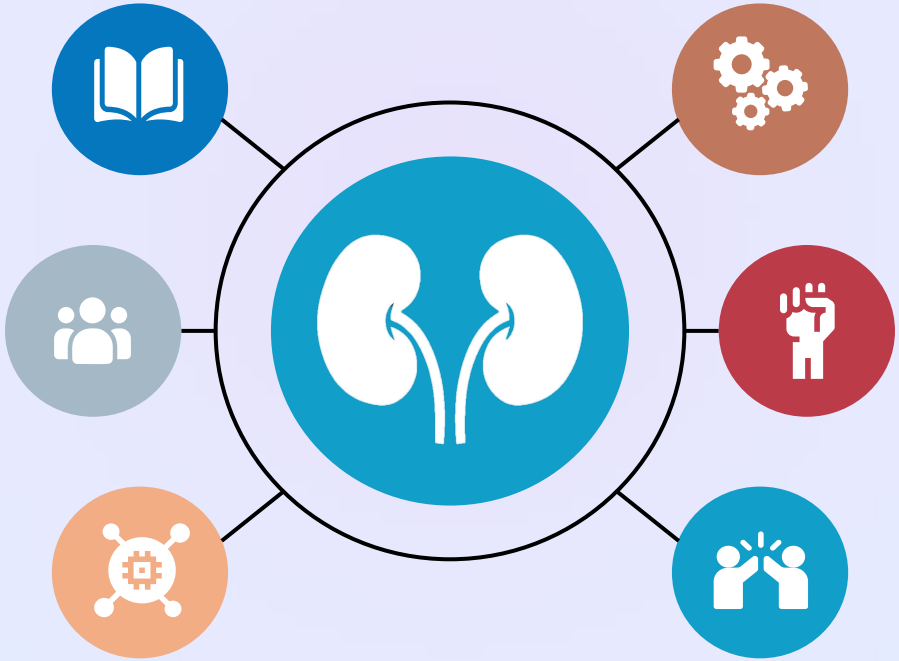
Background Information

Requirements for internship completion

Conducting background research

Understanding stakeholder needs

Designing prototypes



Testing & evaluating prototypes

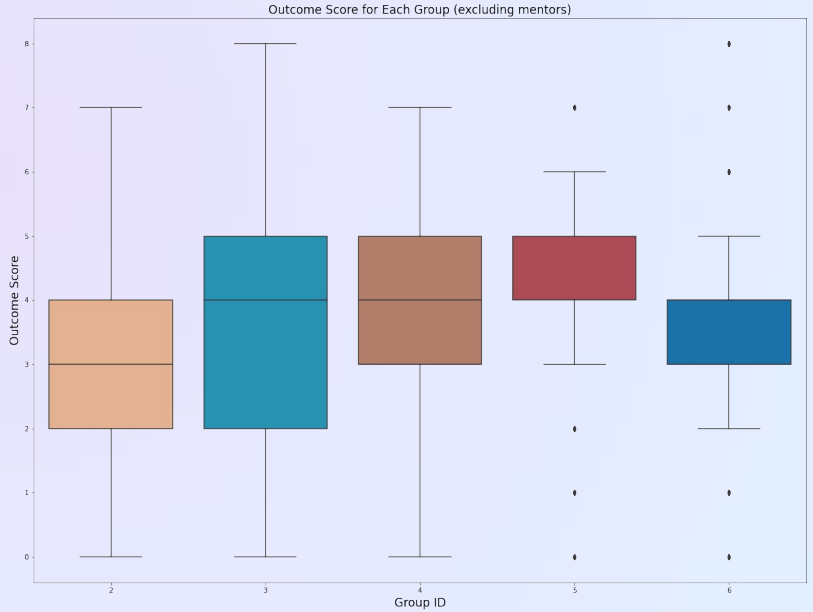
Justifying design decisions

Working effectively in groups

Exploratory Analysis

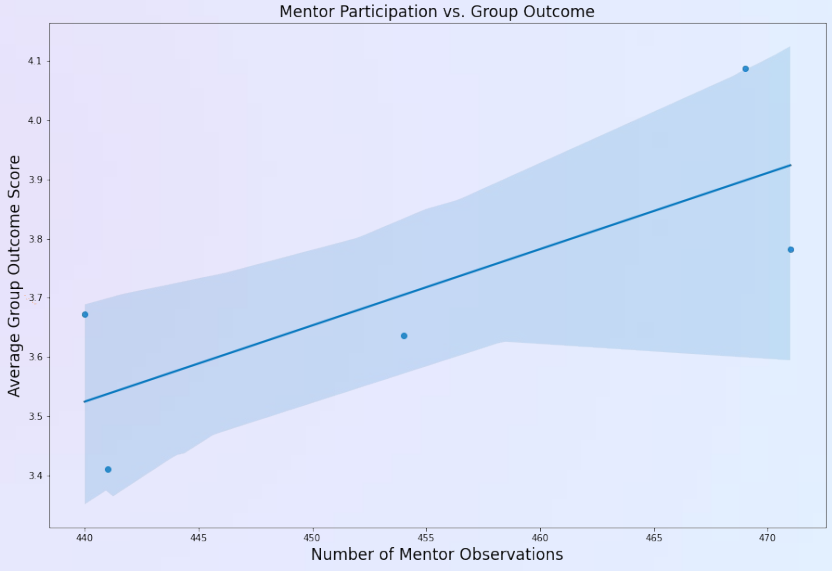
Outcome scores across different groups

- 5 groups, each group has 71-78 students and around 15 mentors
- The majority of groups achieved an average score of 3-5
- Groups 5 and 6 had relatively consistent outcome scores among students with little variation observed.



Exploratory Analysis

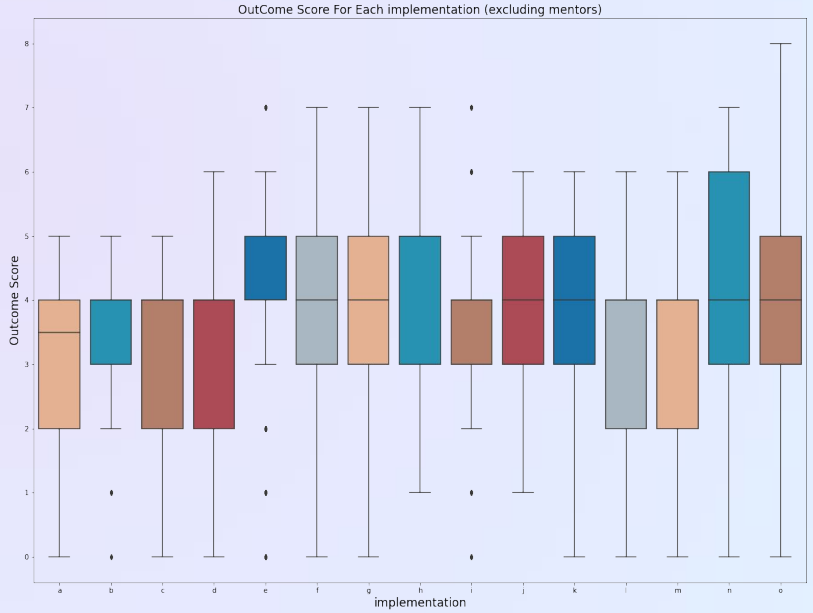
Effect of mentor participation on the average outcome score of groups



Exploratory Analysis

Outcome score across different implementations

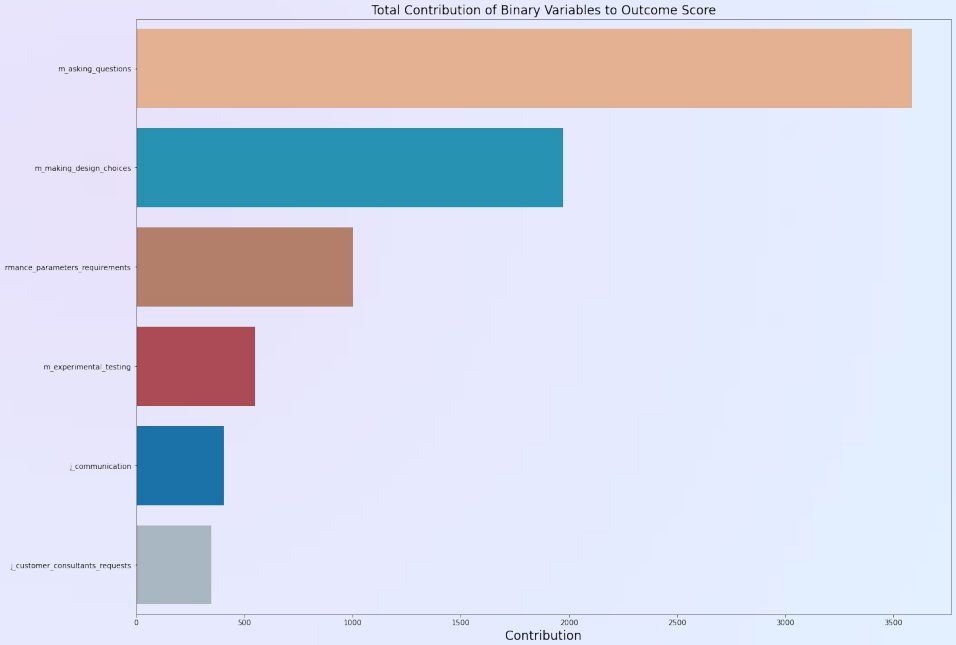
- 15 implementations, which means 15 approaches to satisfy the problem
- Each implementation had 18-32 students and 1-3 mentors
- Most implementations had an average outcome score of 4
- Implementation O has the highest maximum of 8.



Exploratory Analysis

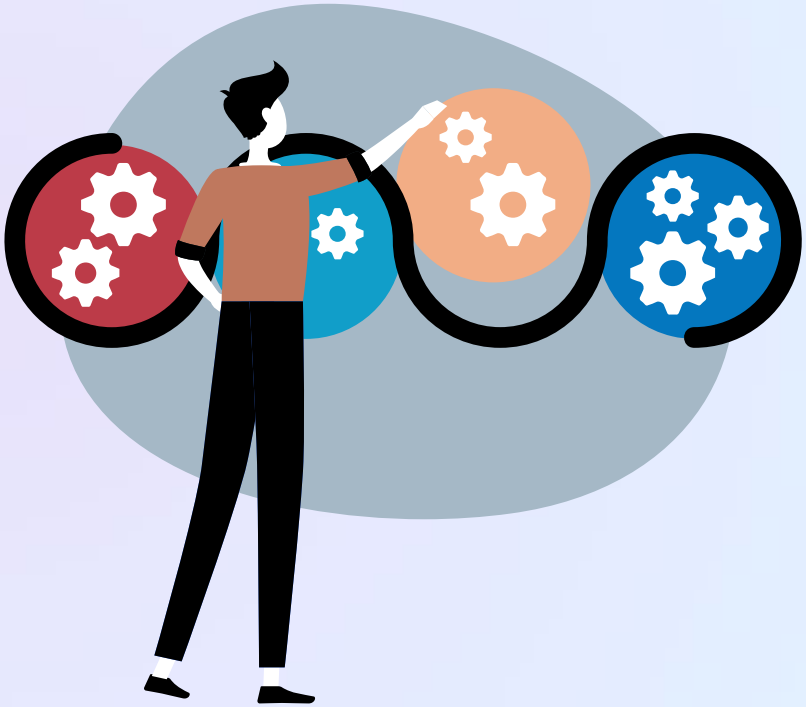
Different topics that were discussed between students

- Students primarily asked questions during the discussion rather than talking about other topics
- The second most talked-about topic was choosing a specification or characteristic for the design
- The least discussed topic was justifying design choices by stating that they should meet or exceed stakeholder requests.



Data Modelling

Predicting Outcome Scores



Linear Regression

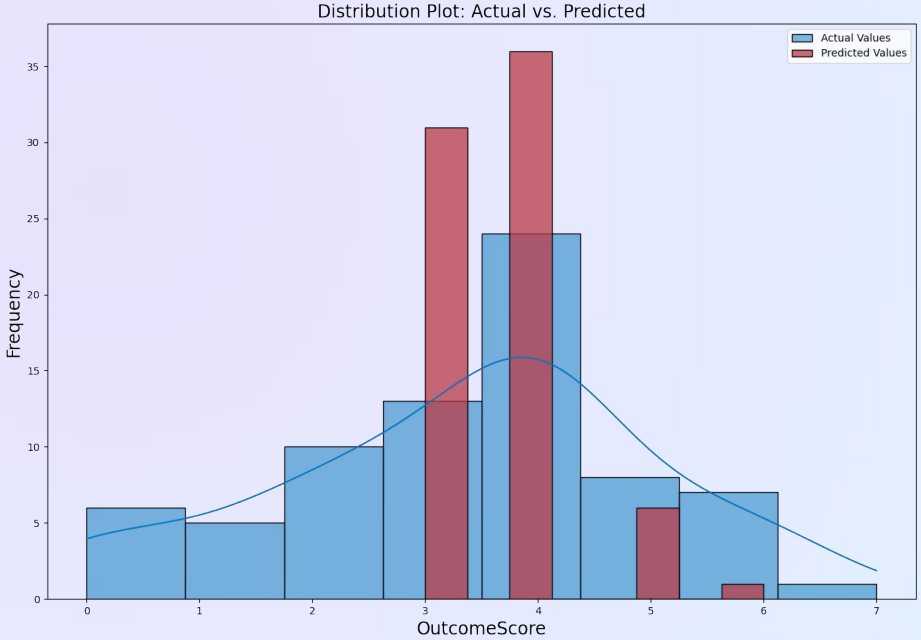
Regression Algorithm

Used a regression algorithm that treats the outcome scores as numerical values

Features that are significant: experimental testing, making design choices, asking questions, wordcount

R-squared value: 0.071
Adjusted R-squared value: 0.053

Accuracy: 0.2297



Predicting Outcome Scores

Supervised Machine Learning Classification Models

Random Forest

33.40%

Decision Tree

36.70%

Support Vector Machines

34.20%

Logistic Regression

39.20%

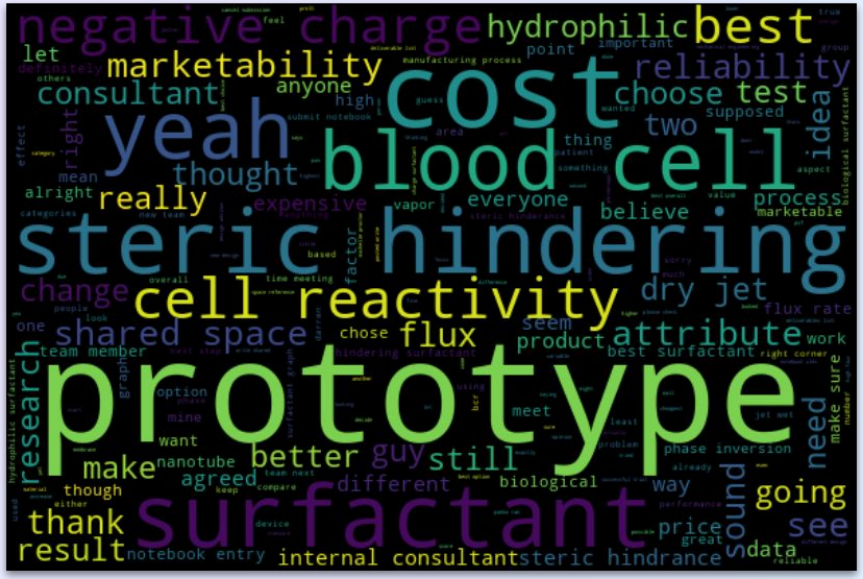
Evaluation Methods for Model Performance

Text Analysis

The frequency distribution of notable words was created.

The TextBlob library was utilized to do sentiment analysis to assign each sentence to a polarity integer, which can take values of 1, -1, or 0.

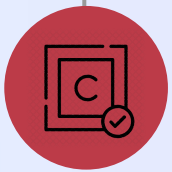
Each participant has a total content integer representing the overall "positivity" or "negativity" of their language.



Evaluation Methods for Model Performance

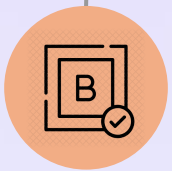
Outcome Score Categorization

Predicting the overall performance instead of the actual score



LOW

Scores less than equal to 2.



MEDIUM

Scores greater than 2 and less than or equal to 5.

HIGH

Scores greater than 5.

Predicting Grade Level

Supervised Machine Learning Classification Models

Logistic Regression

59.50%

Support Vector Machines

66.20%

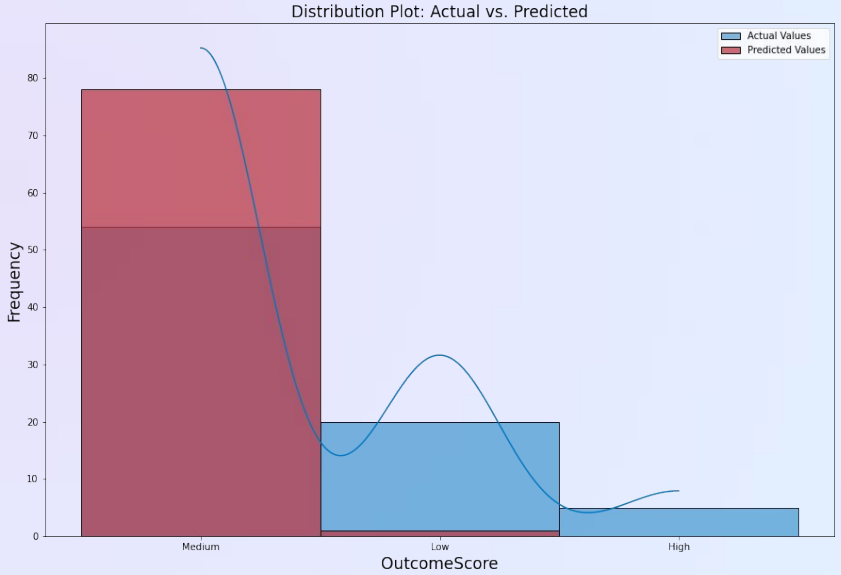
Decision Trees

68.90%

Decision Tree

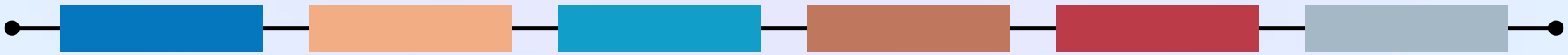
Classification Algorithm

- The accuracy rate of 0.69 highlights the model's effectiveness in predicting the outcome score based on the selected features.
- The model successfully classifies the outcome scores into grade categories.
- Further enhancements and refinements in the predictive modeling process can still be explored.

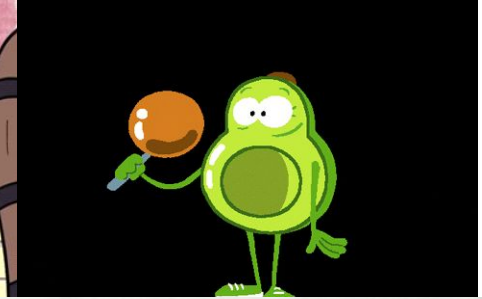


Conclusion

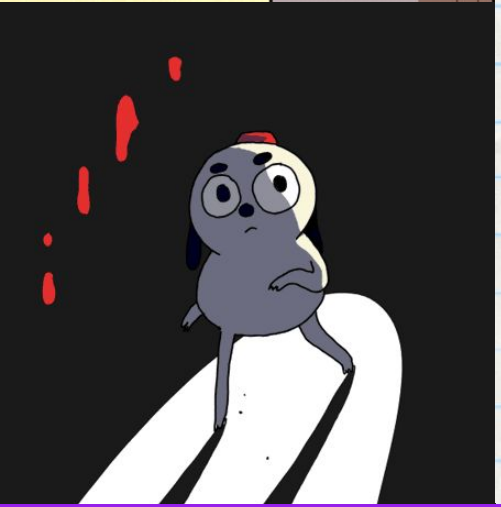
- The implementation approach had a noteworthy influence on the students' outcome scores.
- "Quality over quantity" mentorship and active student engagement played a crucial role.
- Higher word frequency did not necessarily correlate with higher outcome scores; however, the productivity and quality of student engagement showed a stronger association.

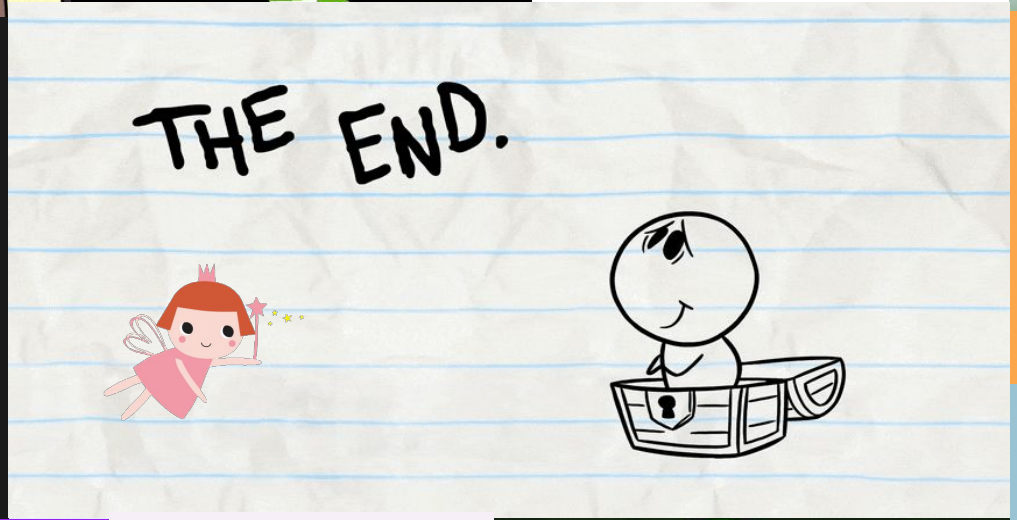



Stop talking!




I'M FINISHED

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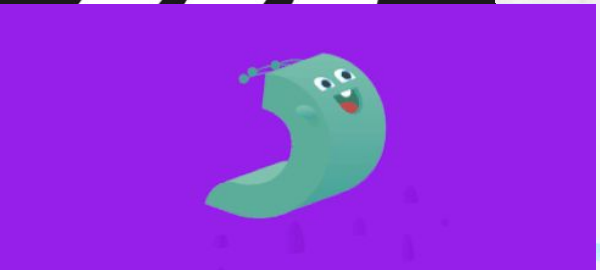


Ha ha ha ha ha ha ha