

# Final DISMATH-ation

## Final Project in Discrete Mathematics

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**Abstract—** Final DISMATH-ation is a visual novel set in De La Salle University. The main character is stuck in a dream, but he does not realize it. He remembers almost nothing, and he must rely on the few memories and clues he finds to regain all his memories and escape. Like the real Final Destination films, one wrong move could be disastrous – he could be stuck inside the dream forever.

**Keywords**—rooted trees; choices; application; root; leaf;

### I. INTRODUCTION

Final DISMATH-ation is an application made using the MIT App Inventor 2. The setting of the game is in De La Salle University. The application is like making a story out of the choices selected by the user. It can also be said that the user manipulates every move of the character in the game. The game is very interactive because the player is the one who decides what will happen to the character in the application, may it be a good or bad ending.

### II. FLOW OF THE GAME

At the beginning of the game, the character in the game was confused why he is in school. Then, four choices will pop up. Three of the four choices are somewhat useless because if the user selects one of those choices, it will just display a dialogue. For example, for the choice “use phone,” if the player selects this, the game will just display or let the user know that the character has no phone. On the other hand, one of the four choices will give the user another set of choices to choose from. One of these choices will result to a game over, so the user has to be careful of the distractions placed in the game that will cause him/her to lose.

The game will keep on going unless the user makes a wrong choice. The user will be given choices on where, inside the campus, to go next. The choices/places to go are indicated in Figure 1. However, in each of these places, there may be certain things that will serve as a distraction to the user, which will eventually lead to a bad ending.

For the ending, the game may end in five different ways. The different endings are indicated in Figure 1. Four of these scenarios are the effects of a wrong decision of the user. The

goal of this game is for the user to end up in Henry Sy Sr. Hall building, that is the reason why the happy ending can only be attained in such place. The only happy ending in this game is when the character in the application wakes up from comatose with complete memories. But before a player ends up with this ending, we included two mini games that will decide whether the player can still continue with the story. The first is an eagles vs archers game reminiscent of the older mobile game space invaders. The second one consists of collecting musical notes. To continue through the story, the user must get 15 points in each of the games.

### III. RELATION TO DISCRETE MATHEMATICS

Before coming up with this application, there were different types of games that the group thought of, but none of which were related to Discrete Mathematics. A tree diagram was used in coming up with the flow of the game.

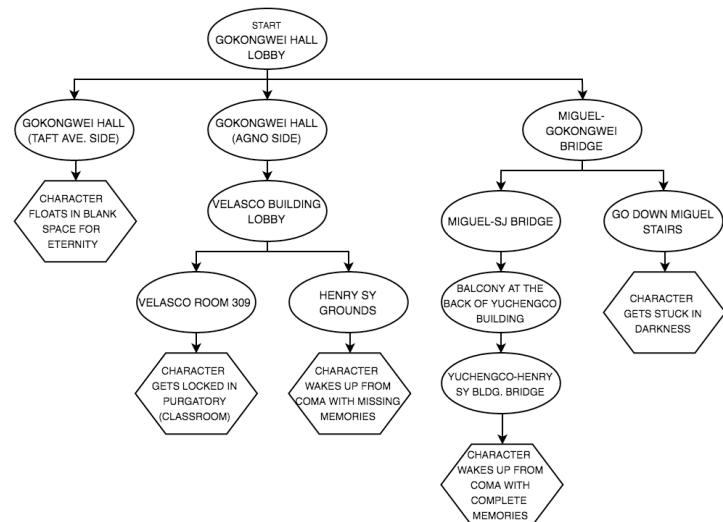


Figure 1. Flow of the game in the form of a rooted tree.

The diagram above shows the exact flow of the story in the game. The different effects of the player's decision can be seen, as well as how to end up with a happy ending.

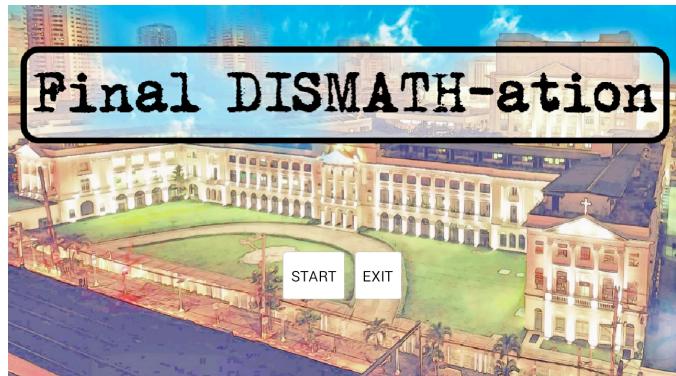
Trees, as defined by Rosen (2013) is a connected undirected graph with no simple circuits, meaning a tree cannot contain a closed loop, and each vertex should have a connection with atleast one vertex. Moreover, a rooted tree is a tree that has a common vertex called the root, where it is located at the top most part of the tree diagram. Every edge on the tree diagram is directed away from the root.

This game heavily relies on the concept of trees, like all visual novels, as trees represent the possible choices and endings. In Final DISMATH-ation, each choice on where to go can be represented as a node on a tree, which would all lead to different endings. These endings are the leaves of the tree.

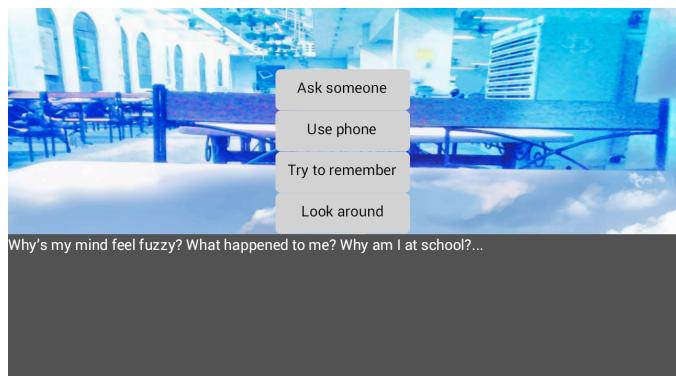
This is not the only way DISMATH was applied to the project. Like all programming tasks, algorithmic thinking was necessary in completing this project. The ability to think in definite steps in order to achieve a goal (or, in this case, an app) is helpful since these steps can then be translated to the blocks of code. The knowledge of logical operators and universal and existential quantifiers also allow easier programming, especially when it comes to the conditional statements or blocks in the app.

#### IV. SCREENSHOTS OF THE APPLICATION

The screenshots below are the actual scenarios happening in the game while it is being used.



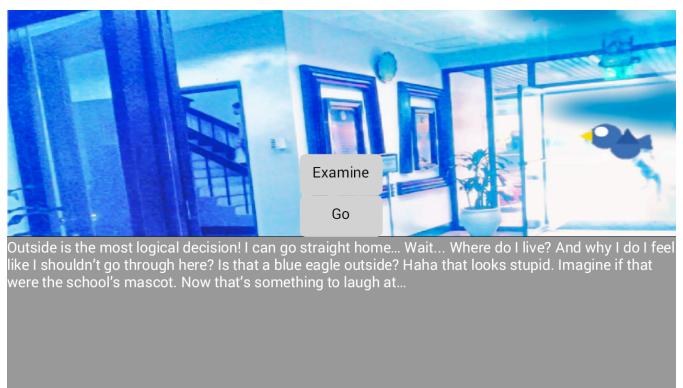
This is the ‘Main Menu’ of the game.



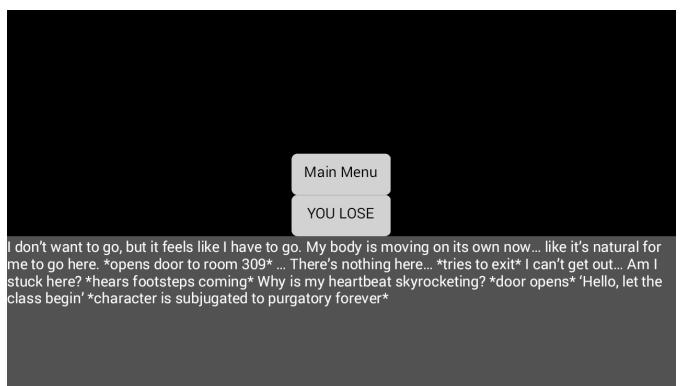
This is the first scenario in the application where the character is confused about why he is in school, and the user is given the chance to select what to do in one of the four choices.



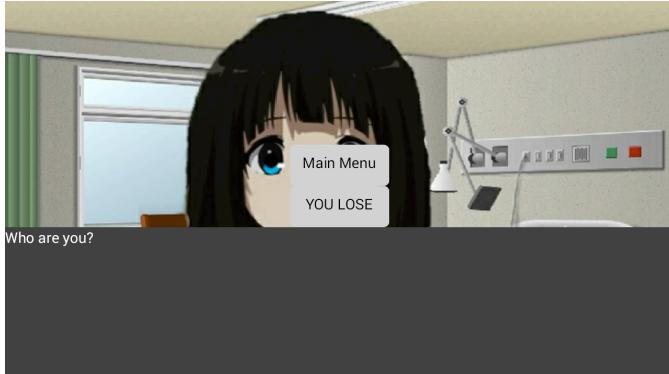
This will be the next set of choices that will pop up when the player chooses ‘Look around’ from the previous scenario.



This would be the scenario if the player chose ‘Taft Gate’ from the previous set of choices. If the player chose “Examine,” it will eventually lead to the end of the game, with the player losing the game, because the ‘bird’ in the game is like a distraction to the player, and should never be entertained to continue with the rest of the story.



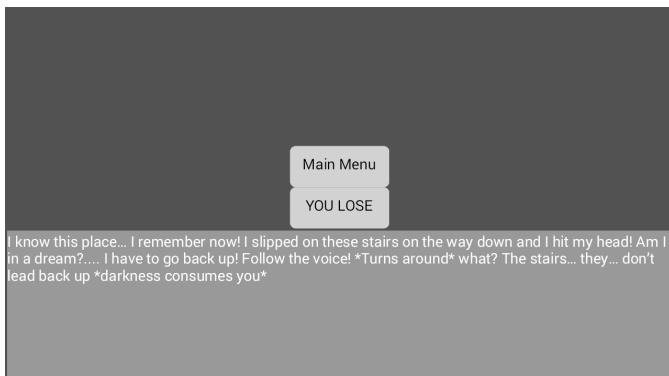
This is another part of the story where the player may lose. This would be the scenario if the player chose ‘Agno Gate’ from the previous set of choices, and then the player decided to go up and enter Velasco room 309.



In this scene, the character does not remember something. So, this is another scenario where the player may lose. This would be the scene if the player chooses 'Miguel' from the previous set of choices, and decided to follow the voice that he heard. Again, this voice is a distraction that should be ignored for the player to continue the game.



This would be the resulting scenario when the player successfully wins the two mini games after arriving in Henry Sy building. In this scene, the character wakes up from comatose and he was able to remember everything. This is the only way that the player can win the game.



This would be the resulting scenario if the player chose 'Miguel' from the previous set of choices, and when he decided to look at the blood down the stairs of Miguel Hall. For the last time, the blood is a distraction that should not be entertained to continue on with the game.

## V. CONCLUSION

From our observation, different topics in Discrete Mathematics really takes a lot of effort and time to master. Similarly, it is also difficult to relate a topic in this course into a game/application. There may be several types of games that can easily be made using the App Inventor, but it may not be related to Discrete Mathematics. Nevertheless, we still think that the best way that a student can learn and master a course is by knowing its use and purpose, and at the same time, applying it, and making something out of it, just like what we did in this final project.

## VI. REFERENCE

Rosen, K. H. (2013). *Discrete Mathematics and Its Applications*. New York:McGraw-Hill.

## VII. APPENDIX

Contribution of each member:

Meygen Cruz – program;

Maxine Genchez – IEEE documentation, backgrounds

Carl Vincent Tan – Story, backgrounds