Trigame

1. Project Description

Trigame is a chess game played on a rhombic board with three types of pieces. One of the pieces goes through the triangles' heights, one through the surfaces and one through the sides. The ultimate goal of the game is to capture all of the opponents' pieces or have more pieces than the opponent by the end of the game (explained in detail in functionality section). The classic chess game has existed for over 1500 years. Although it is a classical game, it became very repetitive over the years with restrictive strategies constraining users' creativity. Trigame is unique and significant in that a move is never done for only one or two purposes, there can be a lot of ways and strategies to play and win which makes the game fun with new ideas constantly flushing the users' mind. It also stays away from any traditional strategies and people can play it in their own creative ways. It gives users a challenge and simply an entertaining and intriguing game to play with friends and family. It might become a popular new game for the world due to its complexity and creativity. It can affect people's way of thinking, making them creative, not constrained and one can look at things in different ways. This game helps math students at H SC develop a logical mind, science students practice their skills of looking outside the box and engineering students develop a creative way of thinking.

2. Purpose

The purpose of the program is to entertain the users. It can also practice the users' thinking skills (creative, logical and critical thinking). It helps math, science and engineering students in the high school.

3. Target User Group

The target group is math, science and engineering students in HSC. For math students, Trigame will enhance their logical deduction abilities because of its complex possibilities. It also improves their speed for reasoning, optimizing each move for the best possible logical outcomes. It helps engineering students become more creative with endless ways to play. Since the board is not wide with pieces highly interconnected (for rules see functionality), how the players utilizes the rules depends on their creativity and sometimes even their personality. This gives the user much more freedom and can stimulate them to play differently. It will also improve science students' creativity and help them think outside the box. Unlike chess, the Trigame is unexplored, there are no winning strategies. Players can try any kind of strategy they like to win. It makes the user more open-minded.

All in all, this is an entertaining game. It will interest math students since it requires deductive reasoning (they like math thus would enjoy logic). It will also interest engineering and science students who, most likely, love being creative and accomplishing certain tasks with their creativity.

4. Functionality

Trigame is a chess game with a board of 32 triangles and 3 types of pieces named “a”, “b” and “c” (Figure 1).

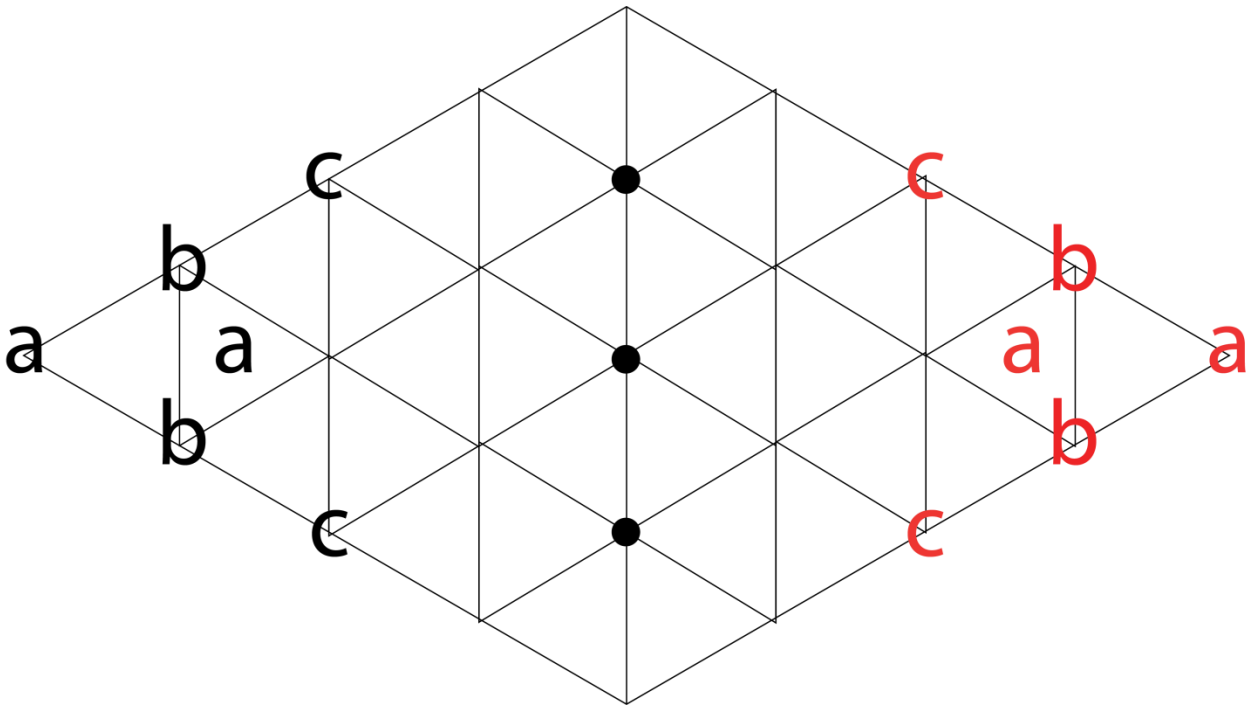

Figure 1. The Trigame board and all of its pieces.

The game abides by these rules:

1. Two players take turns and only one move with one piece is allowed per turn.
2. A triangle means the smallest triangle on the board (with no lines inside). When a piece is said to be inside a triangle, it is in the smallest triangles with no lines inside; when a piece is said to be on the edge of the triangle, it stays in the middle of one side of the smallest triangle; when a piece is said to be on the vertex of a triangle, it is on the vertex of the smallest triangle and possibly sharing the vertex with other triangles (the initial position of the “b”s’ and “c”s’). Capture means removing a piece from the opponent out of the game.
3. Pieces of the same type cannot capture each other.
4. Piece “a”: 1. When “a” is inside a triangle, it can move into adjacent triangles (into the inside of the triangles) that share the same edge with the triangle it is in (capture can be done with the move). When inside a triangle, “a” can also move onto any vertexes of the triangle it is in (capture cannot be done with this move, when a vertex is occupied by the opponents’ piece, “a” cannot move to that vertex while inside a triangle). “a” inside a triangle can capture “c” on the edges of the triangle it is in by moving across the edge “c” it is on, to the vertex opposite the edge; when there is an opponent’s piece on that vertex, the piece is also captured. Inside the triangle, it can capture (only) a piece on the vertex opposing the side of the triangle (“a” cannot

actively move to the vertex when there is not an opponent's piece on it) it is in (a friendly piece on the edge opposing the vertex would not be affected). 2. When "a" is on the vertex of a triangle, it can move into any triangle in contact with the vertex (capture can be done with this move when a piece from the opponent is inside the triangle).

5. Piece "b": "b" can move along straight lines (edges) and stop at vertexes (capture can be done with this move). However, it is not allowed to pass the bolded points unless there is a piece on the bolded vertex (it may capture the piece on the vertex and then move onto any side, abiding by the same rules). "b" cannot capture "b"'s.
6. Piece "c": 1. when "c" is on the vertex of a triangle, it can move to the opposing side of the triangle (capture can be done with this move). When there is an "a" inside the triangle in which the move is done, the "a" is captured. On a side, "c" can only be captured by an "a" or a "c". No pieces can move directly through the edge. When "c" is on the vertex of a triange, it can move to any adjacent vertexes (unless a friendly piece is on that vertex or another piece is on the edge between the two vertexes). Capture can be done with this move. 2. When there is an "a" inside the triangle in which the move is done, the "a" is captured. When "c" is on the edge of a triangle, it can move to the vertex(es) opposing the edge (capture can be done with this move). When there is an "a" inside the triangle in which the move is done, the "a" is captured.
7. Whenever a piece is captured in the game, a 50 moves countdown will be started. If no captures are done within the 50 moves, the program will count the remaining pieces of both sides. If one side has more pieces than the other, the side with more pieces wins. If the pieces are the same for both sides, the 50 moves countdown will be restarted. When a capture is done within the 50 moves, the countdown will also start over. If two complete countdowns (100 moves) are done in a row and there is the same number of pieces on both sides after the countdown, the game draws.
8. One side wins if: 1. The countdown is over with the winning side having more pieces than the opponent. 2. When the opponent is out of pieces.
9. The game draws if: 1. two countdowns are done in a row, and there are the same number of pieces on both sides . 2. Two players agree to draw.
10. Coming soon: When "c" is on the edge of triangle(s) (sometimes two triangles sharing one edge), it can move into other edges of the triangles that are part of the edge it is on (capture can be done with this move).

Once the program is started, an option interface ("Home") will appear with options (on buttons) including: "two players", "quick tutorial", "written Rules".

The user will click (input) an option which brings him/her into the next interface (output). If they click "quick tutorial", an interface displaying the three types of pieces will appear (they are three clickable buttons). If one of the buttons (representing the different pieces) are clicked, a quick visual tutorial of the rules for that piece will be displayed. The user can go back to the interface with the three pieces as well as to "Home" (these will be displayed in the UI sketches in detail). A "Start game" button will be clickable. If clicked, the game will start.

When “Written Rules” is clicked, an interface with all the rules displayed in point form will appear for quick reference. A “home” option can be clicked to go back to the first interface. A “Start game” button will be clickable. If clicked, the game will start.

When the “two players” button is clicked, the game interface will appear with the board and the pieces placed at their locations (Figure 1). There will be a “draw” option which leads the user to an interface confirming whether they wish to draw or not. A “rules” button will be clickable which takes the user to the interface with written rules. A “Home” button takes the user to “Home” interface. The board of the game with the data of the locations will be stored in a table (containing numbers indicating whether the space contains a piece or not and the type of the piece). The first turn will start randomly by the red or black side. When the turn starts, the user can click on any of his/her pieces (will be selected once clicked) and move it to another location by clicking on the new location (captures can be performed in the same way by clicking on the location with the opponents’ piece). If another friendly piece is clicked after clicking the first piece, the new piece will be selected and the next move will be done with the new piece (unless another friendly piece is clicked again). The piece, however, has to be moved according to the rules. If the user clicks a location where it is illegal for the piece to move to, a dialogue will pop up telling the user that the move is illegal and a brief version of the rules for the piece that the user played wrongly will be displayed. The user can click on a “back” button to close the dialogue or check the detailed rules by clicking the “written tutorial button”. The total number of pieces left on each side will be stored and changed once a capture is done. Once the first capture is made, there will be an integer storing the countdown for the number of moves made. Once a move is done, one will be taken away from the integer that stores the countdown. The integer storing the countdown (from 50 to 0) will be displayed on top of the screen once the first capture is made (the countdown will be stored). The number of countdowns in a row will be stored. Whenever a move is made, the countdown number will decrease by 1. If another capture is made, the countdown will start over from 50. Once the countdown goes to 0, the program will compare the number of pieces that each side has and state the winner (the side with more pieces) with another dialogue if there is a difference. If not, the program will start over the countdown from 50. When 2 complete countdowns (100 moves) happen in a row, a dialogue will pop up stating that the game is a draw. Both the dialogue with a winner and the dialogue indicating the draw (a confirmation dialogue) will have a “Home” button to go back to the first interface after clicked.

In general, a user uses the app by starting the program and clicking on the options and, during the game, the pieces and places on the board. GameSalad will be used to develop the functional prototype. The movements of the pieces can be done by changing the positions of the pieces (with x and y values indicating how far left and how far right). The game with the information of all pieces will be stored in a table (a feature in GameSalad). Whenever a move is done, the table will be updated. Other information can be stored with other attributes (particularly integers and booleans).

5. Assumptions and Constraints

It is assumed that users have an iphone with a screen size of at least 640*960. The users have to have access to the internet to download the app and enough memory to store it. The users should be literate

enough to understand the rules. It is assumed that apple will not increase the iphone screen size drastically in the future (even larger than the iphone 6 plus).

The program has to be developed before April 14 which constrains the development of the app. The rules of the chess game might not be perfectly developed due to the time constraint. The traditional chess game has been digitized many times and will be a major competitor for the Trigame due to its dominance. Since the developer of Trigame is new to GameSalad, the program might not be developed with the most efficient logics and might cause unnecessary data usage.

Research Results

I interviewed 5 people (teachers and students) who are related to math, science or engineering. For students, questions regarding their career paths were asked before the interview to ensure that the interviewee is part of my target group. Teachers were interviewed according to the subjects they teach.

Here are the interview questions:

1. Do you like chess?
2. Do you believe that playing chess games will practice your logical deduction skills or not?
3. Do you believe that chess games can sometimes be creative ?
4. If a new chess game was to be invented, would you try it out?
5. Would you choose chess as a type of entertainment?

Participants' answers to the questions:

Tairan (a student thinking of going into engineering in the future):

1. I don't like chess because I don't really know much about it and I am not too willing to.
2. Yes
3. Yes
4. Yes
5. Yes, perhaps.

Haoran (a science student thinking of going into biological research in the future):

1. Yes. It is easy and portable.
2. Yes
3. No. There is nothing new about it. It has existed for too long.
4. Yes but I will probably not end up liking it.
5. Yes, only when I am bored.

Mrs. Jones (a math teacher who knows a lot about mathematical education):

1. Yes

2. Yes
3. Yes
4. Yes. I will also encourage the students to try the new game.
5. Yes. I will also encourage the students to use it as a type of entertainment.

Sam (a student thinking of going into medical research):

1. Yes. It is a fun game
2. Yes
3. Yes
4. Yes
5. Yes

Dr. Huizinga (a biochemistry professor)

1. Yes. The exercise of logical thinking is fun.
2. Yes.
3. Yes.
4. Yes.
5. Yes.

Analysis:

A lot of questions asked were based on the most popular chess game because the interviewees are more familiar with that game. They can have a thoughtful answer based on their experience. Most interviewees are interested in chess which makes Trigame more readily acceptable among my target group. All of the interviewees believe that chess can practice logical deduction skills. This would guarantee the usefulness of Trigame (similar to chess with a lot of logical thinking involved) for math, engineering and some science students, since logical thinking is fundamentally important for these subjects. Most interviewees believe that chess can be creative except Haoran who believes that chess is boring due to the fact that it has existed for a long time. Both answers are significant. Since Trigame is similar to chess, Trigame's creativity will be recognized and appreciated by most people in the target group. Haoran's answer makes my game even more desirable since Trigame is a new game (few people have experienced it) created with creativity being one of its principles. Science and engineering students will most likely benefit from the game since their careers require the ability to make something new. If a new chess game will come out, all interviewees will be willing to try it out (Mrs. Jones would also have her students try it out). This would make marketing and distribution of Trigame easier. Most of the interviewees would choose chess as a type of entertainment (Mrs. Jones would encourage her students to try it out as well), although a few showed some reluctance. This means that my objective of making the Trigame a source of entertainment, will most likely work out. With 2 people not willing to be purely entertained through classical chess, it can also be concluded that people in the target group may be more interested in a game that will practice creativity and logical deduction. This makes the rules for my game important. I have to make sure that the game does not restrict the players too much and that

players can use their sense of logic to play (of course, this should not be made too easy). In the future, the rules can be revised to better fit the consumer's needs.