Trio
A game of skill

Game produced by Dustin Hu and Jackie Xu, with the guidance of Don Smith

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Introduction

Hello, dear reader and possible game player, and welcome to our little game of Trio - a game of skill and math, in which one attempts to get three in a row, much like in the game of Tic-Tac-Toe. However, if you are reading this, chances are that you aren't here to read about how to play the game - you're looking for an introduction, a little briefer on the game, its creators, and its purpose.

Now then, first off, this is a game that is based upon, but is not quite like the game Tic Tac Toe. Unlike its close relative, there are not up to 9 "Pieces" or marks upon the board, but rather, there can only be 6 pieces upon the board at any given time. However, the fact that any piece can move to any unoccupied square makes this game significantly harder, taking out any element of chance and randomness, and changing it into a purely skill based game, one that will, hopefully, provide you with hours of entertainment.

However, it is only with the efforts of the valiant team of developers that we were able to create this game for your enjoyment, so we, in a moment of narcissm believe that we should dedicate a couple paragraphs to a little bit about the devolpers of this game that you will enjoy.

First off, as the one writing this introduction, there's me, Dustin Hu. I am 15 years of age, and a high school student at the time of writing. However, I am not only a high school student - I am a cryptocurrency miner, a computer science hopeful, and a fast learner - fast enough, hopefully, to amuse to teachers who read and mark my stuff.

Now, the other developer, the only other one, really, is Jackie Xu. He is also 15 years of age, and a high school student at the time of writing - a

classmate of mine. He is a fellow computer science hopeful, and also a fast learner - but significatnly better than I am at math, though his english skills are somewhat lacking.

But that's enough of ourselves, I think, to last you for a while - after all, you're not reading this to learn about our lives, and nor is this an autobiography, so alas, while I may wish to continue talking about ourselves, I cannot. Moving on, however, we reach the purpose of this little game - a culminating project for our 10th grade Computer Science course, ICS201, a project that will combine all the little projects that we did for the last few months into an overall larger project.

Setting Up

Now then, welcome to the game of Trio! Upon starting this game, you will be met by a screen that looks like the following:
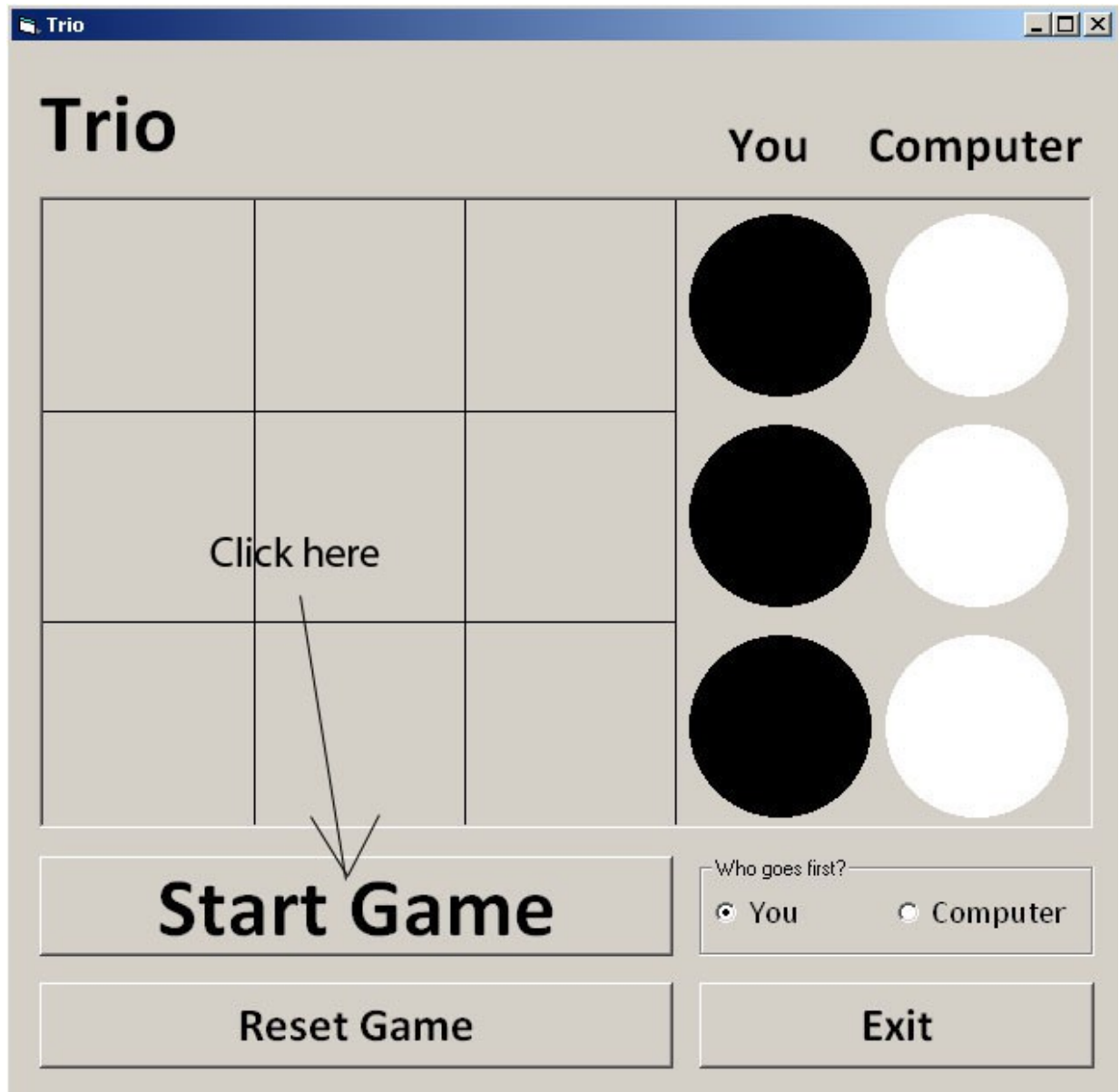

Now, as you can see, there are a variety of options available for you – you can start the game, you can reset the game, or you can exit the game. However, in order to start the game, you must first choose who goes first, in

that box right above the exit button, by clicking on one of the two. If you choose to go first, and you click the start game button, then you have the first turn. Otherwise, the computer gets the first turn.

Playing the Game

Now, playing this game isn't very difficult - all that you have to do is the following. First, you have to select the piece that you want to move (you can only move your own), click on it,
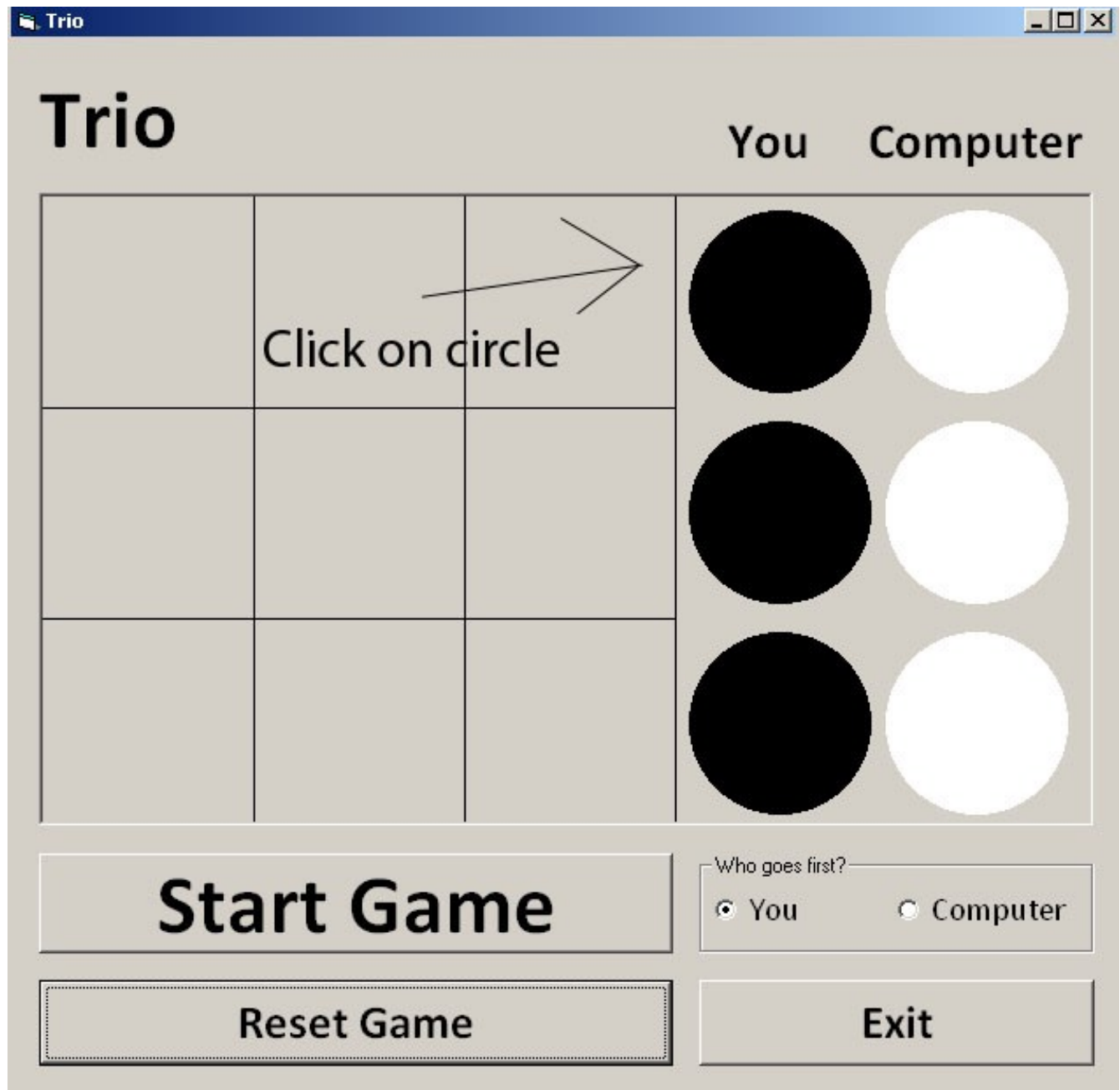
drag it to the square that you want to place it on, and then release the mouse.
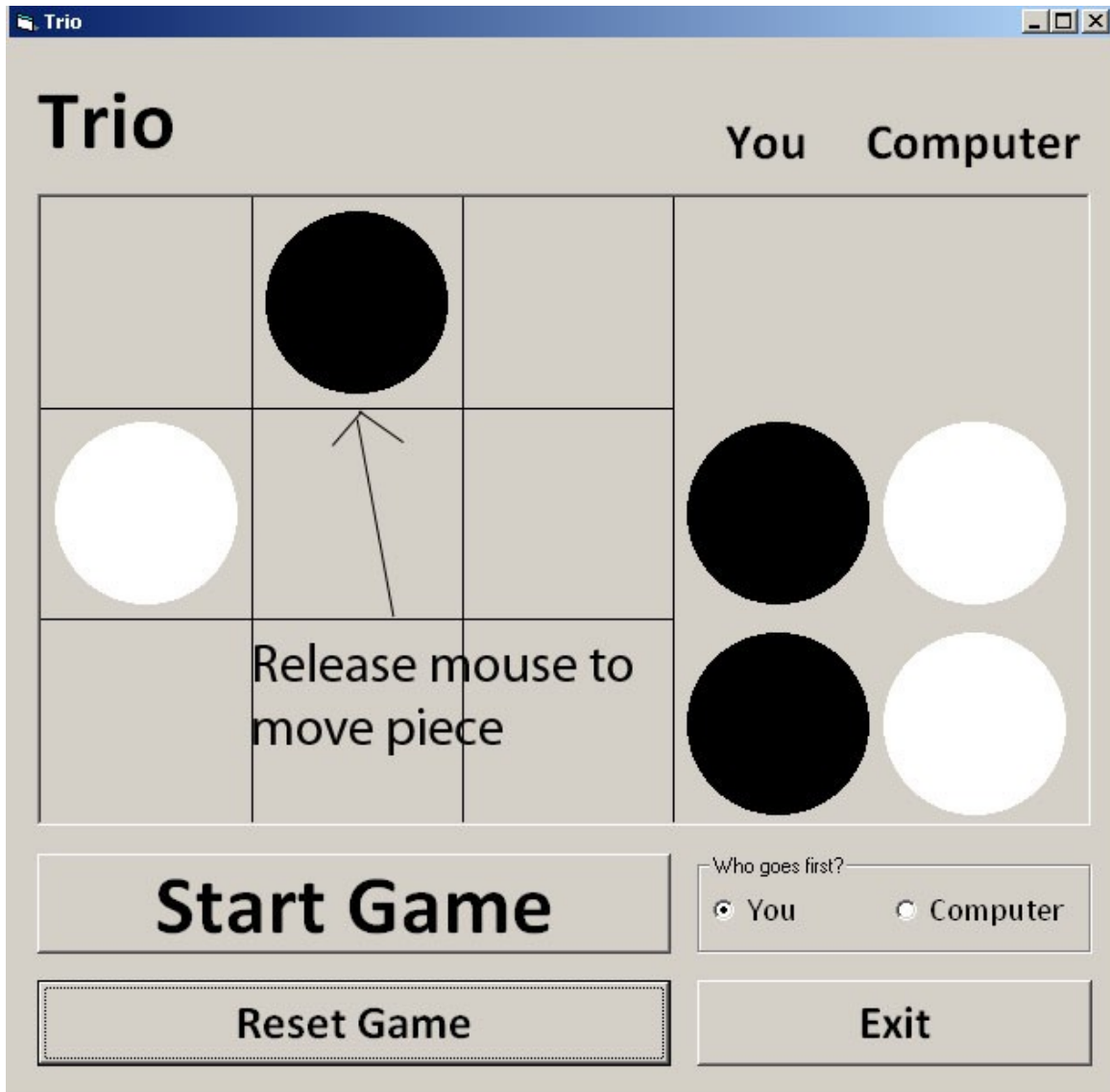
Once you release the mouse, the computer will automatically make its move and place its own piece.

Winning the Game

Now then, onto the meat of this game - how to win it! In order for you to win at this game, you must get 3 of your pieces in a row - 3 across, 3 diagonally, or 3 up and down. Although you may have had made it this far easily, this is the hardest part, as the computer will, for the most part, attempt to block you and win itself.

Moving on, we find ourselves at the three possiblities for a win, the first of which is 3 across - a winning position for whoever is in this position, as is shown in the diagrams below.
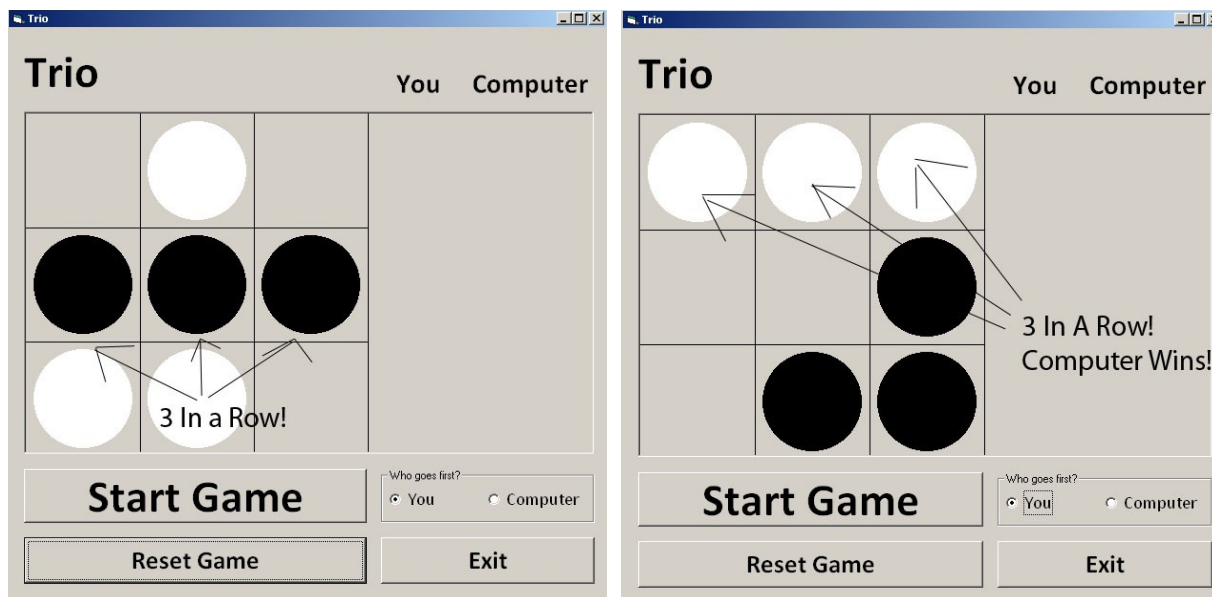

As you can see, in order to win the game, you must be able to get 3 in a row, forming a "Trio", as the title says. Now then, in order to get to this position, you must click and drag your pieces around, much like in the start, and after you do so, the computer will as well.

However, there is always more than one way to win a game. In fact, there

are three ways to win this game, the second of which is shown below,
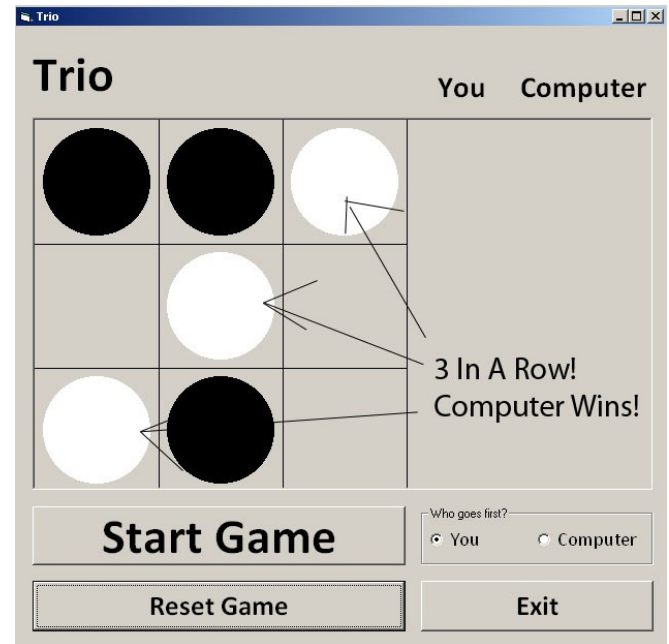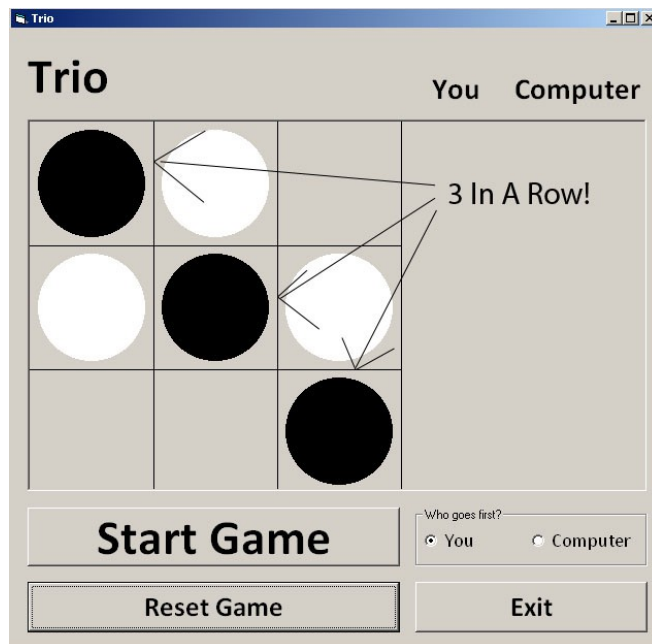
And finally, you can do this.
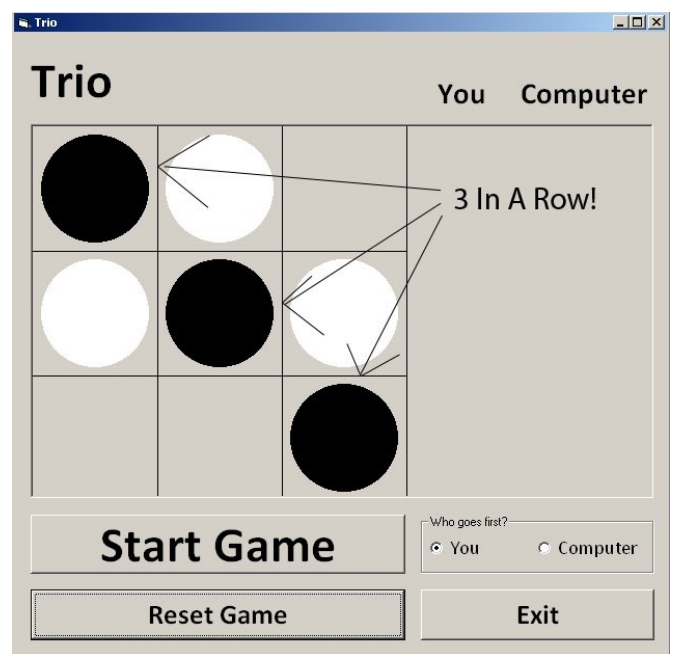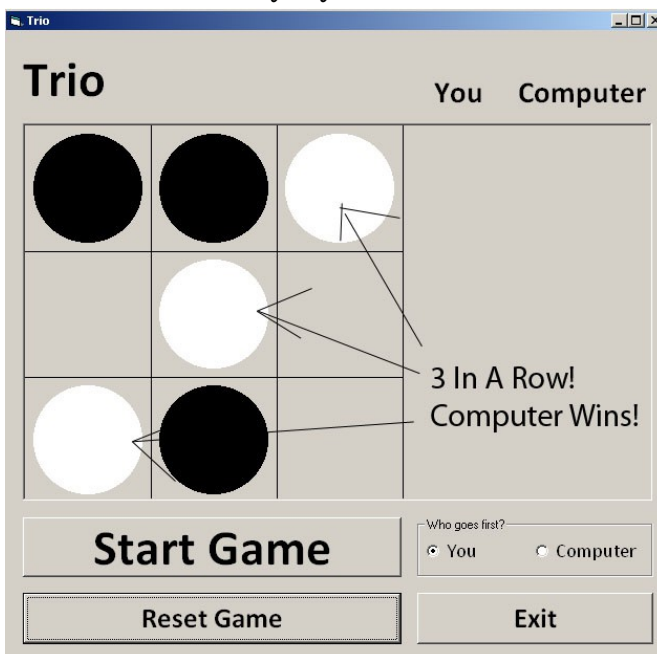
And that's about it for how to play the game. When you feel that you want to start over, just hit the reset button, or if you want to exit, hit the exit button.

Tips and Tricks

Before we leave you alone to play and experiment with this game, let us give you a couple tips and tricks to win.

First off, you don't want to focus solely on wininng once – that won't cut it. By this, we mean that you shouldn't focus solely on getting that three in a row, as doing so will only mean that the computer will block you. Rather, you should try to get yourself into a position in which you can potentially win in two different ways – winning both across and down, winning diagonally and across, or wininng diagonally and down, which would cause the compuetr to lose.

Why does this work, you may ask? Well it works because the computer can only move one piece – meaning that it can choose to either block you at one square or the othre, but not both, which would cause it to lose!

One way to achieve this is to attempt to hoard the squares in one of the corners.

Conclusion

Well, folks, that's all that there is to this game – a game made by a pair of high school students for their culminating project. We hope that you, the player, will have endless hours of fun in playing this game. Happy games!

Notes

Now then, if you're reading this, chances are that you're not really interested in the game itself, but are more interested in how it works and why it works.

The "AI" portion of it isn't really an AI at all. In fact, the computer is able to choose its moves based on some simple but repetitive math. To begin with, this whole game is based on the principle of the magic square - a square in which all the numbers in a row, column, or diagonal all have the same sum. In this case, that's 15.

Now, for the "AI" to work, all that it does is first create a list. This list contains all the possible numbers in the square, which are, in this case, the numbers 1 through 9, so the list looks something like "1,2,3,4,5,6,7,8,9". What the computer does is that it stores every move that you make as a number between 1 and 9, depending on which square that you put your piece on.

Next, the computer will compare the list with all the current values of the pieces. Every value in the list that is held by a square is thrown out, leaving a list of available squares. For example, should there be pieces on squares number 1,2,5,6,8,4, then the list would go from "1,2,3,4,5,6,7,8,9" to "3,7,9", leaving three posibilties.

After that, it will stick the remaining numbers in the list through a loop. This loop adds up all the possible sums of the computer or the player pieces, and, if it determines that there is a number in the remaining numbers that can be added to the sum of the player's or the computer's current pieces, it will set a piece there, allowing it to win.