

# Journey through Game Design

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*Simulation Games in Education*

*Spring 2010*

## Introduction

At the very beginning of semester we were required to choose a final project to work on. I found this a bit odd and had the slightest idea what to do. After creating my Telegraphy, which was a new concept for me, I thought I had it all figured out. "It's a class on Simulations and Games, I like games, the students I work with like games, I'll just create a simulation or game", is what I thought to myself; little did I know what I was getting myself into. I decided that I was going to design a second grade educational math game.

This document will discuss the stages I went through, the lessons learned, successes and failures. I will first talk about the original plan, the games I came up with, the different tools I tried, and end with the tool that I chose.

## The Plan

The first order of business was to create a timeline that would guide me through the process. The timeline well thought-out and looked good on paper; however, the task did not turn out to be so black and white. One thing my professor pointed out was while it's nice to have a timeline to go by the design process would not be as structured as I had presented it to be. He advised me that many of the steps in the timeline would be more so an ongoing processes rather than something that could be done step by step. This proved itself true during the process. Some questions that were asked of me included: what would make my game different? Why do we need another math game? This is when I went into the brainstorming phase.

Plan	Timeline
<b>1. Research current educational math games available. Research the grade level benchmarks and standards.</b>	2 February - 8 February
<b>2. Decide on what math content will be used for the game and the basic concept of the game.</b>	9 February - 15 February

<b>3. Research software options and choose one to be used based on findings. Read discussion boards, check out games created with the software and how they work.</b>	16 February - 22 February
<b>4. Begin learning to use the software application</b>	23 February - 1 March
<b>5. Continue learning the software</b>	2 March - 8 March
<b>6. Decide on the design of the game; The theme, how it will look, object of the game, how it will be scored, etc.</b>	9 March - 15 March
<b>7. Apply techniques learned using the software , begin integrating math into test designs; Find out what can be done and what other things need to be taken into consideration. Find out if there is a need for additional skills, or more information.</b>	16 March - 22 March
<b>8. Begin the actual design, and test, test, test! Be sure not to go outside of scope of the project.</b>	23 March - 29 March
<b>9. Begin to put finishing touches on design and content; continue testing.</b>	30 March - 5 April
<b>10. Verify everything is working properly. Seek feedback from other students in class; make changes if necessary.</b>	6 April - 12 April
<b>11. Present to BETC, seek approval to test with students. Seek feedback.</b>	13 April - 19 April
<b>12. Test with students if approved. Take notes and seek feedback.</b>	20 April - 26 April
<b>13. Fix issues that were found during testing; Test again with students. Summarize findings and prepare project for submission.</b>	27 April - 3 May
<b>14. Finishing touches/submit project</b>	4 May - 9 May

## Brainstorming

Brainstorming was a big part of the project.

## Game Ideas

- Board Game Math Game ( Online and Board Game)
- Math Tic Tac Toe
- Math Hang Man
- Math Challenge
- Race Car Math Challenge

### Board Game Math Game

The idea here was to create a board game first and then create a computer/web based version of it. The game was going to have questions based off of math benchmarks that could be played in a school setting, with family or with friends. This was an idea I really liked and still may revisit in the future, however, having it completed the way I want it in the time that I had was not feasible.

### Math Tic Tac Toe

Just as the original game of Tic Tac Toe the game would use Xs and Os but with math concepts. In this game if the player answered correctly they would get an O and incorrectly an X. Game would continue until either the computer, player or Cat won. After doing a little research on the web, I found similar games exist. The idea lacked originality, so it was on to the next idea.

### Math Hangman

The next idea proved to be unoriginal as well. The idea was to do a Math version of Hangman. The game would have included word problems and also numeric math problems. After a quick search, I realized this too was already available. My game would have differed only by having numeric problems in addition to the word problems.

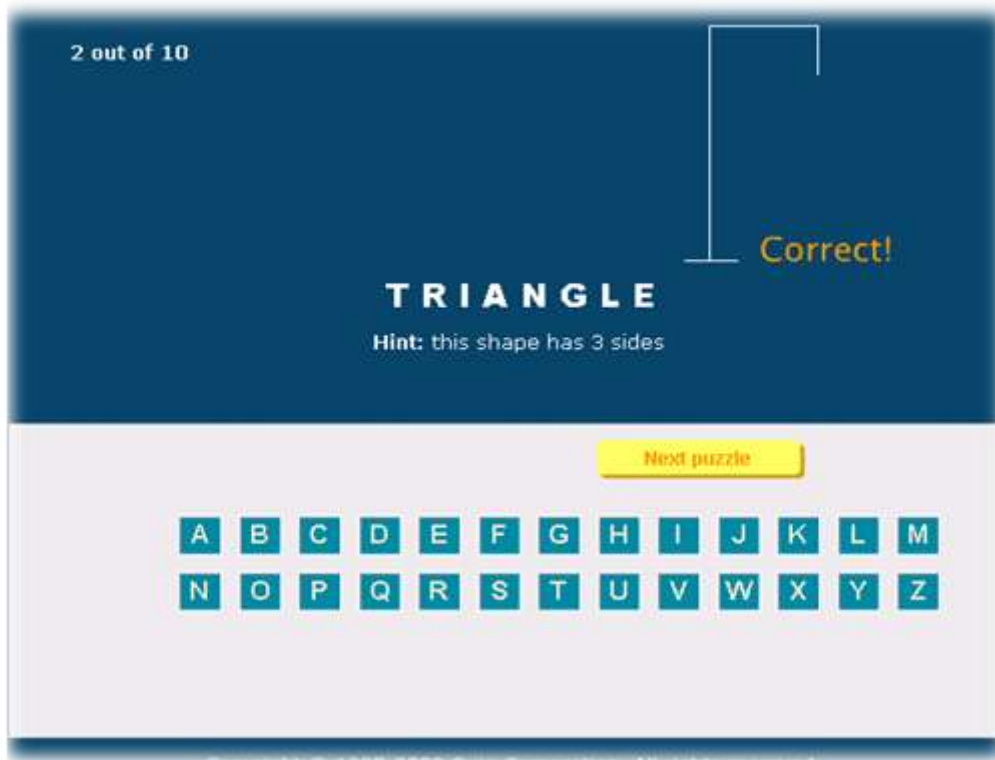


Image from <http://www.quia.com/hm/81768.html>

## Math Challenge



My First Game Design Attempt in Scratch

The idea behind Math Challenge is to have a series of questions that are asked at random. The questions will be based on second grade Math Benchmarks. The game would have a total of 10 questions. The number of questions answered determines the rank of the player. The player could then play again in attempt to rank higher. The Game would have a character (Gurdy, as pictured above) that stands in a classroom and asks the questions. After the player types in the response, the character thinks for a moment and then provides feedback. If the answer is incorrect, the character gives the correct answer and goes to the next question. If the question is answered correctly, the player scores a point. I feel as if this game is fairly original, although there may be similar games.

## Race Car Math Challenge

This game is similar to the Math Challenge, but differs in the point system. The way the game works is there are two race cars, one is the player and the other is the computer. As questions are asked, the player will type in their response. If the response is correct, the player's car moves forward. If the response is incorrect, the computer's car moves forward. Play continues until the first car reaches the end. If the computer reaches the

end first, the player has lost, however, if the player reaches the end first, they have won the challenge. This game also would pull random questions from a pool of questions. Racing games are easy to find online, but I feel like this is an added element that may not be as widely available.

## Game Design Options

The most daunting task was choosing the software or tool to be used for the game's design. This had to be the most time consuming part of the process. The problem was figuring out which tool would work best for the game and which one could be learned during the semester.

### What needed to be done?

- Learn about the software and find out if it was capable of producing desired game.
- Find out what was required to use the software, skill level, experience, etc.
- Play games that use technologies being considered
- Download and play with the software, do tutorials, read forums, search support databases

## Tools

### JavaScript

After playing a few games that were created using JavaScript, I decided that there may be a better tool for the results I wanted.

### Adobe

First in order to use Adobe Tools I had to have access to the software. Adobe Software is very expensive. I decided to get a 30-day trial version of the software. I filled out a request online and within a week or two the Adobe eLearning Suite was mailed to me. I installed the software, fully aware of the technical requirements. The software requires a big chunk of system resources and also has RAM and disk space specifications. Nonetheless, I was able to install the software successfully. Once installed, it was time to play.

#### Adobe Flash CS4

Flash is often used for games so I thought it would be a cool tool to use for my Race Car Game. After doing a short tutorial on using Flash, I realized how much was really involved. Most of the graphics are created in another tool then Flash is used for the animations and altering.

#### Adobe Captivate 4

I've done some pretty cool trainings using Captivate so I thought it would be a nice tool that I could use in building my educational game. Although the software is primarily used for simulations and training, I thought I could tweak it to making it a fun game. Because Captivate 4 is new there was not much documentation for the software. I actually found a board game design template that went perfect with my idea; however it was only for Captivate 3. Due to the limitations of the software I decided that it was not the best tool to use in the time I had.

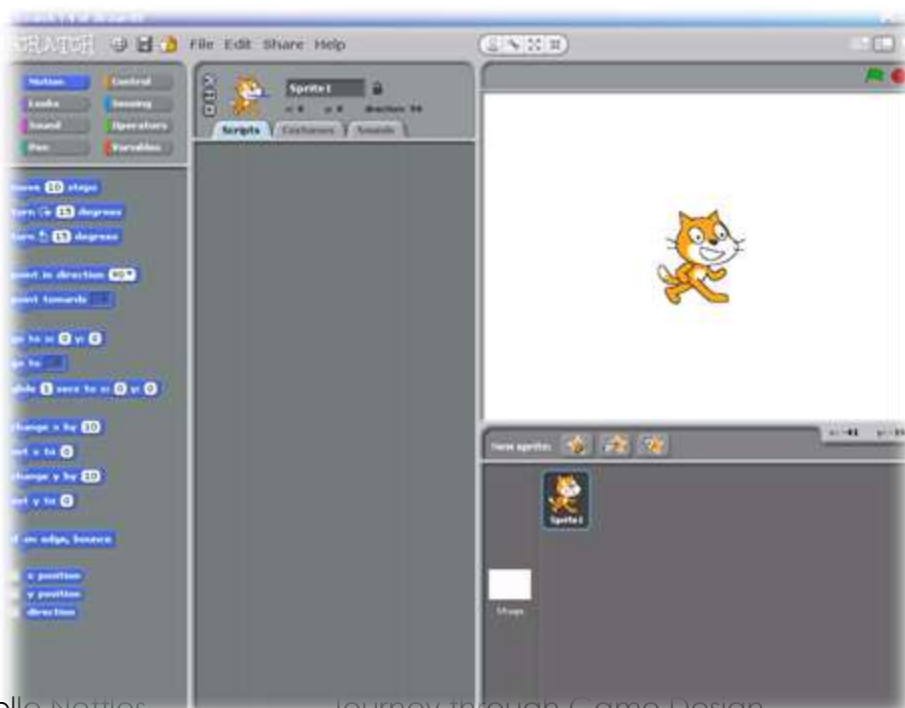
**Game Maker** was a contender because it is less complex than some of the other options. I created a game using Game Maker during the semester, so I figured it may be a good starting point. After starting the creation of my game I decided I would not use Game maker.

**Scratch** uses a drag and drop method that makes it very user friendly.

### Choosing a Tool

After a bit of trial and error I decided to stick with Scratch. Although I like some of the other options, Scratch seemed to be the most appealing because of the ease of use. I felt like it was one I would likely be able to learn in the time I had. Another factor that played a big role in my decision was the graphics used in Scratch. Because the game is geared towards 2<sup>nd</sup> grade students, I wanted the graphics to be more colorful, bright and fun. Scratch also had a well established website with support, forums and many games I could test out.

### Learning to use Scratch



Learning Scratch has been quite an experience. I began with tutorials which have been helpful in teaching me how the different blocks worked. After messing around with the tutorials it was time to try my hand at it. It didn't take long for me to realize that I still had a lot to learn. What really helped me was playing other games made using Scratch. If I found a game that did what I wanted my game to do, I would download the game to study the code. Being able to step through the code has also been helpful. I searched the forums, games and web for additional help. I found a cool website called <http://learnscratch.org> that has helped me along the way as well. The site has video tutorials that walk you through various aspects of Scratch.

### **Trial and Error**

The process of designing a game has involved a bit of trial and error for me. This is not necessarily a bad thing. Sometimes we learn best by figuring out what doesn't work, thanks Dr. Ferdig for pointing that out. I tried a number of different tools and once I chose a tool it took a lot of figuring out what worked and what didn't to actually create the game.

### **Feedback**

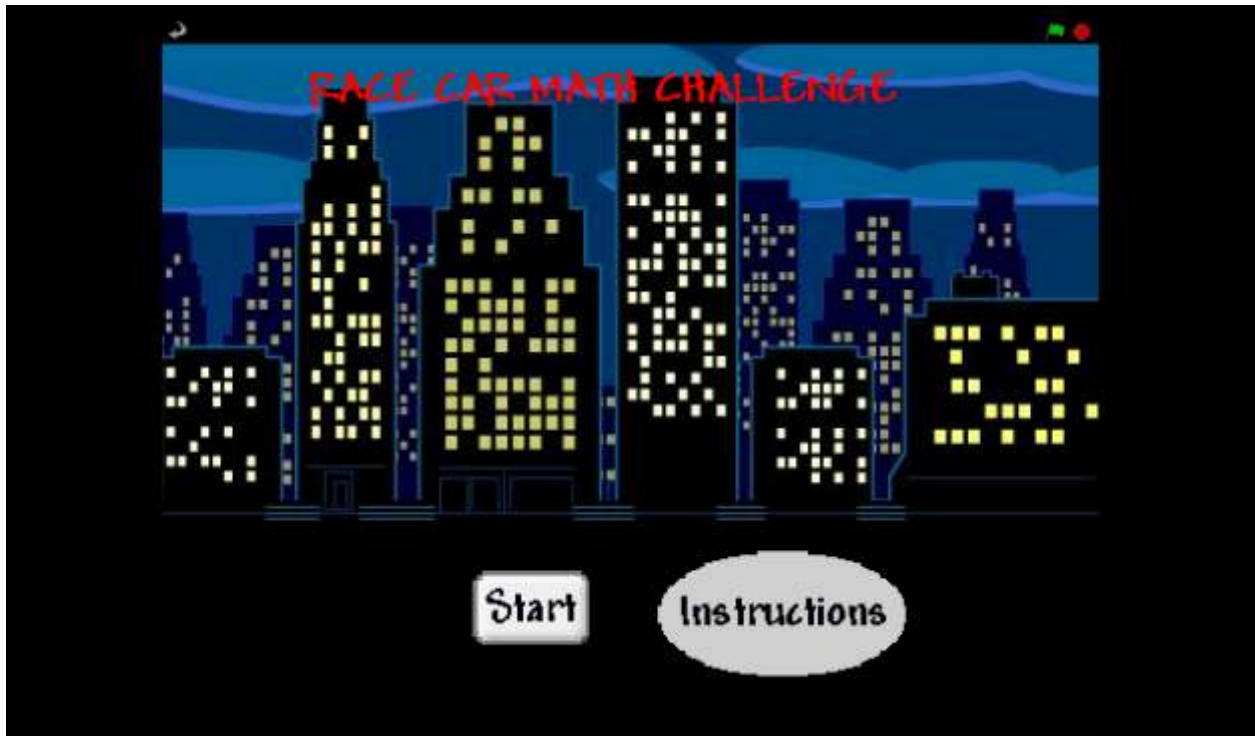
One thing wish I had a chance to take advantage of is receiving feedback during my design phase. I really wanted to receive feedback from students, my peers and also the scratch community. Although I still have the opportunity to do so, it will not be available to me before submission of my final project. The game is now posted for review by the Scratch Community. I also put a link to the game on my Facebook page for my friends to try and lastly I have posted it to our forum in the Simulations and Games in Education course. Feedback is important because as the creator we sometimes miss out on some of the less obvious issues.

### **The Game**

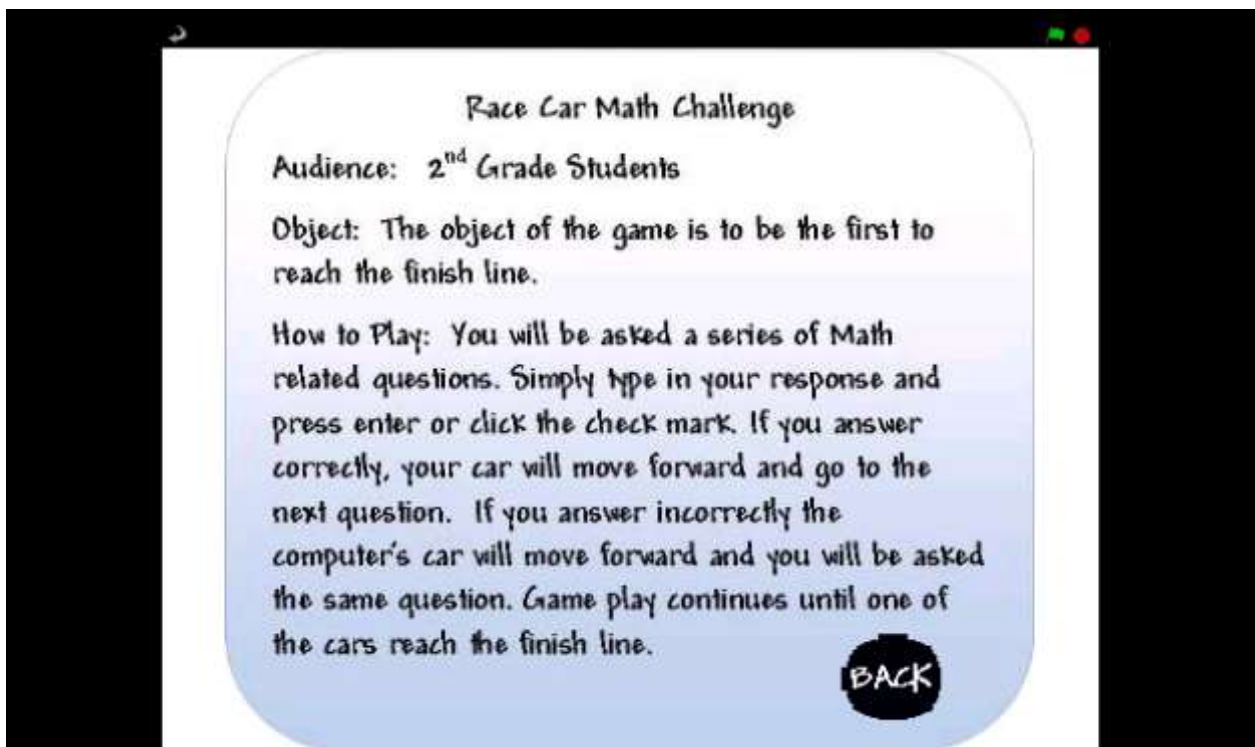
As planned I created a Race Car Math Challenge game. As I went through the design process, I tried to keep in mind the different concepts I've learned over the semester. The game has instructions, a goal, interactivity, music, sound effects, educational concepts, and it provides immediate feedback. Although the game is fairly simple, I feel that it is a success. My goal was to create an educational math game geared towards 2<sup>nd</sup> grade students. All the questions are based off of 2<sup>nd</sup> Grade Math Benchmarks.

The game can be found at <http://scratch.mit.edu/projects/tashae29/1036606>

Below are screen shots from the game.



Main Screen



Instructions





Game Screen

## Conclusion

This has been a challenging yet rewarding experience. As a result of taking the course and completing this project I have gained a better insight into Game Design as a whole. I realize now that there is so much involved with the whole process. The process requires research, creativity, a plan, time and a willingness to learn. I enjoyed working with Scratch, and although I'm only at the novice level I realize it's potential. Scratch just requires you think things through. With any programming language you have to know what the end result should be and then you take the necessary steps to get the result. It'll take some time before I am able to put out a more advance game, but the lessons I have learned through my journey through game design has prepared me for what's yet to come.

<http://scratch.mit.edu/projects/tashae29/1036606>