**BreakoutFX: Status Report 1**

<https://github.com/SecondLogic/Breakout>

04/26/2021

**Completed Tasks**

* Implemented R-Tree data structure for storing spatial data
* Ran general R-Tree insert, deletion, and query tests
* Began implementing shape objects
* Ran crude UI redraw tests
* Changed paddle control to be bound to cursor position instead of keyboard input

**Upcoming Tasks**

* Implement precise collision detection for specific shapes (rectangle, circle)
* Implement velocity for unanchored shape objects
* Implement collision solving
* Run collision tests

**Possible Issues**

* Encountered somewhat rare problems with artifacting and nodes refusing to redraw properly when using JavaFX Tasks to changed node position.
* There is no way for me to visualize the R-Tree distribution currently, but I will just trust that it will work as intended.
* I might have underestimated the time it will take to complete this project
  + The positive thing is I have completed the parts of the project I feel are the most experimental and require the most trial and error.
  + I am still confident I have enough time to complete 80% of the project by the deadline

**Project Notes**

Implementing the R-Tree data structure took longer than expected because it took me a lot of time to gain an intuition for how the data structure works. I thought of designing the algorithms from scratch, but it was taking me forever to determine the best heuristics to use for determining the insertion path of the nodes as well as how to implement them. In the end, I referred to [Beckmann’s R\*-Tree descriptions](https://infolab.usc.edu/csci599/Fall2001/paper/rstar-tree.pdf) to orient my implementation towards something that will at the very least function as the data structure is intended to.

Even with the R-Tree implementation alone, I have already learned a lot of new things about working with Java such as multithreading, nuances with linked lists, comparators, and event driven code using lambdas. I have yet to figure out the nuances of the way JavaFX renders the scene. I have been experiencing problems with nodes refusing to update occasionally and I would like to find a way to fix the problem although it is currently not high in priority.