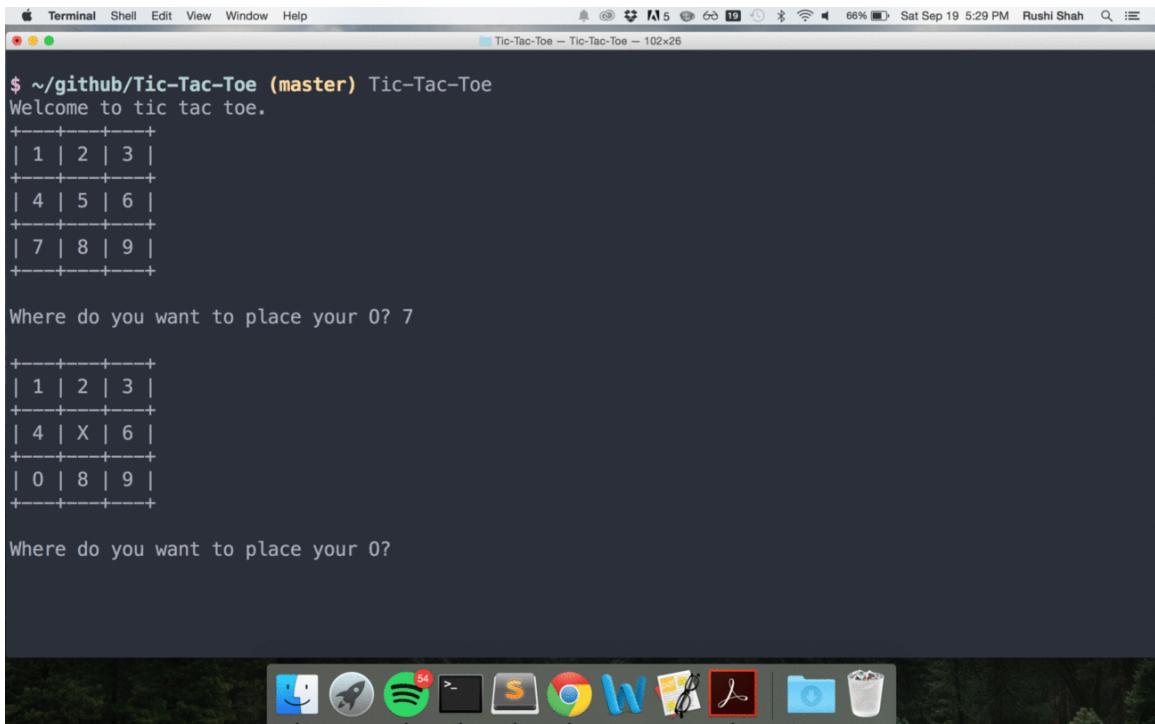


Hack the North Part 1 - Tic Hack Toe

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A screenshot of a Mac OS X desktop. At the top, there's a menu bar with 'Terminal', 'Shell', 'Edit', 'View', 'Window', and 'Help'. The title bar of the terminal window says 'Tic-Tac-Toe — Tic-Tac-Toe — 102x26'. The terminal window itself shows a command-line interface for a Tic-Tac-Toe game. It starts with a welcome message and a blank 3x3 board. It then asks for a move ('Where do you want to place your O? 7'), updates the board with an 'O' at position 7 (top row, third column), and asks for another move ('Where do you want to place your O?'). Below the terminal window, the Dock contains icons for various applications like Mail, Finder, and Safari.

```
$ ~/github/Tic-Tac-Toe (master) Tic-Tac-Toe
Welcome to tic tac toe.

+---+---+---+
| 1 | 2 | 3 |
+---+---+---+
| 4 | 5 | 6 |
+---+---+---+
| 7 | 8 | 9 |
+---+---+---+

Where do you want to place your O? 7

+---+---+---+
| 1 | 2 | 3 |
+---+---+---+
| 4 | X | 6 |
+---+---+---+
| 0 | 8 | 9 |
+---+---+---+

Where do you want to place your O?
```

Hack the North 2014 was where it all began. Sure, it was technically my second hackathon, but it was my first collegiate hackathon (I was a junior in high school) and it was my first international hackathon. Well Canada has done it again, because Hack the North 2015 has been great so far (it is about 1AM on Sunday morning).

My team and I were vacillating about ideas for most of Friday night and Saturday morning so in my spare time I continued learning the dark arts of Haskell. I decided to make a project rather than just chugging through CIS194 (partially because I was stumped). Since I had so much fun making a [sudoku solver](#) in Haskell, I decided to make a Tic-Tac-Toe game. Just a simple terminal gui and a decent computer AI for anybody who wants to take a quick break while coding, you know?

Well boy was it a learning experience. For example, this was the first project that I created without that much outside structure in Haskell. Even with the Sudoku solver, I followed an assignment sheet for a sort of roadmap. But I was flying solo on this one, which was liberating!

The project itself was split up into two separate parts. First of all, the game mechanics and the AI of tic-tac-toe, and second of all the user-input/interface. Typically in an imperative language, the I/O is the easy part, and the AI is the hard part. But that was not the case with this project.

1 The Game Mechanics and the AI

I just followed this [general outline](#) on the decision tree for the program. It was surprisingly easy, and a ton of fun to code. Most of the AI code is in the [TicTacToe module](#).

2 The Input/Output

In python, this would be a synch. Just `location = input("Where do you want to move?")` and wrap the game loop in a while loop until someone wins or the game draws. Haskell is very different, but as I learned, not necessarily more difficult. Loops and mutable variables are a no no so I was stumped for a short amount of time.

I read a lot about fancy solutions like [Monads](#), but I thought that was overkill and I thought that there must be a better solution. After testing out my functions with some [sketchy code](#), I decided it was time to [ask Stack Overflow](#).

The response I got blew me away. Not only was it very in-depth and well explained, the idea was so elegant: mutual recursion between the player's turn and the computers turn that simply stops recurring when the game ends! Coming from an OOP background, that solution would never have been immediately obvious to me, but understanding the solution from both points of view makes me feel almost enlightened. That's the beauty of functional code. It doesn't necessarily have to be better or worse, just different.

Most of the IO code is in the [Main module](#).

3 Hackage Package

The last thing I did was push [the project on to Hackage](#), which is Haskell's package manager. This was my first time publishing my work on any sort of package manager at all, so this was just another adventure. It was surprisingly easy because mostly everything had already been set up using [heineken](#) (which is so awesome), it just involved changing a few config files. One of the most frustrating parts was when everything was working locally but breaking when I installed from hackage and I couldn't figure out why. Turns out I needed to declare the TicTacToe module in the cabal file, so adding `other-modules: TicTacToe` fixed everything. I also followed this [guide on publishing to hackage](#) to make sure everything would go smoothly, in case you are interested in publishing some of your code. What's the moral of the story? The moral of the story is that you can install Tic-Hack-Toe!

Just run

```
> cabal update  
> cabal install Tic-Tac-Toe  
> Tic-Tac-Toe
```