Why Construction Simulator?

After spending a couple of hours reading both the challenges, white-boarding and breaking down into smaller parts, I was more intrigued by the idea of developing the Site Clearing Simulation. Having recently picked up the book Head First Design Patterns, I instantly realized that Command Pattern would be a befitting match for a problem of this nature. A huge part of the decision was motivated by the chance it would give me to apply command pattern on a project and consolidate my skills.

Design

One of the main challenges in this project was to develop it using TDD. I had previously attended workshops on TDD like Code Retreat to understand the concept. But this needed a lot more than that. So, to grasp it further, I quickly finished two courses on TDD from LinkedIn Learning. First a lightweight introduction on TDD by Simon Allardice while the other more practical for Java developers.
Next step was to setup the design. I put the command pattern in place, created a temp receiver class which would respond to commands and lastly broke down the problem into two main categories:

1. One, where I'd have to deal with bulldozer movement on the site.
2. Second, where I'd have to figure out a way to build the site.

Tons of questions poured in. My old habit of writing down everything helped answer most and in setting-up the design.

Some of the main questions:
1. How would you represent the site, what data structure?
2. How would you identify different square types?
3. How would you mutate the squares once traversed?
4. Would each square have a state? How can I change that state and keep a track?
5. How to keep a track of bulldozer movement on the site?
6. How do I know that while moving I passed a tree and record paint damage?

And many more…

Approach

I started writing down each requirement in detail, breaking down each problem into smallest independent parts along with how I could solve those. I started verifying my approach by small code snippets. Writing down everything helped me a great deal in implementing TDD, I used it as a reference to write down tests before coding.

I hit " Aha! " moment when the idea of representing each square on the site as an object of type Square and then creating a 2D array to represent different Square types on the site worked! Now using this idea, I could identify squares, change, and retrieve them by their position in the array.
Next step was to set-up bulldozer movements. A bulldozer would have to move on a 2D Grid that should have the same dimensions as the Square array and have X, Y co-ordinates. This would help me to map the bulldozer with the site. Depending on where the bulldozer is on its grid, I could retrieve the Square type by using it's XY co-ordinates as index on the site array.
Last step was to calculate costs. I had broken down each requirement on costs and written all cases of where it would apply. That made it easy to increment each cost parameter wherever it applied.