Spreadsheet Game Postmortem

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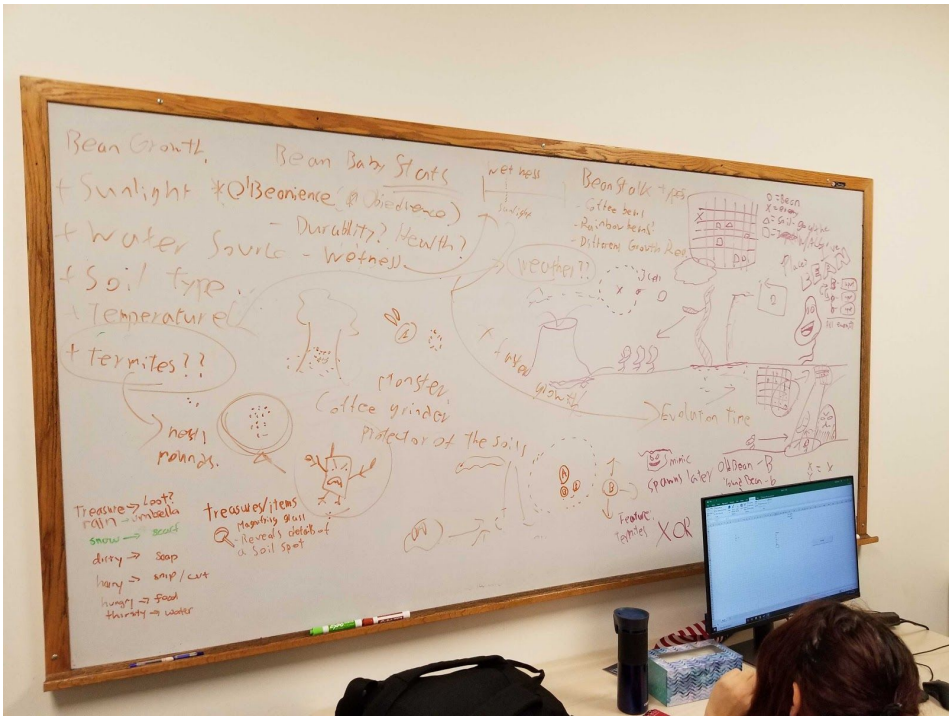
Metal Bean Soil is an **exciting** game with resource management, emergent stealth opportunities, and beanfeasts of charm. The player recommends what direction their beans should move across the forest floor, looking for water, light, and soil, and their beans **may** listen to them, depending on the beans' levels of maturity. Since the game was entirely made in a spreadsheet, each element of the game required reworking drastic simplification in order to be represented in Microsoft Excel. Beans are represented by the letter "B/b", each element is represented by different colors, squirrels are represented by the letter S and Coffee grinders by the letter C. These strict limitations of the format came with a number of design and programming struggles.

The concept was born in the collaboration room (room 3233, to be precise), prior to the assignment of this project, where Wolfe posed the question "what if you're a bean and you gotta walk to a soil…" out of nowhere. This seemingly senseless query was the birth of the game, *The Places I've Bean* (Later known as: *Metal Bean Soil)*. As we filled the whiteboard with ideas, we began our initial development of the game. Later, when the spreadsheet project was assigned, we figured that we may be able to use the idea for this.



Initial Game Development Stage

Let's start by talking about the main objective of this game:

Main goal:

The goal is to navigate beans to soil so that they can grow and become beanstalks. This itself is a process. Whenever a bean is planted, three new beans take its place and the player must plant more beans as time goes on until no beans remain. This ensures an almost infinite circular system.

Game challenges:

So now that we have a system, and a rather dull one at that, we needed some obstacles. The first idea we came up with was to implement baby beans. Because children are, well, children, they will not listen to the player's commands all the time. We considered what sort of stats the beans should have in the game. They should have some way to grow up to become mature beans and, with that in mind, we believed that sunlight would be the perfect element to prompt this growth mechanic. We also decided to add a few enemies that would destroy the beans on the map.

Components:

Obeanience	Our word for obedience. This value determines how frequently a baby bean will follow the player's command.
Adult bean	The adult bean is a bean that will listen to the player’s commands almost all the time. If an adult bean is near a baby bean, the baby bean will follow the player’s command due to adult supervision.
Baby bean	The baby beans are like children who sometimes don’t listen to you and get distracted easily. The idea is that if there are any interesting things around a bean, such as water, sunlight, and enemies, the baby beans’ obeanience will be impacted in a negative way.
Coffee grinder	An enemy unit that eats beans.
Woodmen	A tree monster that patrols around a specific tree that will attack anything that comes into the vicinity of the tree.
Termites	Nasty stationary bugs that kill beans and woodmen.
Water	This resource will short-circuit the coffee grinders and kill them. Any beans moving into water will become wet, which will accelerate their growth when they go into the sunlight.

Sunlight	Any baby beans stepping into the sunlight will grow. They will be immobile until they are fully grown. The speed of their growth is determined by the dampness of the bean.
Soil	Beans that are planted in soil will become beanstalks, which will ultimately produce three new beans to guide to other plots of soil.

Final Game Development Stage

With our previous concept of the game in mind, we figured we could use the existing concept we already had as our game. Our game would need to adapt to the turn-based grid system, which would require us to modify numerous mechanics.

Modified Game Components

Adult Bean	Adult beans no longer supervise the baby beans. There is a small chance that they become lazy and refuse to move when prompted by the player.
Termites	We discarded termites as an adjustment for the scope of this project.
Squirrels	We decided to replace the woodmen with squirrels. The squirrels will have a home space on the grid they will patrol around the cell until a bean comes into its detection range. The detection range is somewhere between 2~4 cells range. Since termites are removed, the squirrels cannot be killed in any way. This creates permanent danger areas on the board.
Coffee grinder	These enemies will continuously spawn over time. Coffee grinders will move randomly every turn, unless a bean is within a range of 2 cells. It will normally avoid hazards like water and squirrels. However, when a bean is in range it will blindly chase the bean even if it will come into contact with hazards. The idea behind this is to provide a way to get rid of coffee grinders on the game field.
Sunlight	We translated the duration required for the beans to grow into number of turns. It will normally take three turns for a baby bean to become an adult bean unless the bean has come into contact with water. In the case where the bean has passed through water before passing through the sunlight, they will instantly grow to be an adult bean.

Development Struggles

The most immediate challenge was learning how to code in VBA for Excel. Nearly all of our programming difficulties came from incorrect syntax or the limitation of VBA. A specific

example would be that we were not able to pass a user-defined object through functions in VBA. This was a crucial problem as our beans were implemented as classes and needed to hold several variables as ‘stats’. In the end, we managed to find an unusual but effective way to pass class objects around, resolving this problem.

Our enemies required some sort of AI for pathfinding and chasing the bean. The AI for the squirrels and the coffee grinders were challenging to implement. We had to ensure our enemies were making a legitimate move on the grid, going in the correct direction, and also not running into hazards.

Since this project was a group project that involved coding, we thought that we could make good use of GitHub for version control. It turns out that Excel workbooks are in the form of a single file and so every push we made would result in a conflict. As such, we could not pull from the project while working on the workbook.

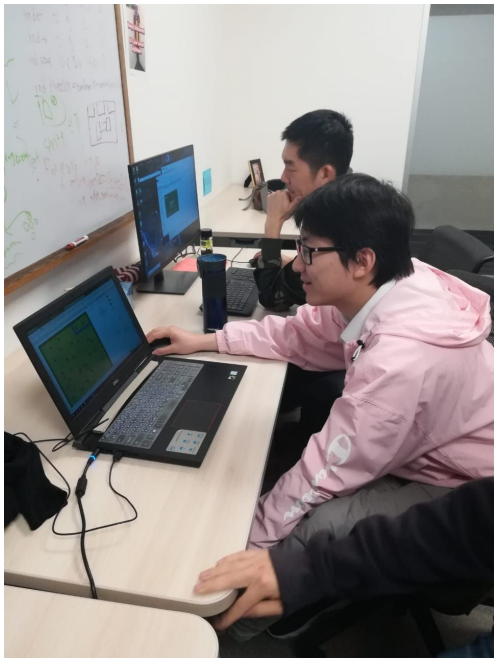
Separating each task was very difficult, too. Some tasks were difficult to work in it alone. When we united them, lots of bugs and unexpected effects appeared.

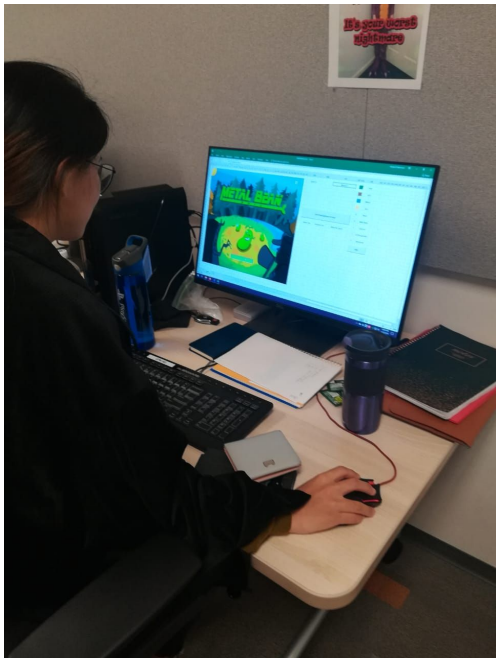
Another issue was that some members wanted to be more involved in the project but not all of us were able to learn VBA. Since this game is mostly based on code, it was difficult for slower learners to pick it up. There were, as a consequence, no more areas to get involved in, and they were unable to further contribute to the project.

Playtesting

Our playtesters pointed out several things after playing our game:

- The instructions were difficult to follow because we omitted some critical information.
- We didn’t want to put too much information in the message box since is a very difficult format to work with, but in the end we were proven wrong since many asked for more information. Since we lacked time to change it, we kept it.
- “It takes forever!” Our gameplay testing suggest users think the pace is too slow.
- Players did not understand some of the feedback we added, specifically the dialogues our characters use.
- “My beans don’t listen to me all the time!” We also found out players think baby beans are too difficult to control.
- “How do I win?” At first glance, players did not understand the game didn’t have a winning condition, only losing condition.
- “Why are my beans moving when I told them to stay?” Players don’t understand that baby and tweans beans have a chance of not listening to you, even if you tell them to stay.
- Some play testers pointed out the map is too big, which affects the pace of the game.




METAL BEAK