Gameslab SoSe 2024, Team Green, Milestone 2

Game Prototype

1. Overview & Progress

We first focused our attention on implementing the core gameplay mechanics and achieving our targeted functional minimum. This includes the basic turn economy and action system, where the player has a given amount of action points each turn, with which he can place buildings or change tiles.
Together with a tutorial map, which introduces the player to the core mechanics of the game, we have achieved our functional minimum and are on a good track overall to achieve our desired target.

Functional minimum

- ☑ ~~One map~~
- ☑ ~~Basic resources: food, water, workers~~
- ☑ ~~Basic facilities: 2 or 3 crop fields, water wells~~
- ☑ ~~Basic turn structure: action points dependent on worker amount, recalculating resources at end of round~~
- ☑ ~~2 soil types: degraded & arable~~

Low target

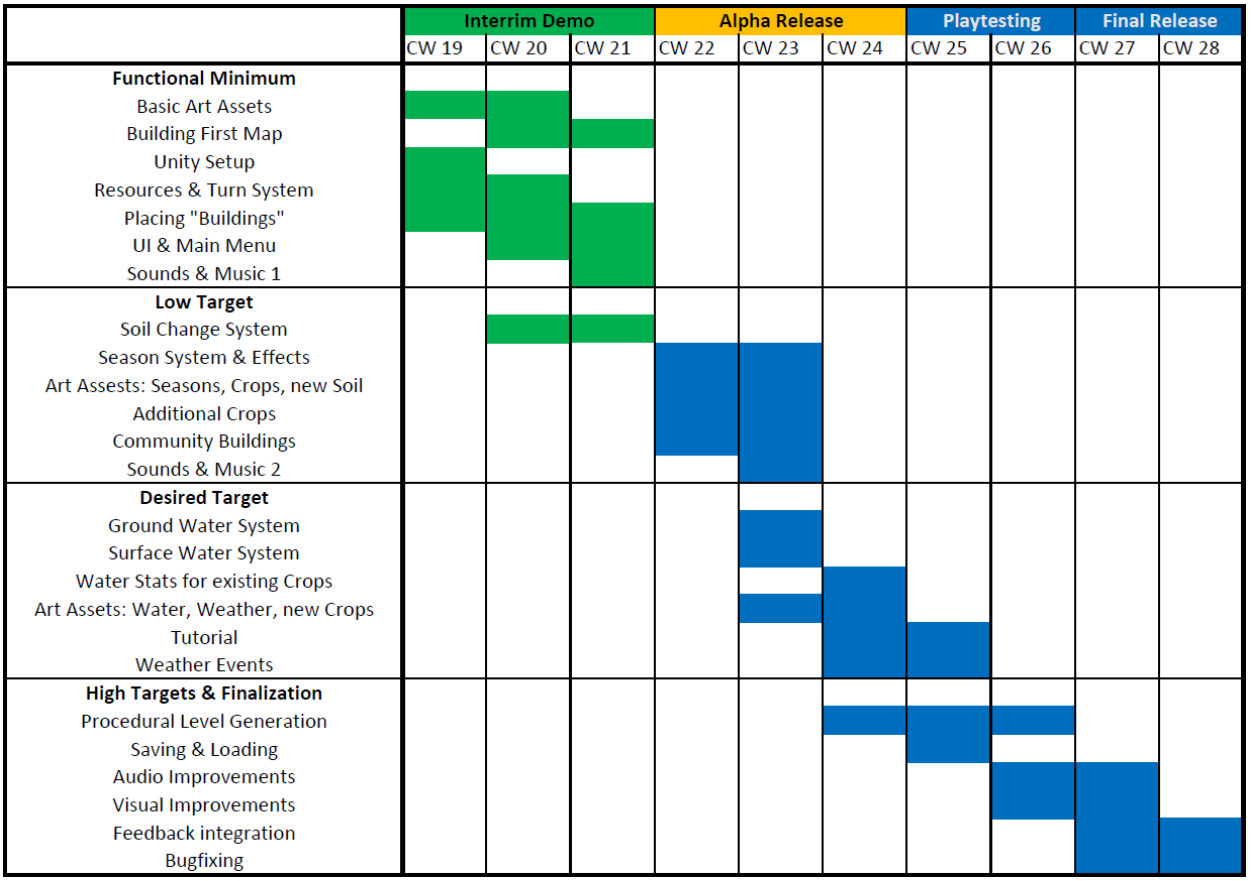
- ☐ Seasons to improve turn variety (Normal, Dry, Rainy)
- ☐ Basic soil change system: arable soil will degrade during dry season if not protected by certain plants, half-moons will turn soil arable during rainy season

- [ ] Differentiation between conventional and permaculture fields (plant resilience to seasons)
- [ ] Half-moons as a buildable structure for land reclamation

Desired target

- [ ] Basic surface water system: water will be retained in natural “pits”, and half moons, and will either dry up over time or sink into groundwater
- [ ] Easy groundwater system
- [ ] Crops need different levels of water, they can die if they are not cared for
- [ ] More crops, with properties related to game mechanics
- [ ] Weather events: Storms, Droughts, Sandstorms… which make it harder for the player to reclaim land, or even directly degrade land occasionally

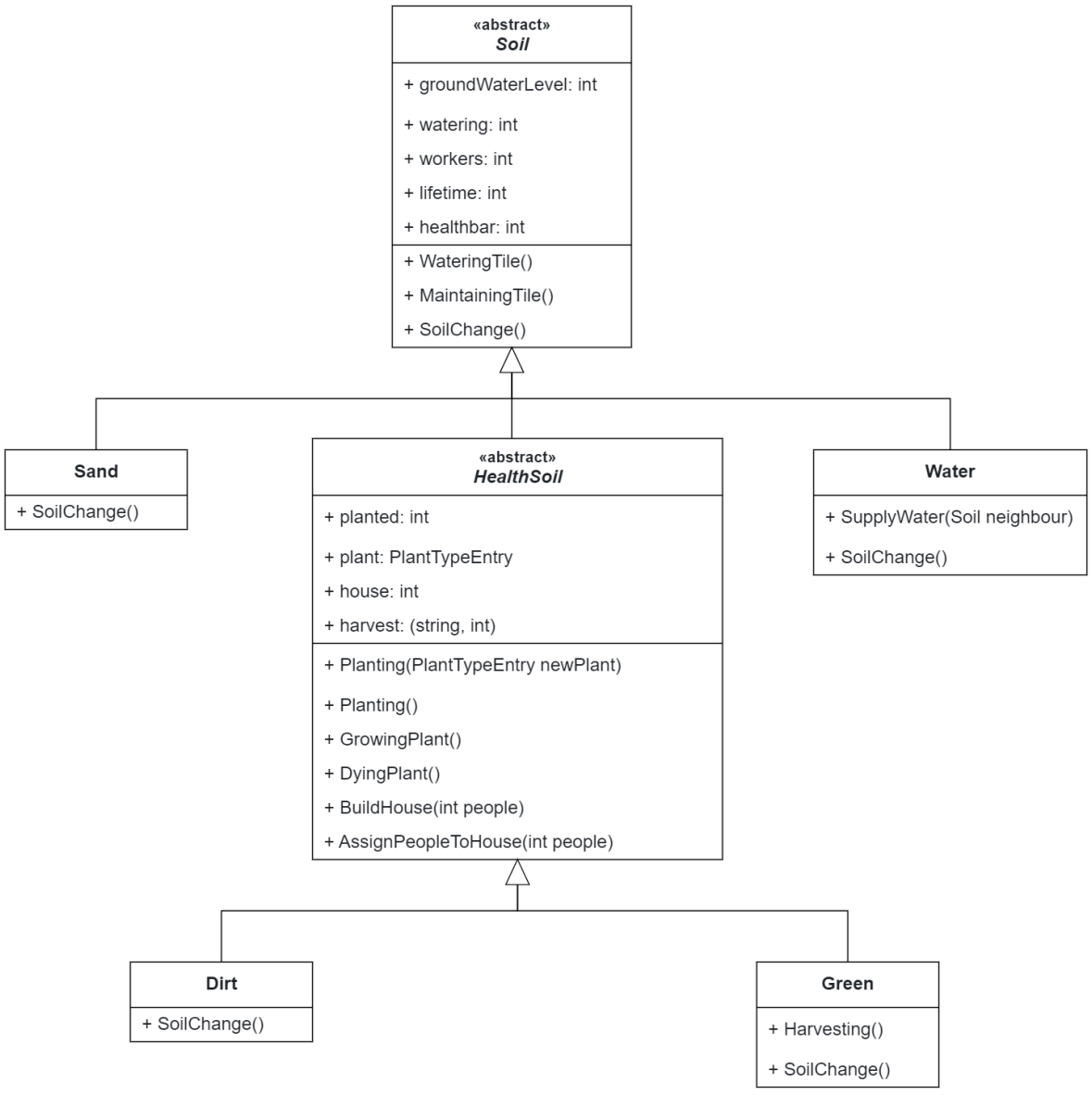
Green: finished subtasks
Blue: not yet started



2. Camera Movement

Players can move the camera by pressing either the middle or the right mouse button and dragging the mouse in the desired direction. Scrolling the mouse wheel allows players to zoom on the map. Additionally, players can't move or zoom outside the boundaries of the map.

3. Soil Hierarchy



Our map consists of four different soil tiles. We manage the type of soil with the soil class hierarchy. Some attributes are the same for all tiles, like their lifetime in turns or health bar. The health bar indicates whether tiles are maintained correctly. It slowly decreases over time

when neglected. Players can assign workers to tiles, who, in turn, can either maintain or water assigned tiles. Taking care of tiles can improve their health again.

The worst kinds of tiles are sand tiles. Tiles become sand tiles when not maintained properly and the groundwater levels drop too low. Players can turn sand tiles into dirt tiles by watering and maintaining them.

Only health soil tiles can be planted or provide housing. Planting a new plant or building a new house only works on previously empty health soil tiles. We divide health soil tiles into dirt tiles and green tiles. Both types of tiles can be planted or offer housing. Only green tiles inhabit fully grown plants that players can then harvest. When plants on dirt tiles are fully grown they become green tiles. The amount and type of harvest are random based on the planted seed. We provide a seed list containing all the different kinds of seeds that the player can plant. Plants die over time when they aren't maintained. Even if health soil tiles aren't planted or provide housing, the player still needs to maintain them keeping them healthy and avoid them becoming sand tiles.

Water tiles are tiles that reach a groundwater level of zero. Dirt tiles or sand tiles that aren't planted and don't provide housing can become water tiles when their groundwater levels increase accordingly.

4. Basic Gameplay Loop

Turn & Action System

We have implemented a basic turn and action system for our game. In this system, each turn allows players a limited number of actions, with the number of actions determined by the number of supplied huts in their settlement. These actions recharge at the start of each turn, so that players can make strategic decisions based on their available actions and resources in each new turn. While the system is functional, it is not yet balanced, as all actions currently have the same action cost and there is no upper limit on buildings. Additionally, we have implemented a basic user interface that displays the available action count and additional information about the game state.

Build / Action Menu

The actions that players can take are context-based and depend on the tile they have clicked. When a tile is selected, a small popup window displays the available actions that can be taken on that specific tile. These actions include planting, harvesting, improving soil, and expanding the settlement, allowing players to interact with the game environment and increase their resource production or improve the map state.
Additionally, some buildings and improvements offer better options than manually working with each tile on each turn. For example, farmhouses affect all the tiles around the building, enabling players to optimise their farming by planting or harvesting multiple tiles or plants with fewer actions.

Resource Management

We have implemented a basic resource management system that includes food, water, and workers. The number of workers depends on the number of houses built in the settlement and directly increases the number of actions players can take per turn. Food is gathered by planting crops, which become ready for harvest a few turns after being planted in suitable soil. Water can be gathered manually from water sources and is also automatically collected each turn by active wells. To help players keep track of their resources, we have added basic indicators on the user interface that display the current amounts of food, water, and workers available.

End-of-Turn Simulations

At the end of each turn, we run a basic simulation on the map to update the game state. Production buildings produce resources if the necessary conditions are met. Plants grow provided there is enough stored water and the soil is suitable. Additionally, certain tiles, such as water sources and wells, have an impact on their surrounding tiles by gradually improving the soil quality over time, making these areas more suitable for farming. We aim to make these simulations more complex as we add more mechanics and options for player actions in the next iterations of our game.

5. Sprites and UI

Sprites and Tilesets

As mentioned in the Game Idea Proposal, we aim to create the game with 2D isometric assets. Moreover, we wanted to use a mixture of free assets available online and assets we would create specifically for our game.

In the end, we decided to use 32x32-pixel isometric tiles (https://scrabling.itch.io/pixel-isometric-tiles) as our base asset pack, while creating new sprites in a similar style. In order to do this, we determined a color pattern, which was used for the basic package, and continued to work with the same pixel isometric style of drawing, keeping the number of pixels at 32 per unit.

In the current development stage, we created several basic sprites for our prototype that weren't presented in the basic package but were needed for further work.

- - Sand Tiles (with different patterns)

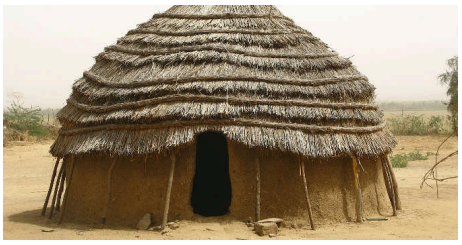
- - Tree Tile

- Small Water Well

- 1x1 House and 2x2 House

Since our game is inspired by the Great Green Wall (GGW) of the Sahara and Sahel Initiative, houses' sprites were inspired by traditional African houses. Even though we don't have enough resources to correctly represent all the countries taking part in this initiative, we tried to incorporate a generally inspired aesthetic to give players a better and more unique experience.

Below, you can see the pictures we used for the inspiration for these sprites.





User Interface

We have created some custom UI assets that can be used as buttons and text windows. Those were drawn in the same color pattern, as the base tileset package.

Thaleah pixel font, available in the Unity asset store, was converted to the TMP font and is currently used as the base font in the game, as it matches the pixel style, we are working with.

The Main Menu is already available with the basic functions such as exiting and starting the game. Moreover, we have a window for information about the

game, which is still unfilled but can be shown by pressing the Info button. The background consists of a placeover picture, for now, that will be changed during the future development.

6. Audio

Our prototype already offers a basic background track that's looped through the entire duration of a play-through and keeps playing throughout scene changes.

7. Evaluation and Takeaways

The theme of our game and the inspiration taken from the Great Green Wall of the Sahel project has been generally well received. Most reviewers also thought that the isometric view, as well as the pixel art style are a good match both for the theme and our chosen "city" builder genre.

We were however advised to focus on a fun core gameplay loop and not overburden the game with too many distracting features.

Most reviewers advised us to keep an eye on the complexity of the project. Given the number of features and interactions, it can quickly become overwhelming to implement each feature individually and even more so to integrate them into one coherent system.
We are aware of this risk and plan to tackle this in the following way:

1. Each individual feature is only an abstraction of real world phenomena and by no means a "realistic" simulation. We intend to keep each feature simple and as such relatively easy to implement.
2. Each feature will be added one by one, to keep the complexity digestible and to not overwhelm us with too much work at once.

Another thing to keep in mind is how we convey all the information from the various systems to the player in a digestible way. We have to take care to not overwhelm the player and on the other hand provide everything the player needs to achieve the game goals.

One of the most suggested improvements to our game was the addition of a tutorial. As we have already planned for this, we do not expect any issues here. We also plan to combine this with a sensible game progression, where features and with them complexity are added level by level. This gives each level a distinct focus and allows the player to learn about each feature step by step.

8. Tutorial Level

We created a simple tutorial level for the player to learn the core mechanics.
The level provides the player with a few starting resources and gives him some very simple tasks to start with. The player is tasked with building some fields, to be able to harvest food,

to build a well to increase water availability and to build more huts to increase his worker and action count.
With each task, the requirements for the respective buildings as well as their effects are explained to the player.
After the individual mechanics and buildings are explained, the player is asked to expand his village to a certain amount of huts and gather a larger amount of food, which are both only possible if he combines the previously learned mechanics to build an efficient food production chain.
After achieving this final goal, the tutorial level is finished and the player and may continue in an open ended play session.