Park Life

Created by

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Contents

OUTLINE

In order to improve public health the municipal government of City has decided to create more green spaces. To this end they have picked out a vacant lot on the outskirts of town that they want to transform in to a beautiful garden. Our main character, a young and inexperienced landscape contractor, is hired to turn this political vision into reality. Plants are high maintenance though, so you must water them, or they'll wither and die. By upgrading your skills in the skill-tree, you gain access to all kinds of upgrades, including automatic irrigation, more plant types and more resilient plants. When plants are fully grown, they can be sold or left to generate points for the player.

In addition, you will once a week receive a visit from your boss, who will assign you tasks to be solved by the following week. By completing these tasks you will receive points and gold that you can use to further expand the park. But remember all days are not the same, the weather plays a big role and can cause major problems, which will make it difficult for you to keep track of everything in the park.

CHARACTER

The Main character is the little blue haired boy named John. He is the park's attending, and loves his job. He is completely controlled by the player, see: Figure 7. for more information on controls.

He is a 16x16 pixels large piece of bit art, with varying animations, such as walking, collecting water and watering. These can be seen below.

Figure 1: MainCharacter

The only other character in the game is John's boss, who works for the city government and has to make sure that John understands his tasks and does them. John calls her "Boss" which is also the only name she has. When a new game starts she comes in to welcome John to his new job as a park employee. This also serves as an introduction to the game-mechanics for the player. It's also "Boss" who comes once a week to check on John to see if he has taken proper care of the park.

"Boss" is a red-haired lady with purple pants. She is from the same collection of sprites as the main character, and thus has the same size and style of walking.

Figure 2: Boss Lady

Gameplay Description

In Park Life the objective of the game is to amass a 1000 points in two months. The player gets points by keeping plants in the 'Healthy' state, completing quests and researching fields of horticulture. Once a quests is completed, it will only be renewed when the Park Boss is there, this means that it is only once a week the player can get new quests.

The player must plant different plants, with only two plant types at the beginning of the game to choose from. When the player plants a seed it needs water to grow, which can be collected once a day from the nearby lake. If the seed does not get enough water before the day is over, it will die and disappear. The player has the opportunity to see how much water each plant contains, and what stage it currently is in.
Provided the seed gets enough water, it will grow following a number of in game days. Planting different seeds cost varying amounts of gold, and it is now up to the player to plant new plants as well as to keep them alive.

A map wide event of drought, or "Dry season", will occasionally render the lake dried out, which means the player must remember to carry enough water. The player will be notified a few days before the dry season starts, and during the drought the remaining time will be shown.

It is also possible to learn new skills that will make life easier for the player. The player has the opportunity to study one skill at time, with each unlocked skill opening the possibility to research better/more advanced options.

GAME WORLD

The game takes place in a vacant lot on the outskirts of an unnamed town. When the game starts the main character is placed on the front porch of a house in a square plot of land surrounded by a fence. Apart from the house, some trees and a lake there is nothing but grass. Behind the fence there is more grass, but the player can not go there. This is the game world in its entirety. The initial layout of the world is simple, because the main objective of the game is to manipulate the world by cultivating plants.

Figure 3: The game world

The world is arranged into smaller square units called tiles. The player can not plant anything or walk on tiles occupied by the house, the fence, the lake and the trees. How the player decides to build up the garden is a matter of strategy.

Water is an important part of the game world. The plants need water to survive, which the player can collect from the massive lake. The lake is where the player gets water, but the climate of the game world is unpredictable and occasionally dry seasons occur. When that happens, the lake dries out and the trees lose their leaves. The player can't go and get water from the lake and if their water supply is not sufficient to keep all plants alive some will die.

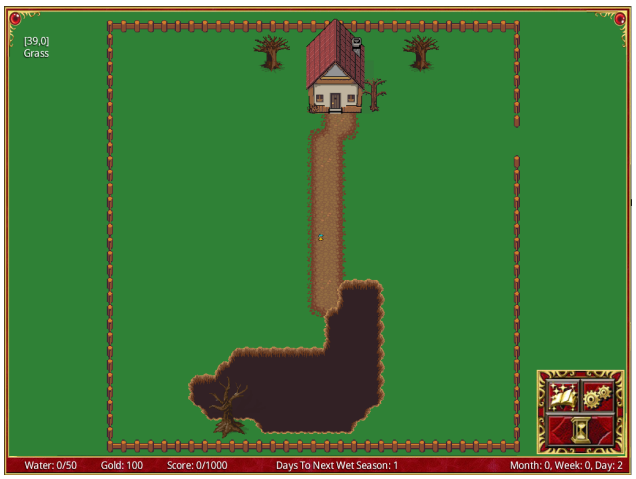

Figure 4: DrySeason

GESTALT

Park Life sets out to be a relaxing game, set in an aesthetically pleasing environment with calming music and chirping birds. There is no rush in this world, only relaxing gardening, as greatness isn't achieved overnight. This calmness is suddenly abrupted by a drought, changing the map from its beautiful state, to one with dead trees and a dry lake.

The music and ambient sounds also change to reflect this, going from relaxing and happy to something closer to cricket sounds and sad piano music. In further development, fishing would be added to the lake as a mini-game, to serve as a mini dopamine rush, taking inspiration from the way it's achieved in either 'Minecraft' or 'Ark: Survival Evolved'.

Gamplay

Turns

The idea of a "turn based gameplay" comes from board games, where players take turns making strategic decisions to reach an end goal. In "Park Life" what the player can do each round is limited by the unpredictable ways of the game world and the player's supply of gold and water.

When the players can not do more on their turn, they press the "Next Turn" button, which will increment the in-game days counter and perform calculations on the game-world, in respect to plant state, water levels, gold/points etc.

After 57 turns (2 months), the game will be 'over'. If the player has reached 1000 points, they've won the game, otherwise they've lost. But no matter what the current score will be saved in local and showed in the game over screen besides the highest score. In each situation the player can still continue playing, as to not lose progress if they're especially fond of their park.

Plants

20 different types plants exist in the game world: turnips, roses, cucumbers, tulips, tomatoes, melons, eggplant, lemons, pineapples, rice, wheat, grapes, strawberries, cassava, potatoes, coffee, oranges, avocados, corn and sunflowers.

The plants are finite state machines with the following states: seed, small, healthy, withering and dead.
The state of a plant depends on the amount of water it has and its previous state. The exact conditions for state transitions are different for each type of plant and these conditions are check on the beginning of each round.

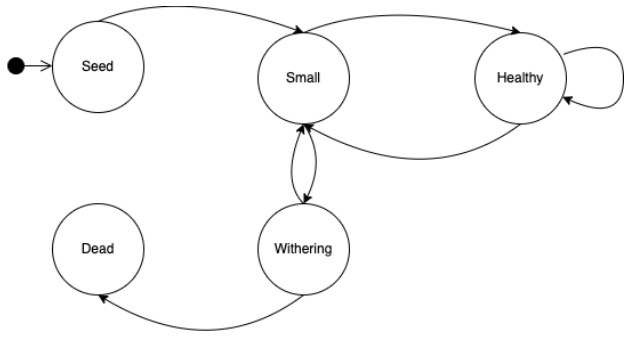

Figure 5: Plant life cycle

When a plant is in the healthy state the player is awarded some points each round. The player also has the option of earning some gold by harvesting healthy plants, but harvesting a plant drains some of its water and sends it to the small state.

Quests

There are three types of quests:

- *Keep healthy quests:* To complete this quest the player must keep some amount of a certain plant in the healthy state for multiple consecutive rounds.
- *Flower quests:* The objective is to plant flowers in a square formation.
- *Harvesting quests:* The player must harvest a certain number of plants each turn for a certain number of turns.

The player always has one of each type of quest. When the player completes a quest, future quests of that type will be more challenging. Quests are made more challenging by increasing the number of plants to be maintained or increasing the number of turns the quest spans.

Skill Tree

Our Skill tree can be seen in the image below. In this skill tree, the player has learned "General" and have started researching "Construction", which is also presented to the user in the corners of the image.
The skill tree follows the rule that if the upper skill is not learned, you are not allowed to learn the skill immediately below it. The player is only allowed to research one new skill at a time. Skills available for research are shown as normal clickable buttons, while more advanced options you do currently not have the prerequisites to research, are grayed out.
If a skill is learned, the color is changed to green, and the skill currently being researched is colored blue.

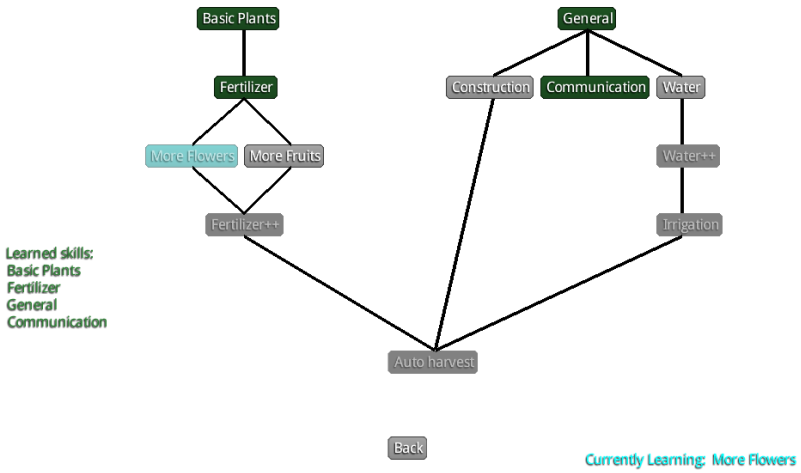

Figure 6: Skill Tree

Below is a list of all skills and their effects:

Basic Plants

- Unlocks more plant types for the player.

Fertilizer

- Plants use less water per day.

More Flowers

- Allows the player to plant flowers.

More Fruits

- Allows the player to plant fruits.

Fertilizer++

- An upgrade of Fertilizer which means that plants use far less water than before.

General

- When a plant is harvested it yields more gold.

Construction

- Plants become cheaper.

Communication

- Player becomes better at communicating with the boss, which makes her award more points for quests.

Water

- The player can carry more water and fetch more water by the lake.

Water++

- An upgrade of Water. Makes water capacity even greater.

Irrigation

- Automatically waters all plants daily. Can be disabled for individual plants.

Auto harvest

- Automatically harvests all fully grown plants. Can be disabled for individual plants.

Player controls

The player controls can also be found inside the game under settings, or by pressing 'K' when a game has started.

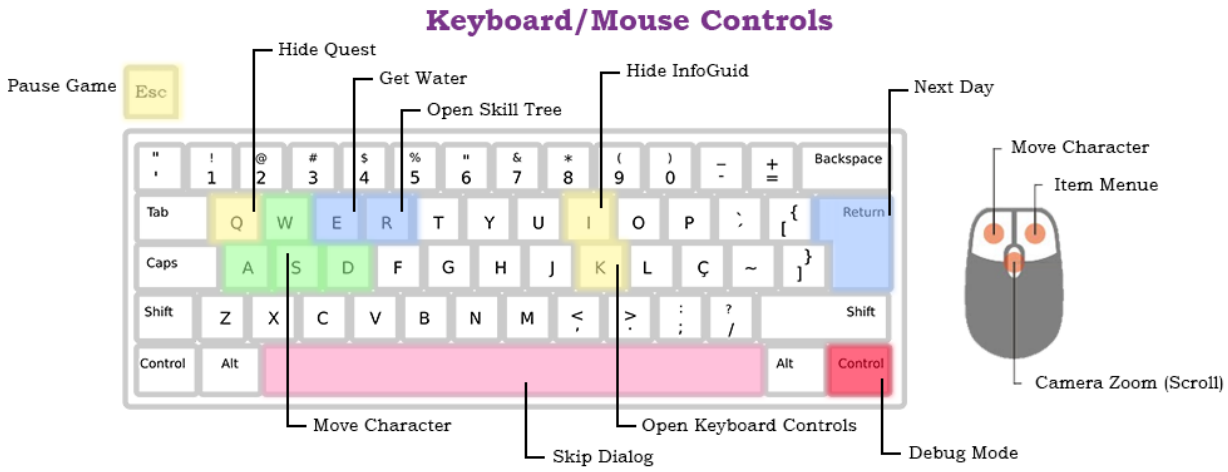

Figure 7: Keyboard And Mouse Controls

ENEMIES

An "enemy" in the game is the player's negligence. By each round end, the plants will lose water, and if not replenished, they'll wither and die.

Another "enemy" is the forces of nature. The game weather is unpredictable, leading to droughts happening periodically, disabling the player from collecting water, thus requiring the player to not have wasted his existing water-supply.
See the figures for a map comparison during normal conditions (3) and dry season (4).

BONUS & FUTURE WORK

In the current version of the game, multiplayer is not available, however the intention is to release a future update for the game, in which players have the chance to compete against each other for the best park. This update would also include purchasable attacks against the other players, such as releasing rats or draining their lakes, to implement a PVP aspect.
This would also include a leader-board, in which players battle to beat existing records, in categories such as shortest time to 1000 points, or most gold earned in a month.

In future works, it is being considered to create a food and energy system, where working in the garden will drain the player's energy. In order to regain energy the player will need to sleep and eat food.

Mini games like the earlier described fishing would work with the food system, i.e the fish the player catches will be able to give the player more energy. It could also be used for a reward system, in that the player will be able to capture different sizes and species.

New map seen inside the player's house, inside the player will have the opportunity to hang fish on the wall, move around the furniture, and buy new ones.

In future work will it also be possible to add other parks/maps which the player must take care of. In addition to other maps, it will be possible to purchase more land so that the player can expand the park.

A storage system where the player can store harvested plants and buy and store new seeds. Instead of selling if immediately after clicking 'harvest'.

An option to choose different types of character skin, deciding the name of the character, and implementing all four seasons is also being considered.

Visualisation will also be upgraded in later versions, with respect to drop down menu on click. The entire skill tree screen will also be updated to fit the game thematically.

There will also be other enemies involved, in the form of diseases in the plants, which would need to be cured before it spreads, or insets/rodents that will eat the plants. Players will be able to buy deterrents against these, such as insect sprays, or guard dogs.

Lastly, more NPC's will be implemented, which will give the player different tasks, or trigger different rewards. Guests as an example could visit the park, and could even act as enemies by littering or destroying plants. This also opens the opportunity for the player to employ staff, such as security guards.

MONEY

In its current form, the game would be sold standalone, as it has not been developed with intent to make money. That being said, there are many options and avenues for different monitization techniques that could be applied to our game.

One possibility is to utilize appointment gaming and have things happen real-time, and thus providing it on a freemium form, such as Farmville does it, while selling gold, land or insta-unlocks.

Another possibility is to add character creation, and have unlockable skins/costumes locked behind a paywall. A third option could also be selling DLC's with new plants, new environments and new stories.

Development Process

Throughout this project, we (the developers) decided to meet weekly, mainly in person but also online during the later stages of the semester, to work on the game.
We decided to work with an agile development method, quite close to the SCRUM process, but with less documentation. This led us to flush out the game, the story and the UX quite early, albeit with some changes which is discussed in the "Deviations" section.

Throughout development, we collaboratively delegated parallelizable functionality development, to maximize efficiency, however also utilized pair programming when developing core functionality others depended upon, such as the rendering of the game and graphics, and translating user input.
Towards the end of the project, with a few weeks left before deadline, we attended the 'Demo day', hosted by the Course lecturer, Lukas Esterle, and got to present our game, and receive feedback. One of the major takeaways we got, was to improve user feedback throughout, and to better the user experience as a whole.
Following the demo day, we defined a list of important functionality to add or change, and added it to a sprint backlog.
This backlog is shown below, updated at the time of writing, albeit mainly in danish and with spelling mistakes.

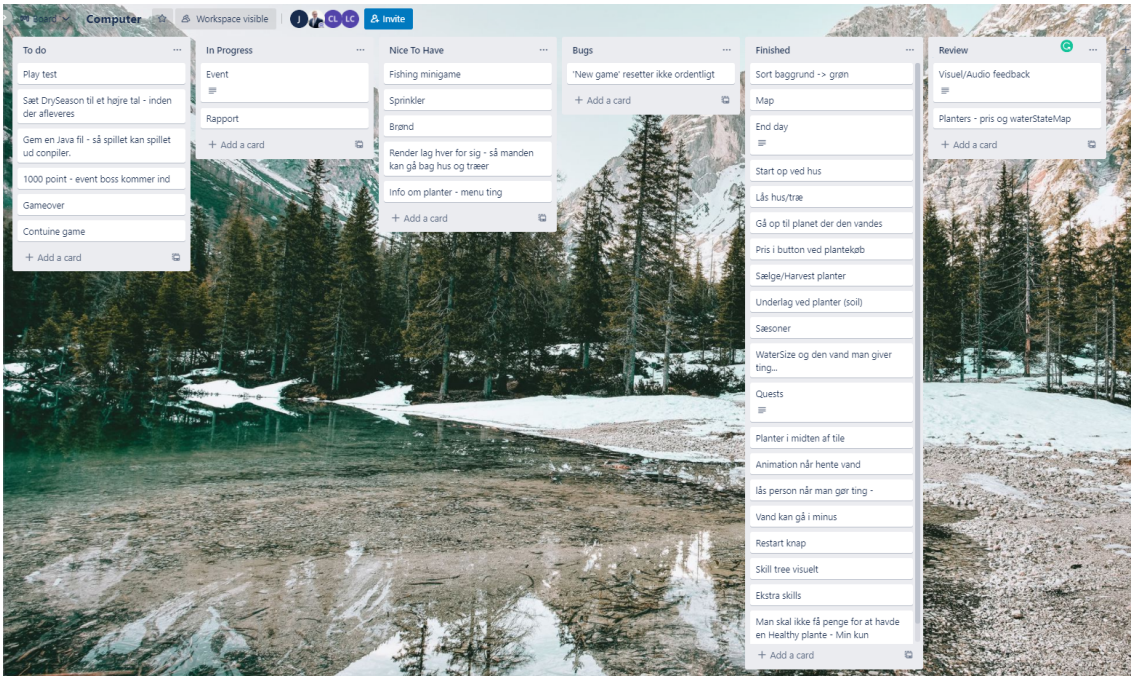

Figure 8: Development backlog - final week

This backlog worked out great, and we made great progress from the demoed version we showed in the start of December, to the game this paper is presenting. The main differences lies in user feedback, with quests, dialogue and user guides, and of course,a lot of bug fixing.

Deviations

At the beginning of development, the play mode was decided to be multiplayer, or even single player vs another AI player, but as the game development went on, the core functionality turned out more complex than anticipated, and as such the PVP aspect was delayed, but with ideas to pursue this, as the game setting allows for great implementation of this. Throughout the development, a lot of features were discussed and almost implemented, but decided against, or changed. Some of the major of these were:

- A mini-game allowing the player to fish in the lake.
- A warehouse, so everything that has been harvested could be stored for later sale.
- A more challenging game world where rats and other pests would steal the plants. The player would have to kill the vermin in various ways.
- Season and weather changes, such as winter, summer, snow day or sunny day. Ended up being implemented as a dry season and a wet season.
- A levels system, with each level unlocking new functionality. This was implemented as a skill tree and score system, to allow the user full control on what to research.
- A purchasable Irrigation system with pipes from the lake, which ended up as a skill in the skill tree.

Major Design Decisions

One of the big decisions we as group had to make was to figure out how to make the game challenging for the player. In an attempt to achieve this, the dry season was implemented.

Another challenge is to limit the amount of water the player can pick up and the amount of gold he gets from harvesting a plant. In order to give the player the best gaming experience, several game tests have been performed, where after each test, it's been discussed to what extent the player received the right number of gold as well as the amount of water given to the plants. Overall after each game test, the balance got tuned. In order not to make it too difficult or repetitive, we have chosen also to implement a skill tree, allows the player to unlock new functionality. The play testers were ourselves, our families and friends.

The map design was also very important. The player should be able to fetch water, so we chose to have a lake. It was also considered to provide the same functionality with a well, however we decided for the lake due to its aesthetic qualities. In addition to a lake, trees were also added, which help visualize the two seasons, as during a dry season, they loose their leaves, and the lake dries out.

The music plays a big role in the game, it helps to set the mood for the two seasons. Happy emotions are achieved with birds singing when there is wet season, and sad piano with crickets in a dry season. It is also important that the player can choose the right volume in the game. And as such We have chosen to divide game sound into three parts, music, ambient and sound effects. The music consists of the two different season tunes, ambient sound is birds singing or crickets, and lastly effects are menu clicks, water sounds, and coin sounds. By dividing the game sound into different parts, it allows the player to adjust the volume for the three different tracks individually which can be seen in the picture below.

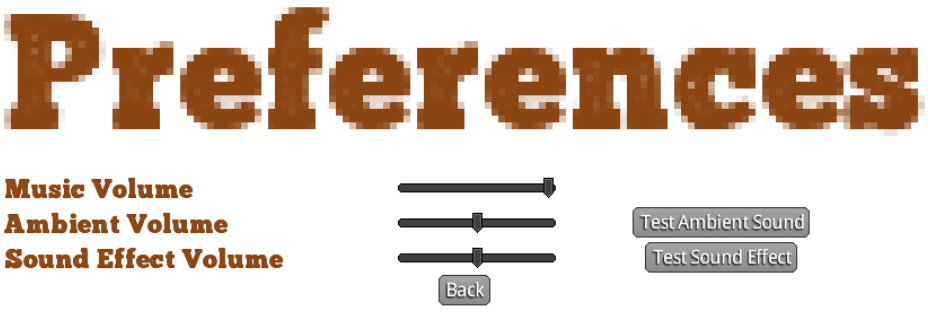

Figure 9: Preferences screen

Technology

'Park Life' was created using the libGDX framework, which was unknown to the team. This required us to devote a large portion of time to study the framework, by reading documentation and tutorials.
A major reoccurring problem was that everything is positioned using coordinates in respect to an origin. However, this initial point changes based on actors. For some, [0,0] would be top left corner, others bottom left, and some even seemed center screen. libGDX also required a deeper understanding of code architecture than the script based unity, requiring us to spend more time modularizing code using different software patterns, such as the factory pattern.

For the map creation, we used Tiled, a 2D level editor we utilized using existing tile sets, see section "Reused assets".
We used a tool called GDX Texture Packer for generating a sprite-sheet with the sprites of the game, such as characters, plants and nearly all other graphical components.

Work Distribtion

Throughout the project all developers were involved in all meetings, providing game ideas, content ideas, as well as developing the game.
As this is our first experience developing a game, and first time using libGDX, some developers also spent time developing functionality that was since scrapped, including but not limited to better menus, other event types, lots of different maps and alternative dialogue.

This being said, as mentioned earlier, the project did have some functionality implementation delegated, and the most notable are listed below:

1. *Liulihan Kuang* was the primary on skill tree.
2. *Casper Hansen* was the primary on all things graphical, such as map and menus, as well as sound.
3. *Jeppe Schildt* was primary on documentation/report creation.
4. *Lucas Clorius* was primary on plants and quests.
5. *Jeppe Schildt*, *Casper Hansen* and *Lucas Clorius* worked on events.
6. *Casper Hansen* wrote dialouge/story, and *Jeppe Schildt* implemented it visually.
7. *Casper Hansen*, *Liulihan Kuang*, *Lucas Clorius* were on the final play test.

Reused assets

We attempted to implement as much as we could by ourselves, however we are not graphic/audio designers, so we did reuse some assets.

Music: https://mixkit.co

- Menu music license by *Mixkit*.
- Ingame wet season music license by *Mixkit*.
- Ingame dry season music by *user696364239*.
- Won game music license by *LittleRobotSoundFactory*.
- Lost game music license by *Mixkit*.
- Exit game music license by *Mixkit*.

Ambient sound: https://mixkit.co

- Bird sound wet season license by *Mixkit*.
- Crickets sound dry season license by *Mixkit*.

Sound effect: https://freesound.org

- Pick up gold sound by *LittleRobotSoundFactory*.
- Watering the plant sound by *CaKon*.
- New day A crowing cock sound by *paullevinrohde*.
- Gte water from lake sound by *InspectorJ*.

Graphics: https://opengameart.org

- Characters by *Fleurman*.
- Crops by *Josehzz*.
- Terrain by *Vaious*.
- House by *Bellow*.
- Fence by *William.Thompsonj*.
- Trees by *Bluecarrot16*.