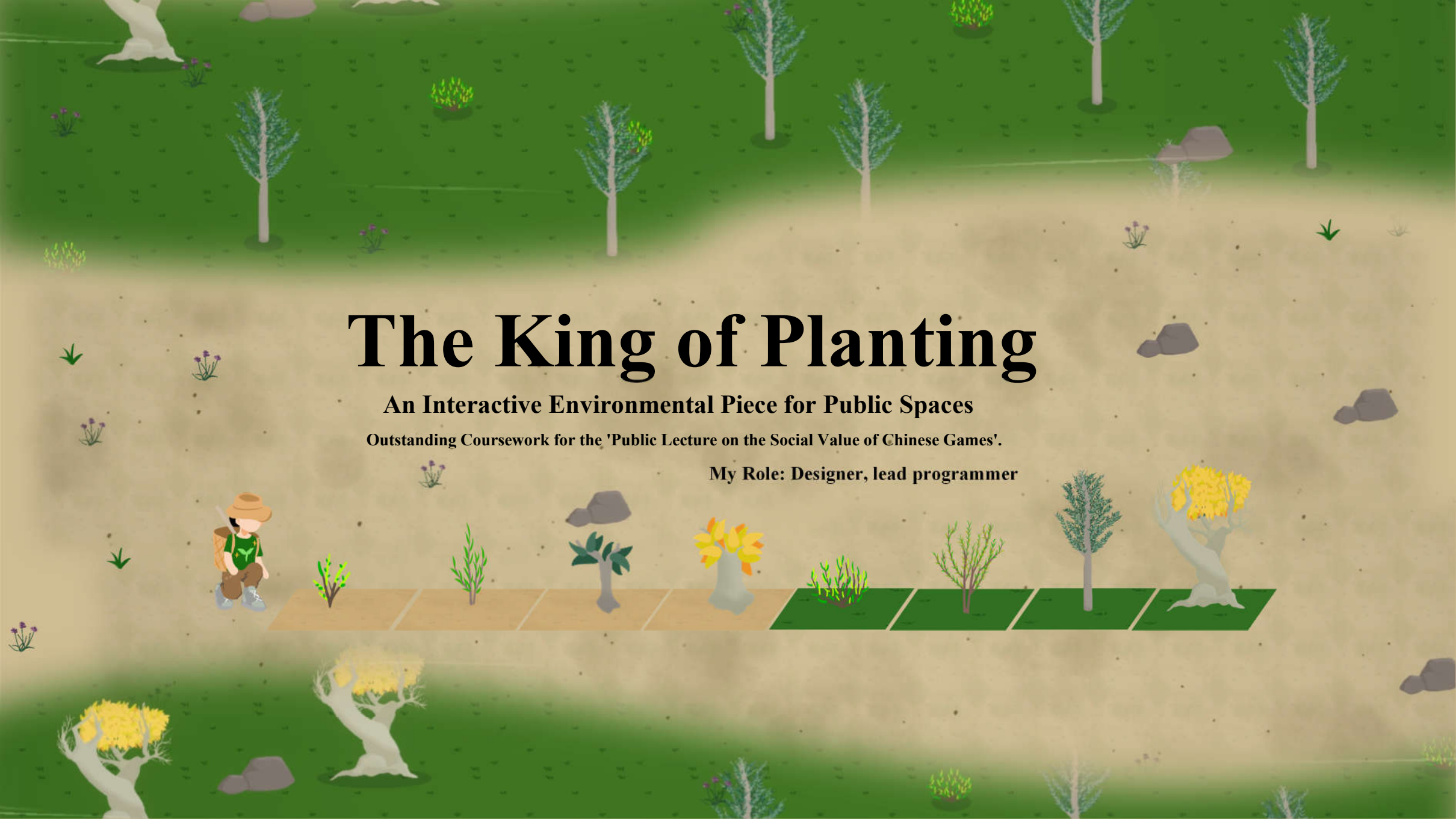
The King of Planting

An Interactive Environmental Piece for Public Spaces

Outstanding Coursework for the 'Public Lecture on the Social Value of Chinese Games'.

My Role: Designer, lead programmer



Game Information

Keywords: Environmental Protection, Public Space, Function Game, 2.5D

Development Engine: Unity3D 2020.3.26

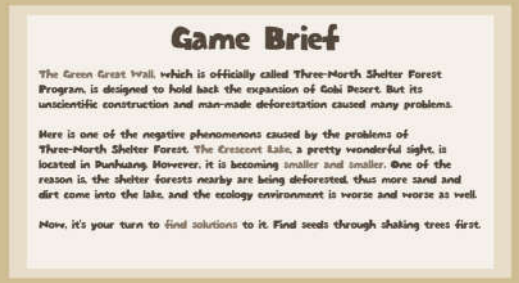
Release Platforms: Windows

Development Team Size: 5

Download Link:

Motivation and Inspiration

Our assignment requires us to design and create a functional game that addresses the current issues in China's afforestation and reforestation efforts, such as the allocation of land for cultivation versus forestry, the ecological homogeneity and susceptibility to diseases due to planting the same type of trees, and other related problems.



Our approach is to start with emotional experiences, focusing on light interaction and immersive experiences to create a contrasting atmosphere between the calm serenity of a forest after planting trees and the chaotic desolation of deserts and wastelands. By emphasizing the differences in visual and auditory experiences of walking through forests and deserts before and after tree planting, we aim to bring the realities of these often inaccessible issues to the players. Through emotional engagement, the game guides players to plant trees responsibly and shapes their behavior, subtly instilling the concept of scientific planting and environmental protection throughout the gameplay.

Roles and Responsibilities

Game Designers: All group members

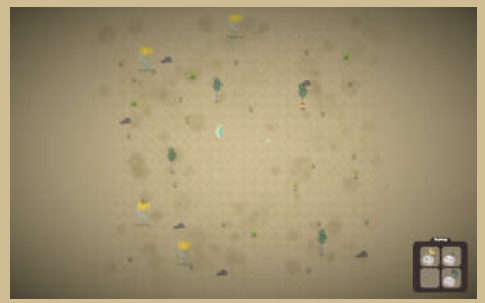
Artists: Xinyi Ma, Jingxue Chen

Programmers: Leyan Wang, Yichen Wu

Technical Artist: Xinghui Chen, Hongjie Ge

How To Play

The game map consists of a 3x3 grid, with the central tile being the 'Crescent Spring.' Over time, the Crescent Spring has shrunk in size due to constant sandstorms, and it is on the verge of drying up. Surrounding the Crescent Spring are eight 'Gobi Desert' tiles. Players are tasked with finding four types of trees around the Gobi Desert to collect saplings. These saplings, after a considerable amount of time, grow into mature trees. Mature trees produce a sapling at regular intervals for players to harvest. If players fail to collect them, no new saplings will be produced.



In order to win the game, players must plant saplings in appropriate locations to transform the Gobi into 'Forests,' which block the sand and wind from all directions, protecting the Crescent Spring. As a result, the spring gradually regains its original size through self-repair. Once all the surrounding Gobi tiles are transformed into forests, Crescent Spring will be restored to its original vitality, signifying the player's victory."

Design Concept

a. Planting in Reasonable Proportions

As a key aspect of the game is to convey the importance of planting different types of plants in a reasonable manner, we researched and identified the types of trees planted in the shelterbelts near the Mogao Caves in Dunhuang.

Sacsaul

Xinjiang Poplar

Walnut Poplar

Sand willow

Additionally, to encourage players to plant a variety of trees in proper proportions within a certain area, we have designed a formula to assess whether the players are planting trees in the correct ratios and whether the number of trees planted is sufficient.

Each Gobi tile needs to reach a certain score through tree planting before it can be transformed into a forest. The score of a Gobi tile is calculated based on the number of trees in that area, the proportion of different types of trees, and their maturity.

However, prior to this, we have set specific attributes, point values, and reasonable planting proportions for each type of tree. The settings are as follows:

Types	Sacsaul	Xinjiang Poplar	Walnut Poplar	Sand willow
Sapling Production Time	20s	30s	30s	20s
Maturation Time	10min	40min	45min	15min
Point Value	2	5	7	4
Reasonable Proportion	6/15	2/15	2/15	5/15

Assuming that on a certain plot there are a number of Haloxylon saplings (a), Xinjiang Poplar saplings (b), Walnut Poplar saplings (c), and Tamarisk saplings (d), as well as mature Haloxylon trees (A), mature Xinjiang Poplars (B), mature Walnut Poplars (C), and mature Tamarisks (D), the scoring system will calculate the score using the following formula:

$$score = score1 * score2^{i}$$

$$score1 = 1 * (2*A+5*B+7*C+4*D) + 0.5 * (2*A+5*B+7*C+4*D)$$

$$T = A+B+C+D+a+b+c+d$$

$$score2 = ((A+a)/T-6/15)^{2} + (B+b)/T-2/15)^{2} + (C+c)/T-2/15)^{2} + (D+d)/T-5/15)^{2})$$

Here, 'i' is a factor used to control the impact of the tree planting ratio on the score. 'score1' calculates the total value of the planted trees, while 'score2' uses the variance formula to assess how closely the player's planting ratio of different tree species matches the ideal planting proportion.

b. Interactive Public Spaces

Afforestation and reforestation require the collective effort of multiple generations, not just a single person's work in one day. To reflect this concept in the game, we designed a unique login mode: We envision this gaming setup to be placed in public spaces like museums and train stations, where each player can only experience the game once. Players, within a limited time, can mostly only collect saplings produced by existing mature trees, and it's challenging to complete the growth process from sapling to mature tree. When there are fewer trees, the available saplings for collection are also very limited. As the forest expands to a certain scale, players can relatively easily acquire saplings for planting. When one player's session ends and another player takes over, the game restarts, and all saplings planted by the previous player will have grown into mature trees. In this way, each generation of tree planters provides more resources for the next generation to continue afforestation. Players may find it hard to perceive the environmental change brought about by their tree planting during their own gameplay. However, as generations of players complete the game, the desert environment will gradually improve, passing on like a torch from one generation to the next. Upon the overall victory of the game, every participating player will receive a notification from the game platform, giving them a sense of accomplishment for contributing to the tree-planting cause and seeing it to completion.

c. Emotional Landscape Design

To create an emotional contrast between the Gobi and the Forest, we approached it from both visual and auditory perspectives:

Gobi

1.Post-processing with dark screen vignettes

2.Smoke clouds

3.Dust particles

4.Gloomy and dim color tones

5.Relatively heavy melodies with an airy sound

Forest

1.Breezy lines

2.Fresh and bright color tones

3.Smooth, rising melodies accompanied by birdsong and white noise

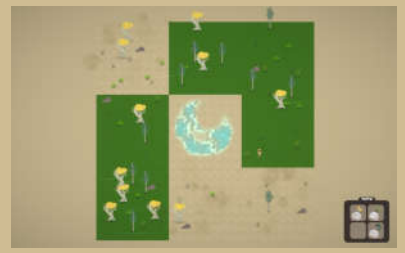
Detailed Introduction to My Work Responsibilities

Design Part

I participated in the design of the overall gameplay and the numerical system, and developed the formula for assessing the scores of each plot.

Development Part

I designed and implemented the game's 2.5D core mechanics (2.5D world effects, character movement, seamless switching to a bird's-eye view), interactions for the player character to pick up and plant saplings, tree growth, sapling production with random drop directions, a sapling inventory, an audio player, and more.



Bird’s-eye view

Planting trees

Lessons Learned

During the two-week 'Public Lecture on the Social Value of Chinese Games,' we reviewed some basic game theories (enhancing player engagement in game design, two types of game randomness, the MDA model, game systems, game loops, rapid prototyping, emotional design in games, paper prototyping, vertical slicing, etc.). Building on this foundation, we also analyzed, studied, and practiced serious game design theories (combining games with player needs and information delivery needs, context, audience, culture, practicality assessment, etc.) through examples of serious games. This experience enhanced our understanding of designing and producing serious/functional games.

In the 'King of Tree Planting' project, we gamified the act of tree planting, providing players with challenges and engaging interactive feedback. We also experimented with shaping player behavior through emotional tendencies, taskifying actions and thoughts players should have in the real world, driving them to perform these tasks, and making players genuinely feel and accept the concepts conveyed by the game.

I also tried scoring player actions through numerical formulas to guide player behavior, deepening my understanding of how rules can influence player actions.

We contemplated how games and other interactive media should be presented in public spaces and how to use the format of public spaces to enhance the game's functionality. We noticed the positive impact of leaving traces in the game system that can be discovered by others, realizing that many people have advanced environmental progress and that each individual can be a key part of the whole process, just as environmental protection requires everyone's effort. This design elevated the sense of identity among players, making them inclined to join the game and collaborate with other players to complete such an endeavor.