

Digitalizing a board game concept

Mobile game design and development

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<p>Abstract</p> <p>The objective of the thesis was to use a board game as a model and create multiple prototypes based on it for a mobile platform. The aim was to keep the core mechanics of the board game and add something new that would be extremely difficult or impossible to implement in a board game.</p> <p>This thesis looks at the theory behind game development, game design and prototyping. It also covers the development of the prototypes that were created during the project and the design decisions made during the process.</p> <p>The project was done in collaboration with Pasi Vilppola where the work was divided into two parts, game design and programming the author being responsible for game design and Pasi Vilppola was given the role of the game programmer. The prototypes were created by using Unity3D game engine and C# was used as the scripting language.</p> <p>The results of the project were four working versions of the game and three of them fulfilled the goals of the project.</p>		
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<p>Tiivistelmä</p> <p>Opinnäytetyön tarkoitus oli käyttää lautapeliä mallina ja luoda sen pohjalta useampia prototyyppisiä mobiilialustalle. Tavoite oli säilyttää lautapelin päämekaniikat ja lisätä uusia ominaisuuksia, joita olisi erittäin vaikea tai mahdoton tuoda lautapeliin.</p> <p>Opinnäytetyö käsittelee pelinkehityksen, pelisuunnittelun ja prototypoinnin teoriaa. Se käy myös läpi projektissa luotujen prototyyppien kehittämisprosessia sekä suunnitteluratkaisuja, joita tehtiin prosessin aikana.</p> <p>Projekti tehtiin yhteistyönä Pasi Vilppolan kanssa ja työt oli jaettu kahteen osaan, pelisuunnitteluun ja ohjelmointiin. Opinnäytetyön kirjoittaja oli vastuussa pelisuunnittelusta ja Pasi Vilppola toimi ohjelmoijan roolissa. Prototyypit tehtiin käyttämällä Unity3D-pelimootoria ja scriptauskielenä oli C#.</p> <p>Projektin lopputuloksena saatiin neljä toimivaa versiota pelistä, joista kolme täytti projektin tavoitteen.</p>		
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Terminology

2D game

Game where action happens on a two dimensional plane usually pictured from side and the graphics are usually rendered in two dimensions (2D (Concept) – Giant Bomb, N.d.).

3D game

Three dimensional game is a game where characters and environments have been rendered in three dimension and actions and movements have depth (Slick, N.d.).

Android

Mobile operating system used by companies such as Samsung, Google, HTC on their phones and tablets (Android, the world's most popular mobile platform, N.d.).

FPS

First-person shooter, or FPS for short, is a term used for a type of action videogame genre that uses first-person perspective, in other words the viewpoint of the protagonist, to show a gun which player uses to shoot enemies in the game world (Janssen, N.d.).

Gaming platform

Platform refers to a hardware and software combination used to run other applications. Gaming platform is the hardware and software used to run games. An example of such platform is PlayStation 4 (Janssen, N.d.).

IDE

Integrated Development Environment or Interactive Development Environment is a program or a group of programs used by programmers to create computer software in software development (Janssen, N.d.).

IOS

Mobile operating system used by Apple in their devices such as iPhones, iPads and iPods (Apple - IOS8 - What is IOS?, N.d.).

Kanban

Kanban refers to a scheduling system that uses cards for just-in-time production.

Pikachu

Pikachu is a fictional character from the Pokémon series owned by Nintendo Co., Ltd (Pikachu – Wikipedia, 2015.).

PlayStation 4

Video game system manufactured by Sony Corporation that customers can use to play games, watch movies and listen to music among other such things (PS4 – Features, Games and Videos, N.d.).

Xbox One

Video game system manufactured by Microsoft Corporation that customers can use to play games, watch movies and listen to music (Xbox One – Official Site, N.d.).

1 INTRODUCTION

1.1 Assignment

The subject for the thesis and the project handles was assigned by Zaibatsu Interactive. The flow of the project was to use a board game as concept and take it to a mobile platform, test how well it works on a mobile platform and then start developing it further. In the project multiple possible concepts of the mobile version were to be prototyped by designing and creating different kinds of games based on same the concept. The objective was not simply to convert the game to mobile, but to think how to add mechanics and improvements in ways that would not be possible in a board game.

1.2 Cooperation

The project was carried out by working together with Pasi Vilppola where the work was divided into two parts, game design and programming the author being responsible for game design and Pasi Vilppola was given the role of the game programmer. This was done to create a more realistic project environment and to allow participants to take specific roles corresponding to those in real game projects.

The project and the created prototypes were done together by working at the Zaibatsu's office. For the days that were done separately from homes the communication channels were used to collaborate. For the thesis the introduction and Pikachu game chapters were worked on together and rest of it was done separately.

1.3 Tools, communication and documentation

Unity3D

Unity3D is a game engine with complete IDE, an integrated editor, asset workflow, scene builder, scripting, networking and more features allowing easier game development. It also has comprehensive documentations, a vast community and active forums making it easy to get assistance with problems. Unity also offers a great deal of tutorials making it fairly simple to study (Unity – Game engine, tools and multiplatform, N.d.).

As Unity3D was the game engine used at Zaibatsu the task was to carry out the project with it as well as to make it easier for the company to use this project in future. As both of us authors on the project had earlier experience using Unity3D it was good choice.

Flowdock

Flowdock is a chat and inbox application for team collaboration. It works on desktop, mobile and web. It has multiple integration options with other applications like Trello and Git (About Flowdock, N.d.).

Flowdock was used as the main channel for communication besides verbal communication. When working remotely or discussing when not at the same place, Flowdock proved to be an excellent tool for communication.

Trello

Trello is a web-based project management application using Kanban paradigm style for project management. It has a flexible and visual way to organize projects by dragging and dropping cards between lists to show progress (What is Trello? – Trello Help, 2015.).

In this project Trello had two primary roles the first was to organize the project and guide the workflow, though it was not used so as much as needed. The second role was to be the main source for project documentation as there was no actual game design document; therefore, the necessary documentation was written in Trello.

Git & GitHub

Git is a revision control system designed to handle projects scaling from small to large projects. It emphasizes speed, data integrity and support for distributed, non-linear workflows (Git, N.d.). GitHub on the other hand is a web-based Git repository hosting service where projects can be located and managed. GitHub has its own tools for using it but it can as well be used with other similar tools like Git or Sourcetree (Features GitHub. N.d. GitHub homepage).

GitHub was used by Zaibatsu to make it easy to transfer the source code for them and in the project it was used to host the source code. Git was used to reach and manage the project locally on computers.

Dropbox

Dropbox is a file hosting service with cloud storage, file synchronization, personal cloud and client software. It allows users to create a folder on their computer where Dropbox can synchronize all content present in the cloud storage. Dropbox can be accessed using their website and mobile apps (Dropbox - About Dropbox, N.d.).

Dropbox served in this project as a place where we shared graphics and builds of the project were shared. It was also used it to store screenshots and thesis related documents.

1.4 Zaibatsu Interactive Oy

Zaibatsu Interactive Oy is a small company focusing on the game industry located in Jyväskylä, Central-Finland. Zaibatsu was founded in spring 2014 by a group of six people who are all stakeholder in the company. They have been developing their first mobile game Elder Goo now for a year and it should be launched during this spring for iOS and Android platforms. Their goal is to create games that are fun and engaging even after hours of gameplay. They also want to bring the essence of classic video games to mobile platforms (Zaibatsu Interactive – About Us.).

1.5 Motivation

The gaming industry has been on the rise in Finland and it is the fastest growing market since the change of millennia. During the 1980s there were only few game developers who worked mainly as a hobby. The first game companies in Finland were founded at the beginning of 1990s; however, it was only in the late 1990s that the Finnish game industry started to gain global influence. Since then the game industry has been steadily rising and at the early 2000s after government help and funding of the game development the growth has increased. After the global success stories as Rovio's Angry Birds and Supercell's Clash of Clans the game industry got a tremendous boost and there are now over 200 companies employing approximately 2 500 professionals (Nordgren, K. 2014.).

The amount of mobile devices has been growing steadily. The amount of applications made for them has increased drastically and the users spend great deal of time on games (Bosomworth, D. 2015). Most of the games can be played alone or through an online multiplayer function; however, there are only a few multiplayer games that can be played together on the same device.

For the author games have been a passion for a long time and being able to develop and design them is very important. That is the author's own motivation for the project was extremely high and it should be made as good as possible with the limited time and resources. The idea for this project was to create a game that brings people together like the old board games, which presents a great challenge to game design as the game needs to be fun to play for multiple persons while at the same time it is restricted by the size of the devices.

2 PIKACHU GAME

The objective of the thesis project was to create a mobile game by using a board games concept. The game we used was Nintendo's Pikachu: Match'em Catch'em. It is a card game for two to four players where the aim is to collect correct cards from the table.

2.1 Contents of the game

The game contains a deck of 27 different cards featuring Pikachu character, four sticks in the shape of Pikachu's tail with suction cup at the end and a machine with three rotating pieces which each have three sides portraying slightly different poses of Pikachu (See Figure 1). The machine also has a button on top and when pressed it rotates the pieces to form a randomized version of Pikachu.

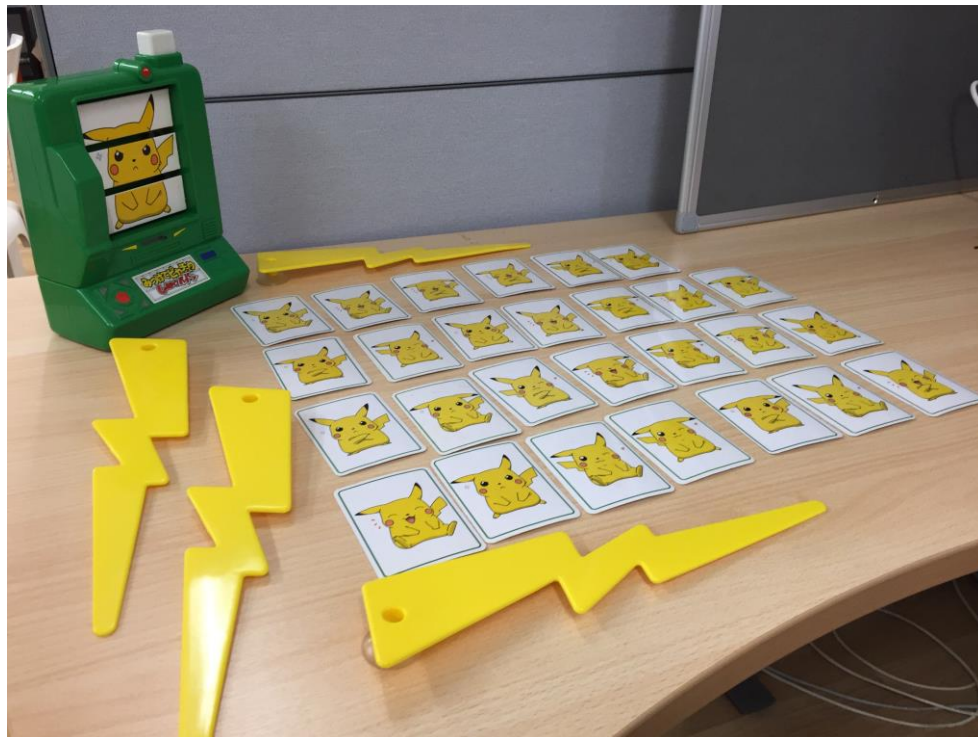


Figure 1 Contents of the Pikachu game

2.2 Setup

The game setup is simple as the cards only need to be laid on the table in front of all players, the machine placed so that everyone can see it and each player is given a tail. The cards can be organized on the table however, if the players wish they can be neatly in rows or in a big pile on table.

2.3 Gameplay

The game starts when the machine is activated for the first time. One player pushes the button on the machine and after it has shown the randomized image of Pikachu the players begin to look for it among the cards. When a player finds the correct card it is hit with the tail and the card sticks to the suction cup at the end of the tail. After confirming it to be the correct one the players may place it in front of them, so that it is still visible to all other players. If the picked card is a wrong one it will be returned to the table.

From the second round forward it is possible for the machine to give the same image as in the previous rounds meaning that the correct card is in a player's possession. This opens the possibility to steal cards from other players forcing a player to not just keep the table cards in mind but also those in theirs and an opponent's possession to either steal from other players or to keep their own cards safe. The game usually ends when a single player has collected three different cards.

2.4 Concept

The core concept of the game is to have an example, which in this case is the Pikachu on the machine, and finding its match among objects, for example cards as it was for this game. This core principle of finding a match for the example was the base concept for the created prototypes.

3 BACKGROUND

3.1 Game development theory

3.1.1 Before Production

When starting game development there are multiple factors to consider before starting. Simply having an idea is not enough and almost everyone has an idea for a game. What is really needed is a more detailed plan for the idea. All of the possibilities and troubles need to be considered during the development process.

Before rushing to gather a team for the project the idea should be developed further so it is more solid as it may also help to choose a better team. When there is more knowledge about the project the more it becomes clear what is needed. The volume of assets compared to the timeframe where you need to finish them also need to be considered. These factors help to decide how large a team is needed. Even if planning to do small project alone it is wise to get insight and feedback from other people with knowledge of game development.

Upon developing the idea it is advised to be as original as possible to make it stand out among the other similar games. Making the game fun and playable regardless of what kind of graphics it has should be a great priority. Even if there is no completely new mechanic giving a new spin to old game element may work as well. When developing the idea and especially when the developing a game based on the idea it is important to prepare to give a pitch about the game. Pitch might become the most important part of the project as it is often needed to get people involved and participate.

When gathering a team for the project it is important to know what is needed. Taking time to figure out what roles need to be filled in order to complete the project is a good idea. Also, taking into account that in a small project one person can manage more than one job and in the cases where the project has more complex tasks like extensive modeling one person might not be enough for the job. Some of the possible positions might include a designer, an artist, a programmer and a project manager. While choosing the right people finding those who are reliable and hard-working is extremely important so the project has people who are serious about seeing the project through to the end. Rejecting skillful people is advised if they do not look like they are willing to stick with the project until the end. It is also a good idea to be honest for those who seem to be unfitting for the project and to tell them the reasons why they do not fit. At best this might lead to them wanting to prove themselves by working hard and becoming a strong part of the team.

Defining the roles clearly for the team members is important as this makes it easier to manage the project when each of the members knows which task they are supposed to do and who their supervisor is. For this, considering each person's capabilities and what they are good at is crucial so that for example a person who is not good with programming is not assigned as the lead programmer. Compatibility between the team members matters quite much even in a small project so the members should be chosen so that they can work together. If there is a potential member who does not get along with most of the team, that person should be made to work with the people who can tolerate him or her or alternatively drop this person completely out of the project.

After the team has been gathered it is a good thing to go through the idea with the members to refine it and get feedback. There is a good chance that the team members come up with something new, however, they may also find some parts of the original idea as bad or something that does not work well. The schedule is also something what should be brought up with the team

members to properly organize the project. For it the schedule each member's personal schedules should be considered so it might even be a good idea to make personalized schedules (Busby, J. et alii 2005, 29-40).

3.1.2 During Production

Trying to keep to the schedule is an important part of the production; however, more important is the ability to deal with the delays as they will occur. The delays can occur from multiple reasons varying from personal crises to software issues. The main focus is to not allow the delays to bring the team down and to try to get back on the schedule or create a new one that takes the delays into account is of importance.

After the project has enough of the assets ready the team should start to integrate them into the game. When the game starts to be playable it is time to start testing the game to see how the mechanics work in the game: are they working correctly and are the assets looking how they should look in the game. Testing is a process which should be started long before the game is complete and it should be ongoing during the entire development process. Testing the game both internally and externally allows to get better results. Those who are not familiar with the game can find entirely different problems compared to those who already know the game (Busby, J. et alii 2005, 40-43).

3.1.3 Ending Production

Before finishing the project it should be polished as much as possible to fix bugs and glitches. Most of the games are often released in a state that the players consider incomplete since there are almost always some problems that manage to evade the developers' and the testers' detection. This is why developers should be prepared to support the game even after it has been finished by patching and post-release fixing (Busby, J. et alii 2005, 43-45).

3.2 Game Design theory

3.2.1 Game design

Everything starts with an idea of a concept and the inspiration for it can come from almost anywhere. The idea can be born while taking a walk, reading something new and different or when attending a lecture; however, the idea will rarely be completely unique. This is why the ideas should be improved by giving them a new twist or adding new mechanics. Brainstorming is a great way to come up with the ideas and it should be done in collaboration with the people from other disciplines and the more there is diversity between the people the better. When brainstorming, there are no stupid and bad ideas. All ideas should be accepted during the brainstorming as even the utterly ridiculous ideas may prove to be a great inspiration and other people can come up with different kind of ideas. When there is a good list of the ideas it should be gone through and the great ideas should be picked up as it is good to have more good ideas than can be used in the game. Still it is important to be willing to throw out not only the bad ideas but some of the good ideas as well because when creating the game it will only suffer if too many ideas are crammed to fit in (Rogers, S. 2014, 30-37).

Sometimes the ideas will not just come. In these situations it is a good idea to narrow down the focus; thinking of too many things simultaneously may be hard so focusing on them individually may help. Other ways that can help are: taking a walk, changing the environment and doing something else entirely for a while. Learning from others is also an excellent way to get more ideas and solving problems (Rogers, S. 2014, 38-42).

The story is a crucial factor of the game even when there is no actual written story. Even the games that do not have any written story can generate a narrative, an order of events. The narrative is born when a player is playing the game and creates own narrative based on the game's flow. The player

can create an infinite number of narratives and the designer should be able to find most of them and make all of them fun. This is why it is important for the designer to look the game from the player's perspective and consider the order of the game events and how they are experienced. The main goal is to create narratives that are interesting and raise the player's emotions (Rogers, S. 2014, 43-49).



Figure 2 The Triangle of Weirdness (Rogers, S. 2014, 50)

When considering story for the game it is possible to go crazy with it; however, making the story too strange may alienate the audience. In this the triangle of weirdness can prove to be an excellent tool to limit the craziness (see Figure 2). When creating a story for the game, only one of the corners of the triangle should be chosen to be weird. This limits the weirdness to only one aspect of the game and making it is less likely to drive the players away from the game. The hard part of creating the story is to make it appeal to all types of players. There are usually three types of players: those who are into the story as it happens, those who want to get into the story in depth and those who do not care about it at all. One advised thing is to keep the story in the service of the gameplay and not the other way around. When adding a deeper story it should not be in the way of the gameplay and it is advised to keep important information out of the dialogues as some players just skip them. One good

way to add more to the story is to give it in a non-mandatory way, for example in the form of collectibles. The most important part is to create a story that players want to play in and where they want to return (Rogers, S. 2014, 50-64).

Making a game is like cooking where you need the recipe first. In the game design the recipe is a game design document and making it is one of the most important tasks for a game designer. The document defines all parts of the game and works as the guideline for the production. The document's length varies depending on the complexity of the game; however, it should always describe accurately what is in the game. There is no official format for the document and making it in a way that works best for the team is most important as the document's main goal is to communicate. Keeping the document simple and readable is of great importance (Rogers, S. 2014, 65-68).

3.2.2 Game design for mobile

When designing a mobile game there are few important factors that should be focused on. The first thing to consider is the play sessions length. Unlike in the PC or the console games, the players play usually only in short sessions while waiting for a bus or waiting in a line. The game should have natural breaks to allow the players a good place to stop. So instead of focusing on creating a lengthy game it would be advised to give the game more depth. This can be achieved by giving the game few good gameplay elements and combining them to make the game more complex and interesting for the player. A good game does not need a great amount of elements to be complex so focusing on creating a few good ones and then considering how they can be reused and combined to create something new (Rogers, S. 2012, 43-47).

Another factor that should be emphasized is the repeatability. As the games are played in short sessions it is important to keep the gameplay exiting so the players do not feel bored after a few levels. Giving the players encouragement to try again when they fail and rewarding them when they succeed can keep the players playing and ensuring that they will return to the game. Again making the breaks in the game feel natural and maybe even encouraging them to keep breaks, so they feel comfortable to stop playing for a while and making it easier for them to return to the game (Rogers, S. 2012, 48-49).

One of the biggest differences in a mobile game design is designing how the game is played. As most of the games are played on a device with a touchscreen there are many things that need to be considered when implementing the controls for the game. One of them is the players' fingers. The players' finger sizes vary and so does their nimbleness. For example when designing a menu that has buttons, the buttons should be enough far away from each other so that the players can press only one button with their finger. It is also wise to position buttons with opposite effects like "continue" and "end game" apart from each other. Also considering how many fingers there should be on the screen at the same time is also crucial as they take up space from the screen leaving less of the game visible. This is why while designing the controls trying to visualize the finger movement on the screen is important. This allows seeing what areas of the game screen are obscured when playing so the important game elements can be placed so that the players can see them most of the time (Rogers, S. 2012, 58-70).

3.3 Prototyping

A game prototype is a working model made from an idea that has the game's core mechanics implemented and is playable. The prototype usually has rough placeholder graphics, sounds and features because when prototyping it is not necessary to perfect the visual look or optimize the game for the platform. Prototypes are an excellent way to see if a game design is working

or not and thereby it is advised to always create prototypes before rushing to create the full game (Fullerton, T. 2014, 197).

There are multiple types of prototypes that can be made with different goals and purposes. Two commonly used types are the physical and the digital prototype. Physical prototypes are usually created with paper, card board and other everyday objects. For example the physical prototype can be a game board drawn on a paper and card board pieces used to represent the player and the enemies. As this style of prototyping is the easiest it is commonly used to create the first iterations. This style allows also the designer to change mechanics quickly as they are only on the paper and it is not needed to program them. It also gives a better chance for everyone to participate in a high level design process as a great technical knowledge is not needed (Fullerton, T. 2014, 197-229).

Digital prototypes are usually done to test the game on the platforms the game will be released. As physical prototyping has its limitations like when it comes to the game controls, it is impossible to fully test them on a physical prototype, which is why the digital prototype is also created. Like the physical prototype the digital is not a finished game and polishing it too much would defeat the purpose of prototyping. This is why the digital prototypes are usually made with minimal art and even the gameplay itself may be incomplete. Digital prototype usually focuses on implementing the game mechanics to the game and seeing how they actually work together (Fullerton, T. 2014, 235-264).

4 PROJECT

4.1 Early development

Before starting to work with the project the author and Pasi Vilppola played the board game that was the inspiration for the project. After playing the board game the core mechanics of the game were discussed about as they would be the base of the project and the starting point of the game. The core mechanic in this case was finding a matching object to an example. After this it was decided to go forward by making a mobile version of the Pikachu game.

The reasons why it was decided first to just convert Pikachu game to mobile and create a classic version were to allow more time to come up and design mechanics for the game. Also, as all game versions would be based on the same core concept it was possible to make simple versions of the core mechanics to the classic version and then use them again later on.

4.2 Brainstorming

During the development phase there was plenty of brainstorming of ideas of different kinds of mechanics and versions ranging from simple 2D games to complex 3D games. Most of the ideas were generated during the development of the classic mode when it was most crucial to get ideas for next modes. There were multiple ideas that were considered for the project and some of these can be seen in the Table 1.

Table 1 Brainstormed ideas for game modes

Name	Description
Deluxe	Improved version of the classic mode. The game has score system and bombs that can be used to cause mischief to other players.
Bugsquash	Instead of cards the game has bugs as collectables. The game also has events happening randomly during the game.
Finders Keepers	The players move in 3D world gathering objects
Memory game	The table cards are backside up on the table and players can press them to turn them around. If the correct card is found player can take it to their hand
Combo/series	There are specific series of cards. Game goes on multiple turns where players collect three cards. At the end of the turn players are rewarded with points for the cards they managed to collect. If player gets full combo of specific cards they get more points.
Fill the cube	Players have a 3D object in a random shape and the aim is to fill it with predefined pieces as precisely as possible.

Continues on next page

Table 1 continues

Find the cube	The game has 3D cubes on the game screen that can be rotated and players need to find the correct cube.
Build the cube	Players have a 3D cube that can be rotated with empty sides. Players objective is to fill the cube's sides with correct pieces.
Decorate the room	Players have an empty room and their objective is to decorate it to match the example.

From these only four were chosen to be developed. The chosen modes were: classic, deluxe, bugsquash and finders keepers. These were chosen by what would be possible and easy to make with the resources in use and what were considered the most interesting and fun to play.

4.3 Development

The development was mostly done by focusing on a single feature at the time and then implementing and testing it through. After testing it would be designed further if needed to fit better the game.

The development was started with the classic mode where the core mechanics of the game were implemented. This also allowed the testing of how the controls would work on the touchscreen. During the development of the classic mode the controls for picking up the cards and collecting them were designed and created and the same controls were used in deluxe and

bugsquash modes. One of the mechanics that was created for the classic mode and later used in all of the versions was player selection. The player selection screen had been divided in four parts representing each player (see Figure 3). The players could tap their part of the screen to activate the player slot.



Figure 3 Player selection screen

The second version to be created was deluxe mode. It was created by implementing new mechanics to the classic mode to improve it. The deluxe version had the most testing done due the bomb mechanic causing numerous problems which most were solved either by design changes or fixing the bugs. The bugsquash was created after the deluxe and it used the same core mechanics as the previous versions. The biggest additions to the bug version were the bug movement and event systems. The last version made was the finders keepers which were furthers form the original concept and had most of the mechanics redone for it. For it there was some level design done for the game area where the players move and collect the pieces.

During the end of the project the classic, deluxe and bugsquash modes were given to a small group for testing to see how people would play and finding possible bugs in the game. The last parts of the project were to update the documentations as it was lacking in information about the game modes and making latest builds of the game for returning.

5 CLASSIC & DELUXE

5.1 Introduction

This game mode has two different versions that were made. The first version was a classic version, which was essentially a mobile version of the Pikachu game. The second version was done by adding mechanics to the classic version and improving it. Both of the modes have a set of 18 cards and they support two to four players. Both modes also have two example cards positioned at each side of the game screen (see Figure 4). The players are also visually separated by each having their own color shown as the background color of the player's hand.

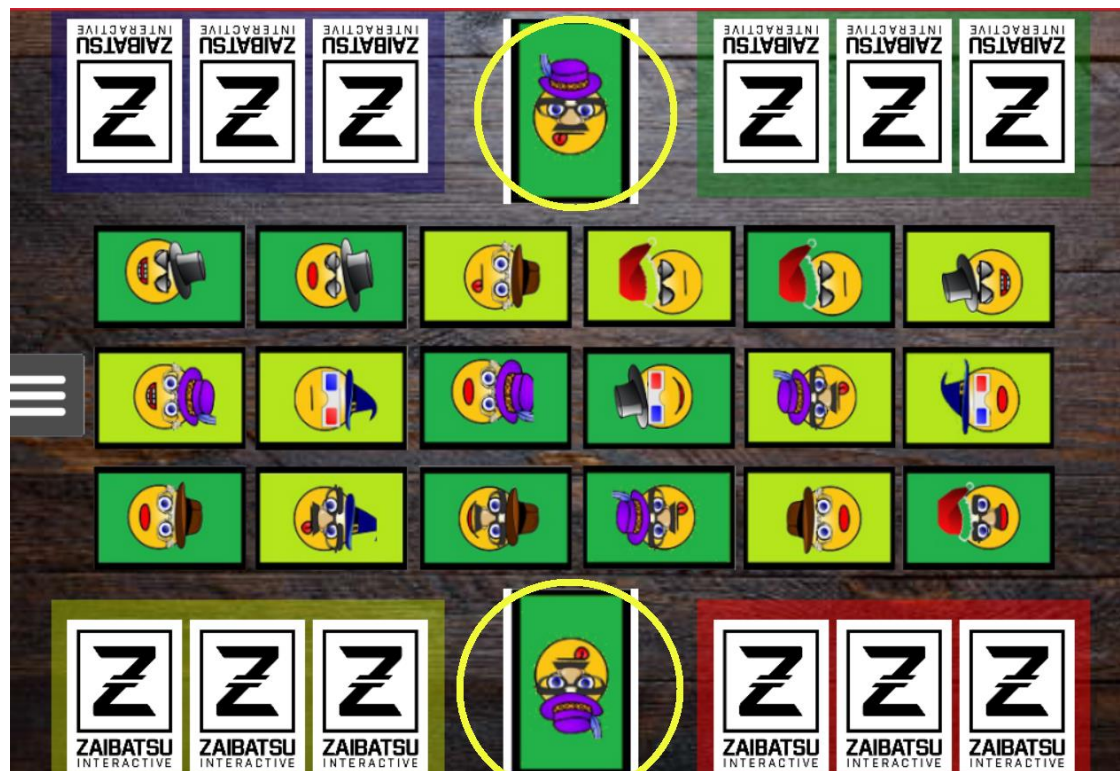


Figure 4 Example cards highlighted with a circle

5.2 Classic

The classic mode is a straight forward game and does not offer anything new compared to the board game. Players try to find a matching card for the example from the table or from other player's hands and get it to their own hand. As in the original board game it is possible to steal cards from other player's hands or defend the own cards. The first player to get three cards to their hand wins the game.

5.3 Deluxe

After finishing the classic version the creation of the deluxe version was started by adding mechanics to the classic mode while keeping the game playable. The main gameplay is the same as in the classic version; however, there is one game changing mechanic that was implemented in the deluxe version, the bomb, which shall be discussed in more detail later on. Other mechanic that differs from the classic mode is the score system that allows an alternative way to win the game by collecting 100 points.

Bomb

During the game there is a chance for the example card to turn a matching card to a bomb. When the bomb is activated it will be indicated with a small bomb icon and a timer (see Figure 5). The bomb will blow up when the timer reaches zero or when it is taken to a player's hand. When a matching card is taken to player's hand while the bomb is active it will explode and instead of giving that card to a player it returns to the table and the player whose hand the bomb exploded in loses one card from their hand, which also returns to the table.



Figure 5 Bomb indication on example cards

For the bomb there were also two different settings for how it works. The first setting affected how the bomb acts when the counter hits zero and the bomb has not been given to any player. When the setting is on, the bomb that has not been given to a player explodes when the timer hits zero and it explodes so that every player is affected, meaning that all of the players lose one card from their hand and suffer a point loss. If the settings is off the bomb will just make the example card to change. This setting is on by default in the game.

Another setting was called “hidden bomb” which activates the bomb only after the correct card has been picked up. This makes the game slightly harder as the players cannot just quickly take the cards to their hand as they might get a bomb and thereby cause themselves trouble. This setting is also on by default.

5.4 Design decisions

Even though the card game did not bring much to the mobile version there still were many design decisions. These were mainly to decide how many new mechanics there would be implemented and considering what was possible to do with the limited resources and skills. In this chapter the most important and biggest decisions are discussed in more detail.

5.4.1 Cards

In the start there was a long discussion about what kind of cards would be chosen for the project. As the players are in different positions they see the game differently and so the objects can be seen in multiple directions. In this light it was considered that the cards could be symmetric, allowing everyone to see them in the same way. For this multiple different arrangements for the cards were also considered so that all players would be in equal standings. One of the ideas was to have a rotating example card in the middle and the rest of the cards in circle around it (see Figure 6).

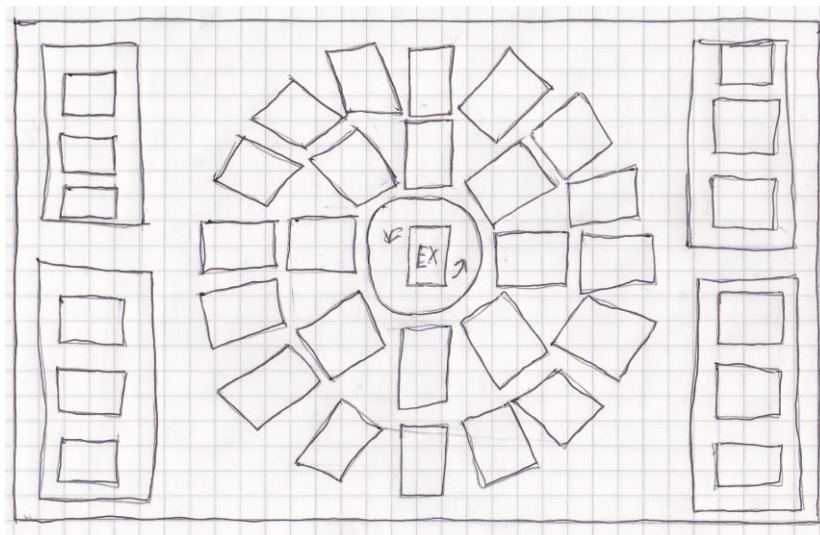


Figure 6 Concept of circle orientation of the cards

For this it was also considered that the table cards could move as well in the circle. This idea however proved to be unfitting as the cards would have needed to be smaller making them hard to see. In the end it was decided to go with cards that had different faces on them and place them on the table so that none of the cards face directly the players (see Figure 7). One of the reasons for this arrangement was to preserve the feeling of a board game with many situations where the players are looking things from upside down or sideways.

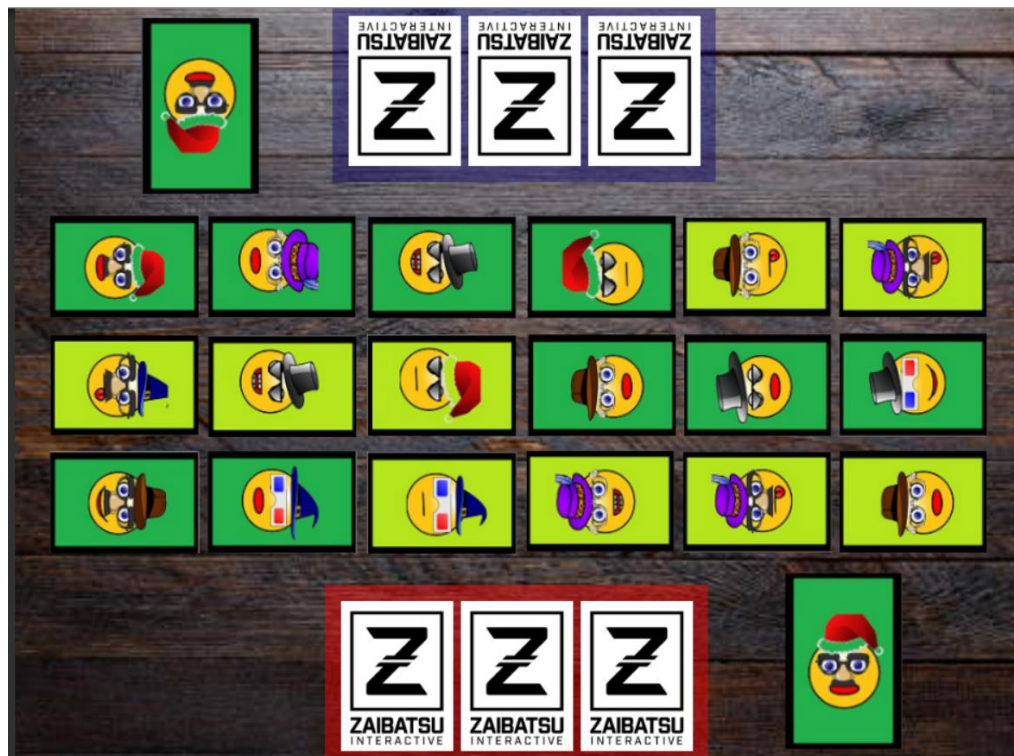


Figure 7 Player arrangement in 2-player game

For the cards it was also considered a possibility that they would be animated to create something that would be extremely difficult to reproduce in a board game. The idea was scrapped because neither of the authors was good with animations and making unique animations for each card would have taken a considerable amount of time.

5.4.2 Bomb

The biggest and most defining mechanic that was implemented was the bomb and it also had the most decisions to make. There were multiple ideas for how the bomb could work. For example one of the ideas was to always have the bombs visible on the table. In this case the game would have randomly chosen one or more cards at the beginning of the game and made them a bomb card. These cards would have been bombs for the rest of the game. When the example card would have chosen one of these bombs, the bomb would activate and when taken to a player's hand it would have exploded. This idea was scrapped when it was decided that it would be better for overall gameplay if the bombs will not be visible entire time.

Some other ideas for the bomb were considered when it was discussed how the bomb would affect the players. These ideas included locking player's hand so that the player would be unable to collect cards for a set amount of time and rearranging the table cards. For the last idea it was also considered to have it as own mechanic in a form of a panic button, which would have rearranged the cards so that players need to remember the card locations again.

5.4.3 Score

The score system was implemented mostly to make sure that the games would not be too long and start feeling boring. At first it was considered whether to put the score system in the game or not as it really did not bring anything special and it was left out of the game at first. Later on when the bomb had been implemented in the game there were times when the game took a long time to finish due to the great amount of bombs and nobody could get three cards and finish the game. During this time it was decided to put the score system in place as an alternative way to win the game.

The score amounts were tweaked so that a player could easily get 100 points even if there were lots of bombs in the game by minimizing the point loss from the bomb and increasing the amount given to the players for the cards (see Table 2). The game also rewarded the players more for stealing and defending the cards to encourage players to look at everyone's hand.

Table 2 Score amounts in deluxe mode

Event	Points
Getting correct card from the table	+10
Successfully stealing card from other player	+15
Successfully defending card in own hand	+15
Losing a card	-5
Bomb	-5

5.5 Further development

Even though there is little space for new mechanics on the game screen it is possible to add more if necessary for example as events like in the bug version of the game. The game works quite nicely with bomb so it might be

good idea to focus improving the cards instead of creating more mechanics to the game.

The cards of the game have multiple ways how they can be improved. One excellent way that was considered for this project but was not implemented because of time and skill limitations is the animated cards. If the cards would be animated it would make the game feel entirely different and make it more interesting. One downside in this would be that it would make the game much harder for player; however, it would be possible to have the game multiple difficulty settings. This way the game could have wider range of the audience and giving longer lifetime.

Other thing that should be done to the cards is to increase their amount so that the game does not always have the same cards making each session more different from each other. Also the images in the cards could be pretty much anything making the possibility to give the game different themes. There could be different kind of card decks and players can choose what they use. These decks could be unlocked by playing or maybe bough separately to allow customization of the game.

5.6 Summary

The classic mode was mainly done to see how the game works on mobile and to create the core mechanics that would be used in the later versions. While it is playable it is lacking in depth and not very interesting. The deluxe version had its own twist and made it fun to play; however, it would still need more development to become a really great game and to make it stand out.

6 BUGSQUASH

6.1 Introduction

Bugsquash game mode was inspired by the Zaibatsu's art director who suggested an idea of collecting bugs instead of cards. The core mechanic of the game mode still stays true to the original concept of collecting matching items for the example. The game is playable by two to four players. In the game there are 16 bugs at any given time roaming around the game area that are randomly chosen amongst 72 different bugs. In the middle of the game screen there is a dome and inside it is the example bug that is randomly chosen amongst the 16 bugs currently in the game. Players' objective is to find a matching bug for the example and drag it to their case (see Figure 8).

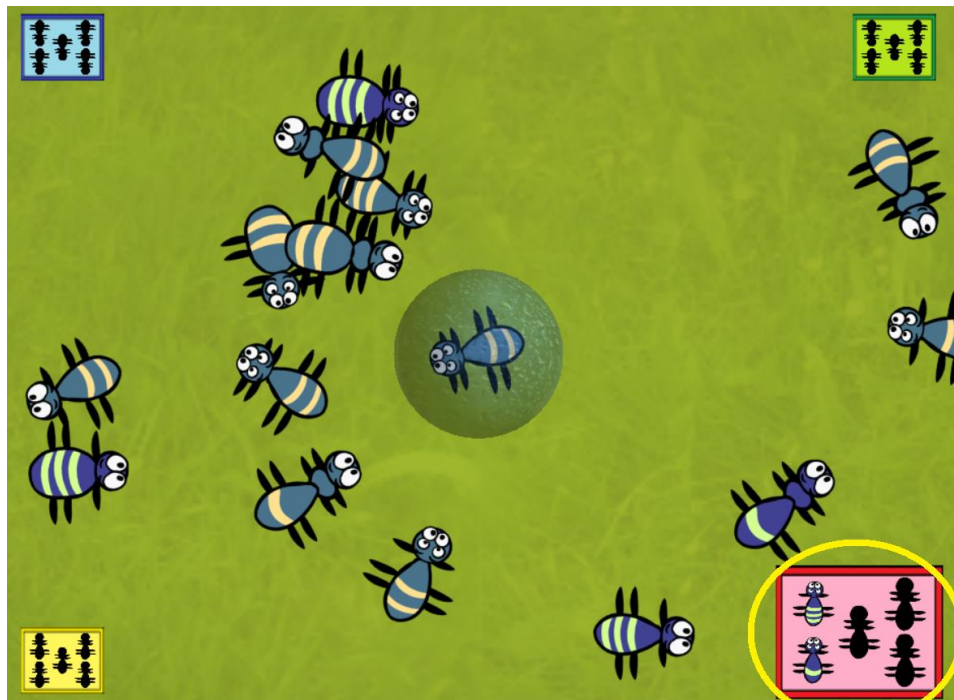


Figure 8 Player cases highlighted with a circle

What makes this game mode relatively different from the previous card versions is how the objects that the players are trying to collect are moving

giving the game an entirely new feeling while still having the same logic. Apart from moving bugs the game mode includes events that give the game a little more twist. In the prototype there are three different events that can occur. Each event obstructs the players in some way, however, so that they possess equal threat for everyone. There are two possible ways for the game to end. The first one is when a player manages to collect five bugs and becomes the winner. The second possibility is for the players to lose the game when the aliens are allowed to abduct five bugs. In order to avoid the game ending to the aliens' victory the players must work together in destroying the aliens when they appear.

Leaves

When the event starts a bunch of leaves fly to the game area (see Figure 9). These leaves can be moved by the players freely and stay in the game until the correct bug has been collected. Leaves can hide the bugs under them making them hard to see, the players can also move the leaves to hide the example giving them an advantage if they remember which bug is the correct one and the others do not. When the correct bug is collected the leaves fly away from the game area.

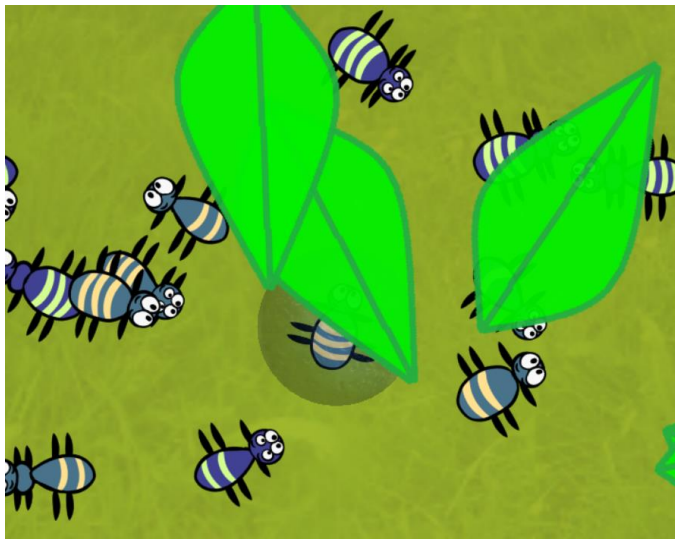


Figure 9 Leaf event

Bubbles

During the bubble event bubbles continuously appear from the sides of the game area until the event ends (see Figure 10). The bubbles are transparent so it can be seen what is under them; however, they block touch meaning a bug which is under a bubble cannot be picked up. When a bubble is touched it breaks and no longer blocks touch meaning the bubbles need to be popped in order to be able to get the correct bug. When the correct bug has been collected, all of the bubbles pop and new ones will not appear until the event is triggered again.

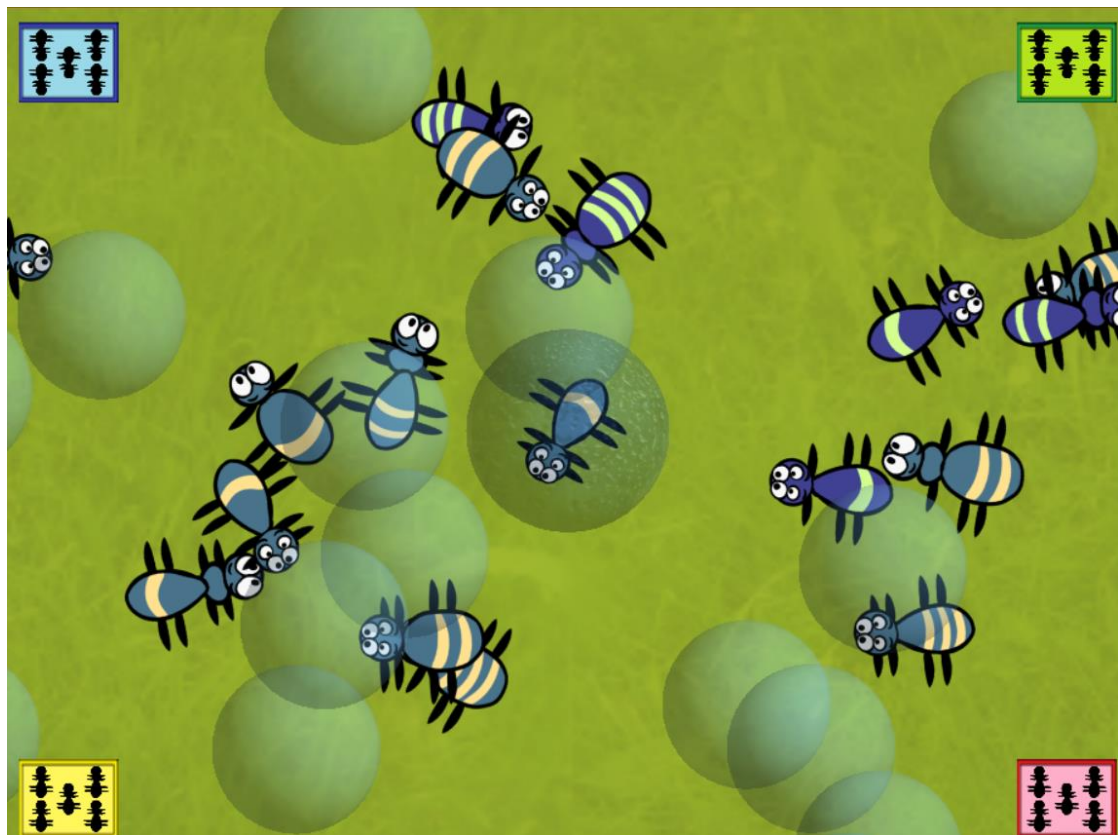


Figure 10 Bubble event

UFOs

The aliens are the most gameplay defining feature amongst the three events as it can lead to a loss for the players. When the event is triggered flying

saucers start flying to the game area and each of them targets one bug which they try to abduct (see Figure 11). They can cover the bugs under them making the bugs harder to see and when they reach their target they start hovering above it while abducting. The causers can be destroyed by tapping them three times, each tap damaging the causer more and the third tap eventually destroys it completely and frees the bug that was being abducted. If the causer manages to capture a bug and flee the game area successfully the aliens get one abduction point. At five abduction points the game ends with an alien victory and all of the players lose the game. The event goes on until the set amount of the causers has come to the game.

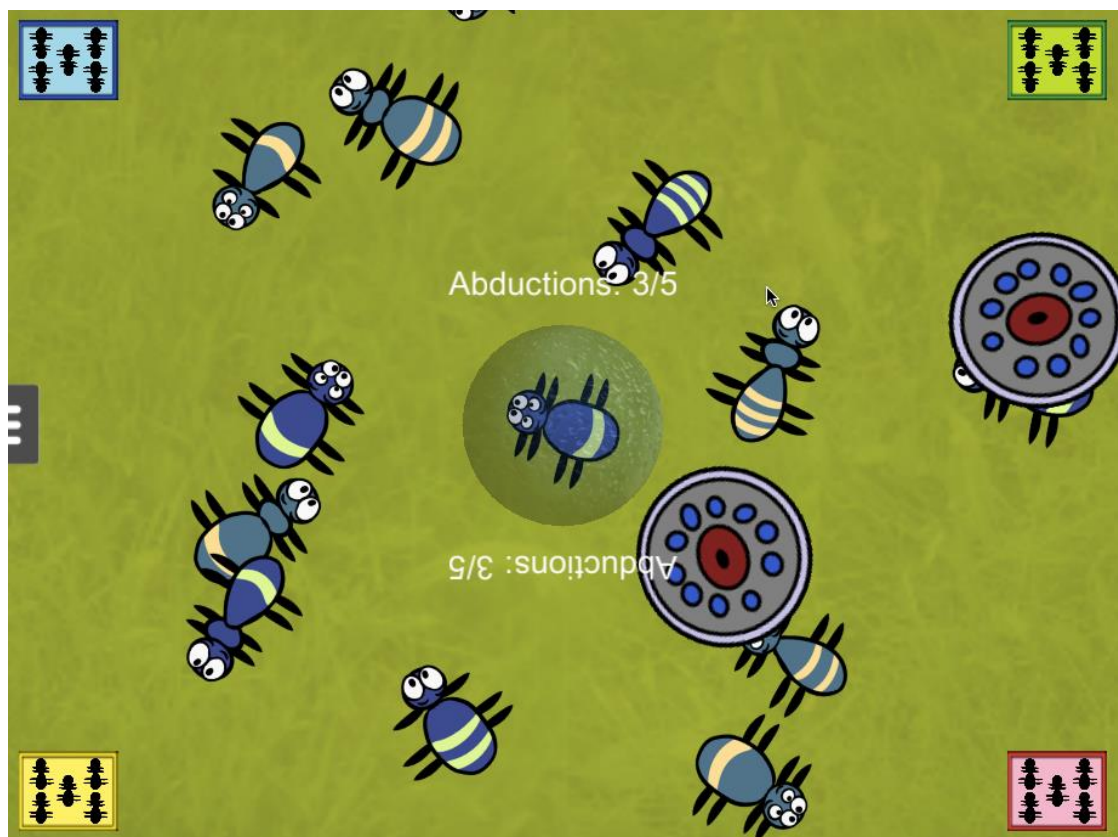


Figure 11 UFO event

6.2 Design decisions

6.2.1 Bugs

The bugs were one of the main aspects of the game as the collectable objects of this version. Still there was quite little discussion about them as the aim was to make the game playable. The discussion was mainly about what parts of the bugs would be changing between the bugs and how small the differences would be. The parts considered were the eyes, the number of body parts, the amount of legs, the color and the shape of the body. The game first had placeholder bugs that had their color, leg amount and the shape of the body changing between the bugs (See Figure 12).

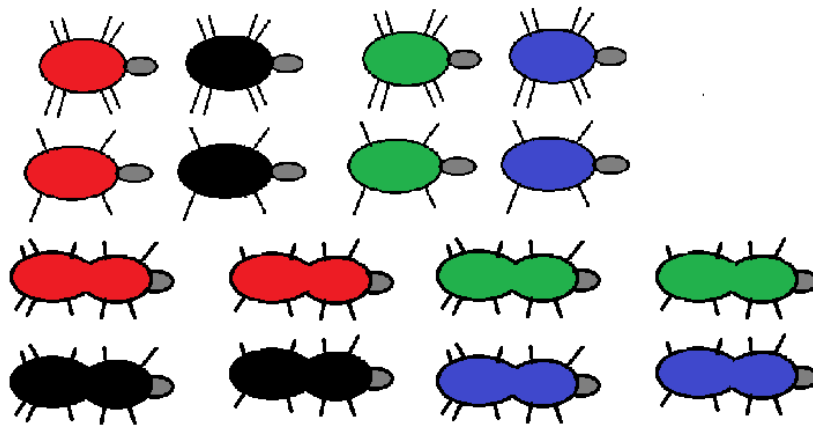


Figure 12 Placeholder bugs

Later on when the Zaibatsu's artist kindly made new bugs for the game the bugs had the amount of the eyes, the shape of the body, the amount of legs and the color differencing between them (see Figure 13).

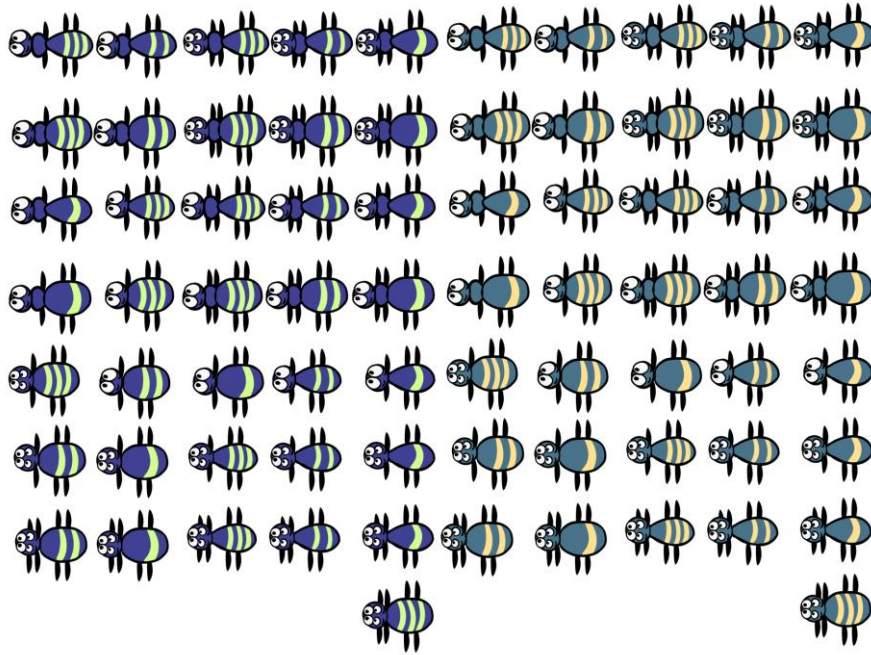


Figure 13 New bugs

6.2.2 Player mischief

One of the most discussed mechanics was how the players could harass each other. One ideas that came up was when it was considered that bugs would be collected to test tubes the players could shoot at other players tubes to break them and freeing the captured bug. For this there were multiple options that could be used like a slingshot and a baseball. After considering and planning them further it was concluded that they would be hard to implement to the game so that they would be easy and simple for the players and so the idea was eventually scrapped.

6.2.3 Events

After it was decided that the game would have events to bring a twist to the game there was some brainstorming done to come up with possible events. The brainstormed events included for example a ball, rain and snow. Each of the event had different effects but most having common concept. The concept

was that the events would be causing trouble equally to all players or they would require team work. The ball for example was considered as cooperation event where the players would have needed to work together to lift and carry the ball away from the game area. The rain event would have been a time challenge where the game area is slowly filling up with water eventually drowning the bugs. If the players would have been unable to capture the correct bug in time all of the bugs would change in the game and example bug change to a new one.

The events that were decided to implement to the game were chosen by considering how easy it would be to implement to game. With this it was decided to add leafs, bubbles and the aliens as events for testing how they would work in the game. For the alien event it was considered to give them more focus and to have multiple alien based events; however, due the time limitations of the project it was left as only one effect. The reason behind making the alien event to make the players lose the game if the aliens' saucers are not destroyed was to force players to cooperate during the game. If the aliens could freely take bugs the players would more likely to just ignore the aliens and just focus on capturing the correct bug instead of fighting the aliens together.

6.3 Further development

This game mode offers many possibilities for further development and one is to keep game mostly the same and improving the event systems in the game. Keeping the gameplay so that it has both cooperation and competition could keep the game interesting and fun longer. The events could be improved and new ones could be added to create diversity. The events can bring the need of cooperation to the game or offer ways to distract other players.

Another great option is to focus on the aliens and give them a bigger role on the game. The game could use aliens not only for the gameplay but to give

the game a background story. With this the game would focus more to both the competitive and cooperation parts of the game. The competitive side would be the bug catching between the players and the alien invasion would be the side that requires team work.

As the other game modes this mode as well has great possibilities with different themes. Instead of bugs the game could have wanted bandits which the players could capture and imprison.

6.4 Summary

The bugsquash mode has the same core mechanics as the card version; however, the moving bugs and events make the game much more interesting. The events of the game would need the most polishing as the core gameplay works nicely. The greatest forte of this mode is how it requires little bit cooperation between players while competing against each other giving the game a small twist.

7 FINDERS KEEPERS

7.1 Introduction

Finders Keepers was the last version made during the project and it was taken the furthest from the original board game. While the core concept is still the same the gameplay is entirely different from the other modes. The game goes on FPS-style allowing one to four players to participate. In the game the players move in a 3D-world trying to find chess pieces from the game world (see Figure 14).



Figure 14 The Finders keepers game area from bird view

The example is indicated by a spinning hologram of the correct piece in the return area near the starting position of the players (see figure 15). There are

12 different pieces in the game and multiple locations where they can spawn in the game. The objective of the game is to find the correct piece and carry it back to the return area while other players try to prevent it and steal the piece. The game ends when a single player has collected seven pieces or all of the pieces have been collected and the player with most pieces collected wins the game.



Figure 15 Finders Keepers example highlighted with a circle

In the game players can look and move around the game area where they can pick up objects and shoot at other players. There are two kinds of objects that players can pick up, the chess pieces they are collecting and crates that can be thrown at other players. If a player shoots and hits an object that another person is carrying that object will be dropped.

Looking around

The player is able to look around by moving the finger on the screen and the character's camera follows the movement to the same direction.

Movement

The player can move forward by holding two fingers on the screen. The character is always moving to the direction they are facing, however, the players may look around while moving by moving their fingers on the screen in the same way as they would be looking around to turn their vision and at the same time the direction where their character moves.

Shooting, picking up, dropping and throwing

Shooting balls, picking up objects and dropping chess pieces and throwing crates are all done by double tapping. The control has been implemented so that a player can use only one of the mechanics at a time. In order to the pick-up feature to work, the player needs to be targeting a pick-able object and be close enough to pick it up. After picking up the object the player can move it around while moving (see Figure 16). When carrying an object the player is unable to shoot so the players can only drop or throw the object they are carrying. The difference of dropping and throwing comes from the object the player is carrying. The chess pieces cannot be thrown and only be dropped and for the crates it is vice versa. During other moments the player is able shoot with double tap.

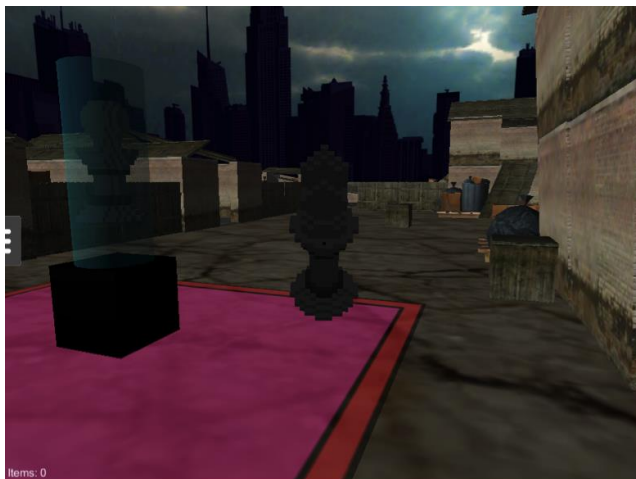


Figure 16 Player carrying a piece

7.2 Design decisions

7.2.1 Player controls

The controls were the biggest design problem in this mode. As the screen could be divided up to four parts for each players, the game would not have much space for touch controls. This is why the controls needed to be limited to as few as possible. It was briefly consider for the game to have a virtual control pad; however, it would have taken up space from the screen that was already limited with size. Easiest of the controls to decide on was looking around and it was first to be implemented as touch control. Moving finger around the screen and having the camera follow its movement felt natural and easy to use.

The movement of the character had many control variations that were considered. One option was to have the game screen recognize the position of the touch on the screen and when the touch would be on the upper side of the screen the character would move forward and when on the bottom side it would move backward. After testing how it would feel it was decided to be too complicated and Impractical for the game. Later on it was decided that the movement would happen when the player has two fingers touching the screen. Amongst the considered possibilities this felt most natural. At the same time it was decided that the player's movement would be limited to moving only forward. This was done mainly for the difficulty of adding easy methods for moving backwards and to make the gameplay harder as when carrying correct pieces to the return area you cannot go backwards keeping the carried piece safe.

The mechanics for picking up and carrying objects changed multiple times during the development as it took long time to find controls that felt natural. Before the shooting, picking up, dropping and throwing were made to use same control most of them had their own control. Shooting had been in the

game since the start and it had been using the double tap to work. At start picking up required the player to tap the screen and hold the touch while targeting the pick-able object. The multiple different controls made the game controls more complex and harder for the players to play so it was decided to make them work with only one control.

7.2.2 Gameplay

For the gameplay there were few possibilities how the game flow would go on. At first it was considered that the player would only need to find the objects in the game and walk on them and they would automatically collect them. Later it was made so that the player needed to pick up the object to collect it. These, however, made the game based too much on luck so it was decided to add more mechanics to make the game more challenging. This was done by making the collecting of items harder by adding the requirement that the player need to carry it back to the starting location to collect it. Now it was possible for other players to try to intercept the player carrying the correct piece and steal it before they were able to collect it.

When play testing the game it was noticed that it was hard for the players know when someone had found the correct piece and was carrying it. For this it was decided to make the player characters to have different colors so they could be recognized and a mechanic that would inform all players when a correct piece has been picked up was created (see Figure 17). Now the players were more prepared to go to intercept when they knew who was carrying the correct piece.



Figure 17 The info text when correct piece is found

7.3 Further development

This game mode has great amount of possibilities for future development; however, on a mobile platform it can quickly be restricted by the devices power. One mechanic that should be implemented if this would be developed further is adding time limit for the game. Even though it was planned it was not yet implemented in the prototype. Without the time limit the games may become too long and be boring for the players. From the created modes this is the one that would need most polishing to get it work well on mobile and to keep it fun and interesting for the players.

The game mode could easily have more action in it by adding non-player enemies for the players to fight. Also by having multiple types of collectables could give the game more depth and give the players more options.

7.4 Summary

This mode was made with a great interest as it was something entirely different from what was at the beginning. It is also a great example how much difference can be between the games even if they would have the same core mechanics. The game offered something that is rarely seen on mobile and it was fun to play. The biggest downside for this project is that it can easily be too heavy for mobile platform and would be better suited for console or computer.

8 CONCLUSION

8.1 Discussion

Since the start the project offered us great change to see what we can create. We were given a clear object that still offered freedom. We were given a board game to play and then given task to make it to work on a mobile platform. Goal was to create a game with the same core mechanics but with something new that would be difficult to add to a board game. Our only limitations would be the mobile platform and the board games mechanics. Both of us authors had earlier experience from game development so the development process started smoothly. We were able to communicate and divide the work well while still supporting each other during the entire project.

The development of the game modes proceeded mostly in a good pace. Our main focus was to keep the games playable while adding mechanics one by one. Few times there were bigger bugs and problems that took longer to resolve. With good testing and fixing we were able to overcome those problems and make the games playable. As we were making prototypes we did not focus too much on fixing minor problems that either occurred extremely rarely or were not game breaking.

Our first version did not yet offer anything new but it became strong base for our project as we could reuse the mechanics created for it in the later versions saving time and resources. We had many great ideas for the game but some were beyond our skills and with the limited time we had to choose only few ones to be developed further. There were also few ideas that we considered crazy and bad mixed in our list of ideas; however, this time they did not prove to be useful for the game or as inspiration for the versions that we created.

We were able to create four working prototypes during the project. From these three were done to reach the goal of the project as the first was done to give the project base and work as starting point and it did not fulfill the goal as it did not offer anything new. From the three that fulfilled the goal the card version was only one that barely reached the goal. If our skills and time would have allowed the card mode could have been improved further by giving the cards animation. The other two modes reached the goal quite clearly especially the last one which was furthest from the original concept. From my own perspective the bugsquash version was the greatest success of our project

One thing that we could have done better during the development is the tracking of the project and updating of documentation. We had excellent tools but because we worked mostly next to each other during the development we communicated mostly verbally and forgetting to keep the documents and project flow updated. In the end we were able to update the documentations with necessary information before ending the project so that the projects results could be used more easily in the future.

The project proved to be a very interesting and a great opportunity to improve our skills in game development. It was easy enough to produce results with just two persons while still offering challenge. We were able get lots of experience with different parts of game development and learned what parts we should try to improve. We were able to reach the goal of the project and the results can be used for future development.

8.2 Future development

In my opinion all game modes have the potential to be developed further into a great game; however, the bugsquash and finders keepers modes offer the

best changes to succeed in it. My own choice for further development would be the bugsquash as it is my personal favorite. While the finders keepers mode offers the biggest range of possibilities it can easily become too heavy for a mobile device and so it would work better on console or mobile platform. Even though on mobile it would be easier to be seen among other games as there are very few of 3D games. The card version could become fun if the cards would be given animation and other mechanics would be tweaked, nevertheless it is my least favorite version and I would not personally continue its development.

With the bugsquash I would make the aliens the core of the game. Making them the main focus would give the game a clear theme and direction. The premises for the game's story could be that the aliens are trying to destroy the world's ecosystem by taking away the crucial insects that help to keep it alive and the players are competing against each other to become the person to save most of the insects.

The aliens could be coming randomly during the entire game and not just in a single event. This would give them more emphasis and allow them to come even during other events giving the game more difficulty. The events of the game could be caused by the aliens trying to sabotage the players' attempts to save the insects. One new event could be an alien mothership landing on the game area that would work like a boss that the players would need to destroy together in order to continue the game.

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