New Bee COMPSYS 302 Pacman game Report

Group 18 [New Bee]

Group member: Steven Yan & Jerry Yang

Table of Contents

[New Bee COMPSYS 302 Pacman game Report 1](#_Toc511908242)

[1. Introduction 3](#_Toc511908243)

[2. Game Background 3](#_Toc511908244)

[3. Specifications 3](#_Toc511908245)

[4. Design Features 4](#_Toc511908246)

[5. A top-level view of how the system works (diagrams are a good idea) 5](#_Toc511908247)

[6. One or two significant issues during development and how they were overcome 5](#_Toc511908248)

[3. Discussion of the suitability of the tools for the application (e.g. Java) 6](#_Toc511908249)

[4. Discussion on OO-design and how cohesion and coupling issues were addressed 6](#_Toc511908250)

[5. Software development methodology 7](#_Toc511908251)

[6. Game design experience 7](#_Toc511908252)

[7. Suggested improvements for future development 7](#_Toc511908253)

[Appendix 8](#_Toc511908254)

## Introduction

This report introduced Group Project for Computer System Engineering COMPSYS302 students. Students in Group 18 are required to design an OO-design Pacman style game for a 12 year old teenager. The game is based on a Pacman style protagonist who is a skilled thief called Ben. In the game, he has his own magic power which could avoid the guard in the castle. He needs to escape the castle with a specific key and access through the right door.

Game is designed in Java environment. It has two different mode to play—single and multiplayer mode. In single Player mode, user only able to control Ben in the game. In multiplayer mode, User can invite their friend to help him collect more coins to achieve a higher score.

## Game Background

Ben is a skilled thief who can also play magic. When he was young, he was a top student in magic school and won many big prizes. After he graduated, he worked for a big union as a senior magic counselor. However, he was framed by the government and lost his reputation and most of his wealth. His wanted posts are on the street everywhere on the street. Fortunately, his wife trusts and supports him. He has made a plan to find out the person who framed him. However, firstly, he has to feed his family.

In this game, he entered a castle and try to find some money.

## Specifications

This game has following specifications:

1. We developed a Welcome Screen to allow user to choose different game modes or read the help screen to understand the special game feature. Our single player mode has the protagonist and some automatic moving Guards inside a Castle. Player needs to collect the right key to get the access to the door. At the same time he will be able to use his powers to avoid guards and collect coins to gain scores.
2. A 3 seconds countdown timer applied before any elements able to move.
3. Guards start to move automatically.
4. The window size are set to 1024 \* 768
5. Pellet will disappeared when protagonist collides with a pellet.
6. Character will not move through the wall.
7. When player collides with a Guard, he will lose a life and back to the start position with other pellet stay on the canvas.
8. Game has a time limits which is 120 seconds, it will cause a fail if the player did not escape from the castle in required time. Press button “Y” will end this set of game immediately.
9. Press button “P” will pause the game and resume the game.

Press button “Esc” will exit the game and close the game window directly.

1. Game finish when protagonist hold the right key and access the right door at the same time with button ”C” pressed, which gives them flexibility to collect more coins or stop this set of game.
2. Sounds will be played in the game depending on collisions’ type.

## Design Features

1. Score

Every Coin worth 10 points.

If ben cannot escape within 2 min (he died or times up), ben loses all of his coin (the player will get 0 points).

1. Player name

Player’s name will show up on the game scene.

1. X mark

Ben can drop X mark as he is moving. He can teleport back to his mark anytime he want.

1. Powers

There are question marks on the map, when you pick them up you can see in the right down corner your power will show up. It can be either fireball or icewall.

Fireball kills the one guard. Icewall will make multiple guards freeze onto it.

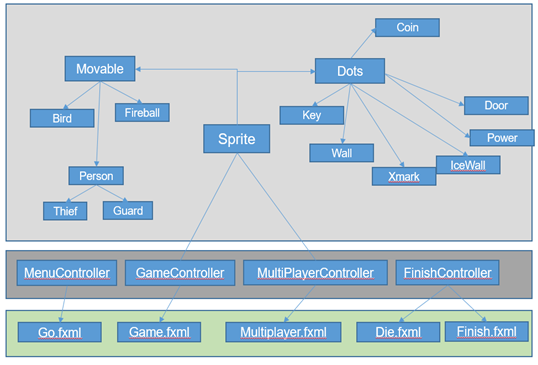
1. Doors and Keys

There are 2 doors and 4 keys on the map.

Ben needs to escape from the door.

Only 2 keys can open corresponding doors.

## A top-level view of how the system works



## One or two significant issues during development and how they were overcome

1. **Walls.**

**The biggest problem** I had when I design this game is the Collision of Moving Character and walls.

This is because wall is small images connected together, and our character can move horizontally and vertically at the same time. Therefore, when our character (one rectangle image) intersects (already goes in) with walls (rectangle images), there are walls on at least 3 sides of our character.

**The way that I overcome this** is that I made a “ghost”, ghost is a copy of my character. Before I update the position of my character, I make a ghost and let it move. If the ghost intersects with the wall, I can have 3 directions. If they are left, up, and down, I can know the wall is at left side and tell my character not to move in that direction.

1. **Powers**

**The problem** I had when I am creating power is that I cannot construct and destruct a new object (Fireball or IceWall) in my animation timer.

**The way that I overcome this** is that I made arraylists that contains many fireballs and I initialized them outside of our frame (our game is 1024 \* 768, I set their position to 1200, 800). When I need to use them, I set their position to where I want. When I do not need them, I put them back to their original position (so the player will not see a fireball when it collides on the wall.)

## Discussion of the suitability of the tools for the application

As this game is designed for 12 years old teenagers, we are not expecting to use lots of complicated graphic contents. We are using Java and JavaFx to develop this project. It is a good practice which based on OO-design. Java and JavaFx offer a huge amount of libraries for us to achieve hard features design and implements. We build the user interface with Scene Builder which provides comprehensive GUI elements with flexibility to modify them later.

However, the increasing number of different types of mobile devices reminds us to consider about develop our project on a Mobile devices or Cloud based devices. That is why a cross-platform design is more essential in modern game design. We are thinking of using JavaScript or C# to achieve our further development purpose.

## Discussion on OO-design and how cohesion and coupling issues were addressed

Sprite is my top model which every other model extends it. Then I have Movable class and dot class to separate moving models and fixed models.

Every FXML file needs to connect to a controller which can make things like button and label functional.

In controller, there should be methods to be used by things like buttons.

In initialize function, firstly we have to initialize our models. Then we used animation timer to print our model onto the canvas.

## Software development methodology

Rapid-development method and Feature driven development method are our development methodology. We using labs and focus groups to gather requirements. Prototyping and user testing of designs and re-using some classes which following the OO-design patern. Add improvements to the next product version. Keeping review requirements. Our product also improve from user testing, and adding efforts to the weak parts that not meet the requirements. Short, iterative, feature-driven life cycles driven the project development in a powerful and efficient way. .

## Game design experience

This is the first time that I develop my own game. I feel it is very interesting to look at games from programmers’ points of view. A simple requirement from a player could be a big problem to programmers. Also, I have learnt the many game mechanics and how game is present to players (Animation timer).

## Suggested improvements for future development

Due to the hash of time, I did not do a proper multiplayer mode. The plan was “fireball combat”. Up to 4 players are thrown into a simple map. Each of them can launch one fireball every second. All of them can use X mark but the cool down is 10 seconds.

There should be more kinds powers and even Weapons on the map.

The animation could be more smooth if the images are replaced with Gifs. When the thief get killed, a short gif that thief being slayed should be played.

Also, I used the simplest AI ever. When the Guards touch the wall, they just turn around and move to another direction. I should implement a proper AIs. With the well implemented AI, I can also develop the map and spawn points of thief and guards.

## Appendix

1. Licenses

<https://creativecommons.org/publicdomain/zero/1.0/>

<https://creativecommons.org/licenses/by/3.0/>