System design document for group 16

Erik Sjöström, Filip Labe, Jonatan Källman, Sarosh J. Nasir

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v1.0

1 Introduction

1.1 Design Goals

Monster Clicker is a mobile game for Android. So the program must therfore run on Android, it must be able to get input from the user, and display the result of these inputs.

1.2 Definitions, acronyms, abbriviations

- *Monster Clicker* - The name of the project.
- *Activity* - The class which is presented to the user. Allowing him or her to interact with the app.
- *View* - Abstraction, in this case it is implemented as an activity.
- *Presenter* - The main comunicator for a specific package. All method calls should go through this class.
- *Model* - Where all the logic for a specific package is contained.

2 System architecture

Monster Clicker starts when the user opens the application. From there the user has the option of visiting several different activities. Each activity presents and represents different use cases such as, buying upgrades, viewing the map, attacking monsters, etc.
Monster Clicker ends when the user either exits the app or closes it using the android application manager.

2.1 Programming patterns

Monster Clicker, just like any other piece of software relies on different design/architecture patterns, such as:

- Game Loop [1]
- Model View Presenter [2]
- Singelton-pattern
- Factory-pattern
- Observer-pattern

2.2 Dependencies

Monster Clicker is a self contained piece of software, whch means that it does not depend on anything but itself. The application contains all the information required to be able to run.

The application is subdivided into several packages:

- *Player*
- *Monster Pack*
- *Map*
- *Stats*
- *Home*
- *Shop*
- *Upgrade*
- *Clock*

Gem Clicker is developed for the Android operating system and is guaranteed to run on android phones running 4.0 or later versions of the operating system.

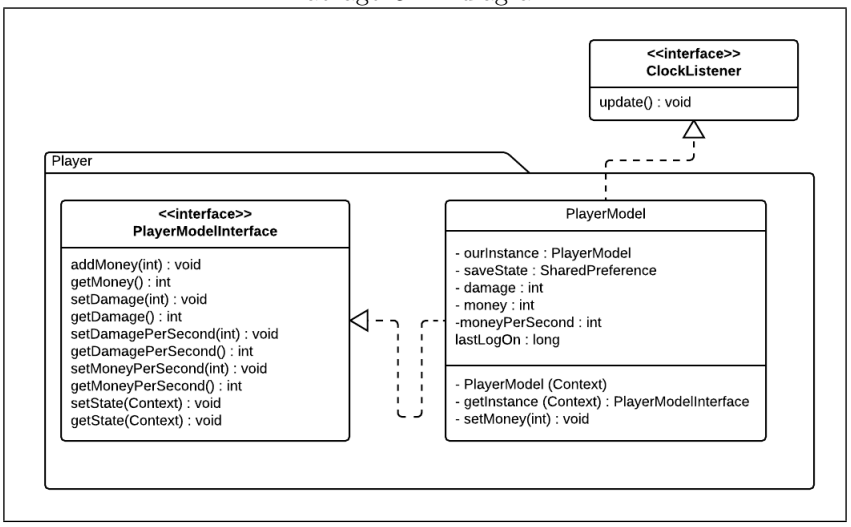
3 Subsystem decomposition

3.1 Player

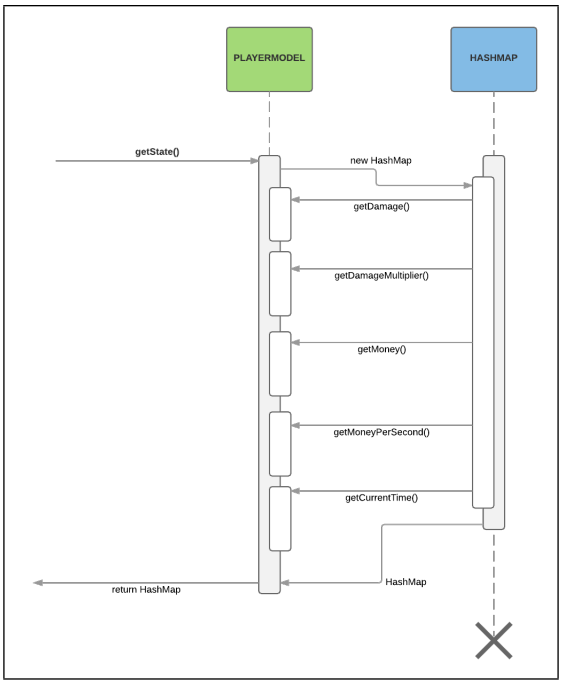
This package contains a player model, and an interface for this model. The model contains the state of the player, damage, gold, etc. And methods to access and/or change the state. The interface provides a layer between the model and anyone who wishes to access it, only exposing non-internal methods.

3.1.1 Diagrams

Package UML diagram:



Sequence diagram of getState()



3.1.2 Quality

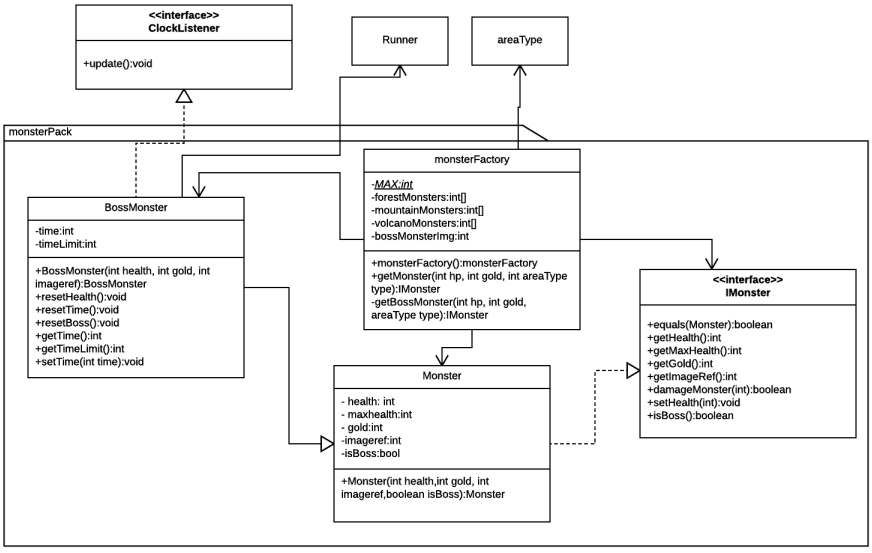
The tests for *PlayerModel* can be found in */OOPP/app/src/androidTest/.../oopp/PlayerModelTest.java*

3.2 Monster Pack

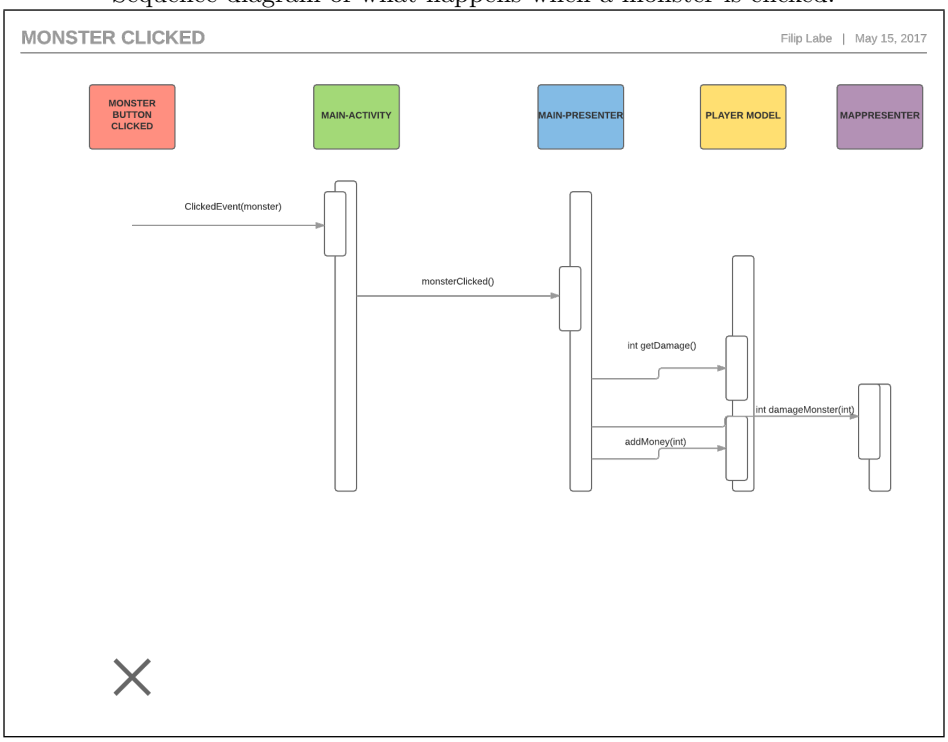
This package contains a monster model, and a monster factory. The model contains the state of the monster, gold, health, etc. A constructor to set the state and methods to modify the state. The factory handles the creation of monsters in a simplified way.

3.3 Diagrams

Package UML diagram:



Sequence diagram of what happens when a monster is clicked.



3.3.1 Quality

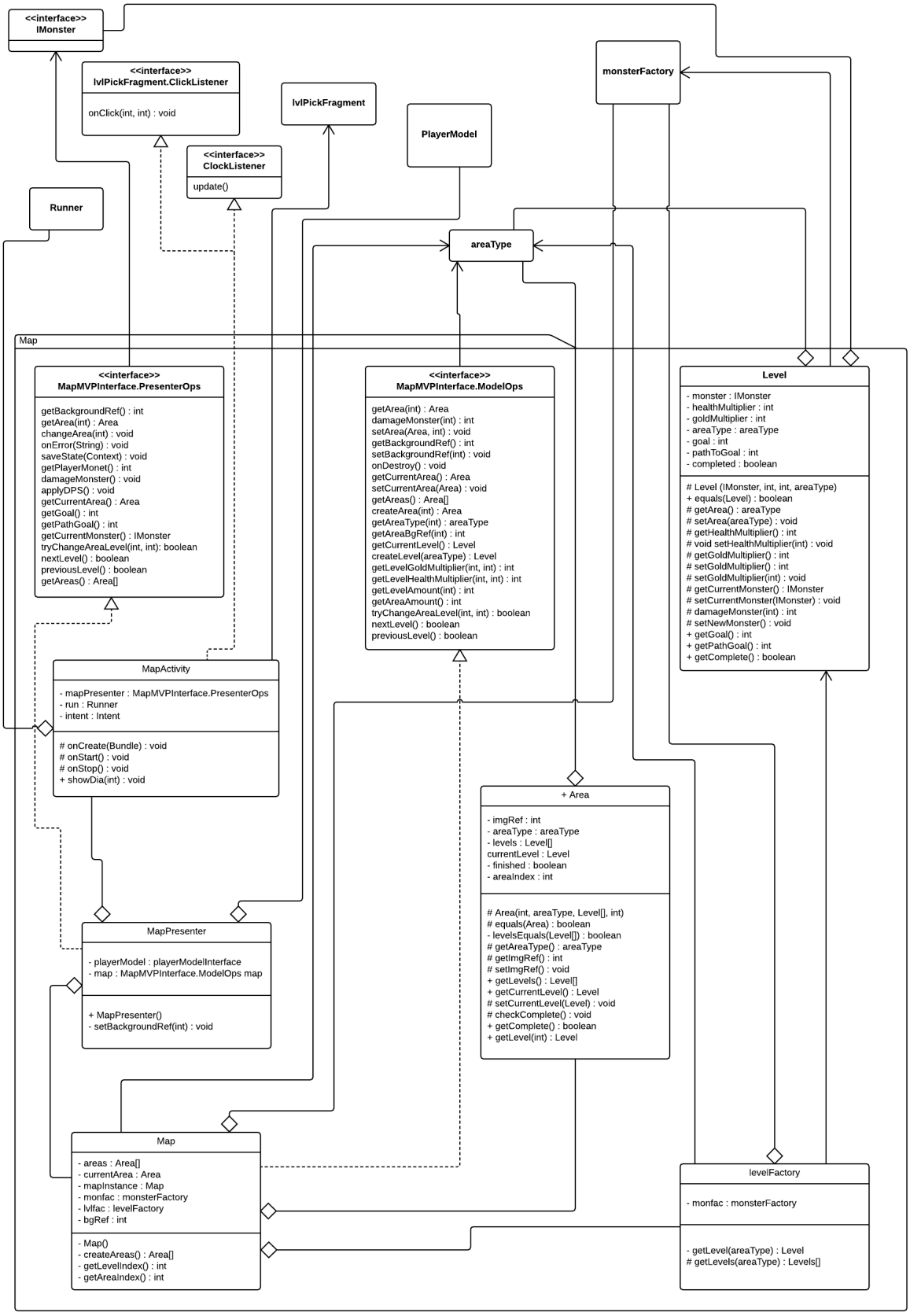
3.4 Map

The package which represents the map activity in the app. From here the player can change area. Takes care of the area, level and map instantiation. The map package consists of the files:

- Area: Container class for Levels.
- Level: A class which contains information about the monster and which methods can be used to act on the monster. Plays a significant role as it contains the monster which you are fighting in the main activity.
- Map: The model.
- MapActivity: The view.
- MapPresenter: The presenter.
- levelFactory: Produces levels.
- MapMVPInterface: The interfaces which regulate how the classes communicate internally and how other packages can communicate with the the presenter.

3.5 Diagrams

Package UML diagram:


<<interface>>
IMonster
<<interface>>
lvlPickFragment.ClickListener
onClick(int, int) : void
lvlPickFragment
monsterFactory
PlayerModel
<<interface>>
ClockListener
update()
Runner
areaType
Map
<<interface>>
MapMVPInterface.PresenterOps
getBackgroundRef() : int
getArea(int) : Area
changeArea(int) : void
onError(String) : void
saveState(Context) : void
getPlayerMonet() : int
damageMonster() : void
applyDPS() : void
getCurrentArea() : Area
getGoal() : int
getPathGoal() : int
getCurrentMonster() : IMonster
tryChangeAreaLevel(int, int): boolean
nextLevel() : boolean
previousLevel() : boolean
getAreas() : Area[]
<<interface>>
MapMVPInterface.ModelOps
getArea(int) : Area
damageMonster(int) : int
setArea(Area, int) : void
getBackgroundRef() : int
setBackgroundRef(int) : void
onDestroy() : void
getCurrentArea() : Area
setCurrentArea(Area) : void
getAreas() : Area[]
createArea(int) : Area
getAreaType(int) : areaType
getAreaBgRef(int) : int
getCurrentLevel() : Level
createLevel(areaType) : Level
getLevelGoldMultiplier(int, int) : int
getLevelHealthMultiplier(int, int) : int
getLevelAmount(int) : int
getAreaAmount() : int
tryChangeAreaLevel(int, int) : boolean
nextLevel() : boolean
previousLevel() : boolean
Level
- monster : IMonster
- healthMultiplier : int
- goldMultiplier : int
- areaType : areaType
- goal : int
- pathToGoal : int
- completed : boolean
Level (IMonster, int, int, areaType)
+ equals(Level) : boolean
# getArea() : areaType
# setArea(areaType) : void
# getHealthMultiplier() : int
# void setHealthMultiplier(int) : void
# getGoldMultiplier() : int
# setGoldMultiplier() : int
# setGoldMultiplier(int) : void
# getCurrentMonster() : IMonster
# setCurrentMonster(IMonster) : void
# damageMonster(int) : int
# setNewMonster() : void
+ getGoal() : int
+ getPathGoal() : int
+ getComplete() : boolean
MapActivity
- mapPresenter : MapMVPInterface.PresenterOps
- run : Runner
- intent : Intent
onCreate(Bundle) : void
onStart() : void
onStop() : void
+ showDia(int) : void
+ Area
- imgRef : int
- areaType : areaType
- levels : Level[]
currentLevel : Level
- finished : boolean
- areaIndex : int
Area(int, areaType, Level[], int)
equals(Area) : boolean
- levelsEquals(Level[]) : boolean
getAreaType() : areaType
getImgRef() : int
setImgRef() : void
+ getLevels() : Level[]
+ getCurrentLevel() : Level
# setCurrentLevel(Level) : void
# checkComplete() : void
+ getComplete() : boolean
+ getLevel(int) : Level
MapPresenter
- playerModel : playerModelInterface
- map : MapMVPInterface.ModelOps map
+ MapPresenter()
- setBackgroundRef(int) : void
Map
- areas : Area[]
- currentArea : Area
- mapInstance : Map
- monfac : monsterFactory
- lvlfac : levelFactory
- bgRef : int
- Map()
- createAreas() : Area[]
- getLevelIndex() : int
- getAreaIndex() : int
levelFactory
- monfac : monsterFactory
- getLevel(areaType) : Level
getLevels(areaType) : Levels[]

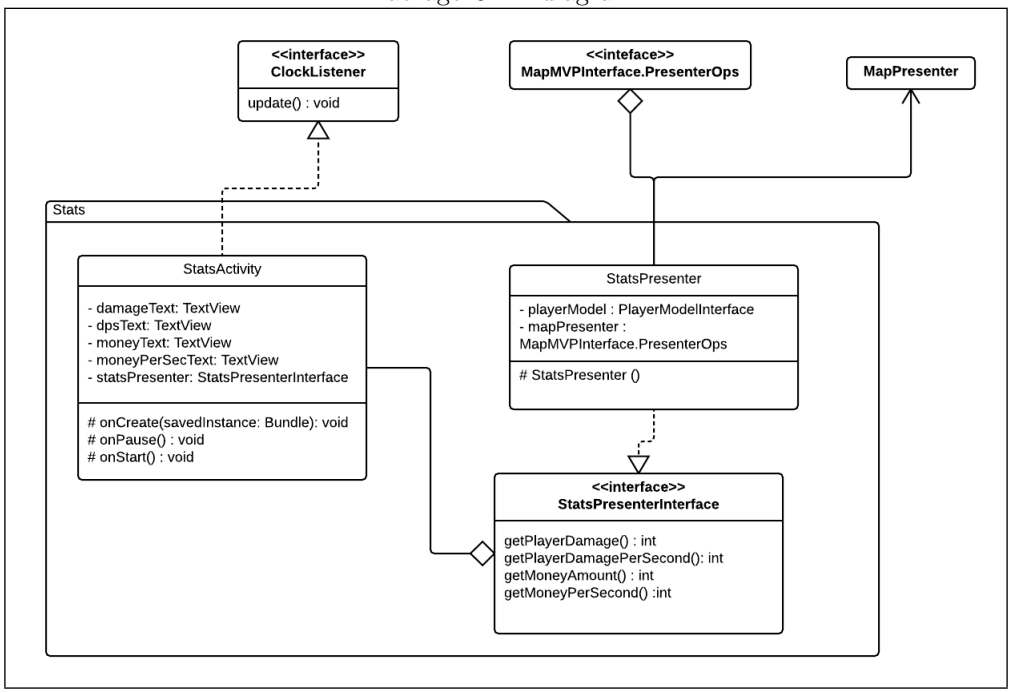
3.6 Stats

The stats package presents the state stored in the PlayerModel in a readable way.
The stats package consists of the files:

- StatsActivity: The view.
- StatsPresenter: The presenter.

3.6.1 Diagrams

Package UML diagram:



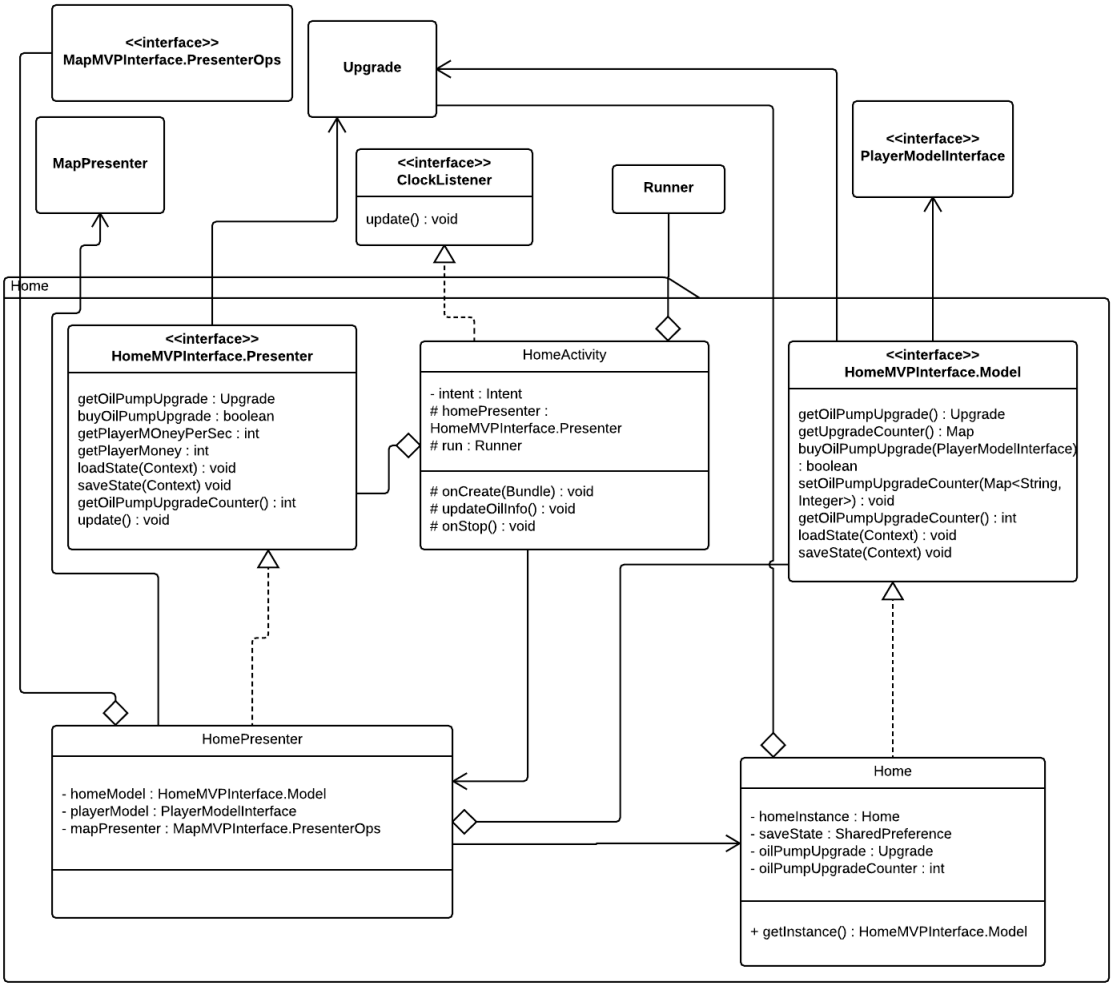
3.7 Home

The home package represents the home activity in the app. It consists of the files:

- Home: The model
- HomePresenter: The presenter
- HomeActivity: The view
- HomeMVPInterface: The interface which regulates how the presenter communicates with the model and the view, and how everyone else can communicate with the presenter.

3.7.1 Diagrams

Package UML diagram:



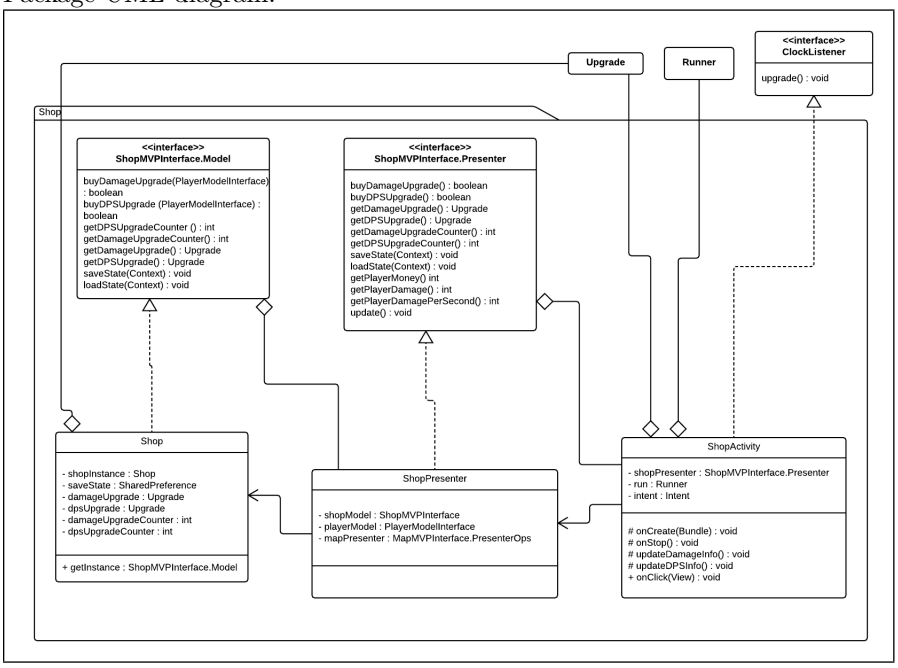
3.8 Shop

The shop package represents the shop activity in the app. It consits of the files:

- Shop: The model
- ShopPresenter: The presenter
- ShopActivity: The view
- ShopMVPInterface: The interface which regulates how the presenter communicates with the model and the view, and how everyone else can communicate with the presenter.

3.8.1 Diagrams

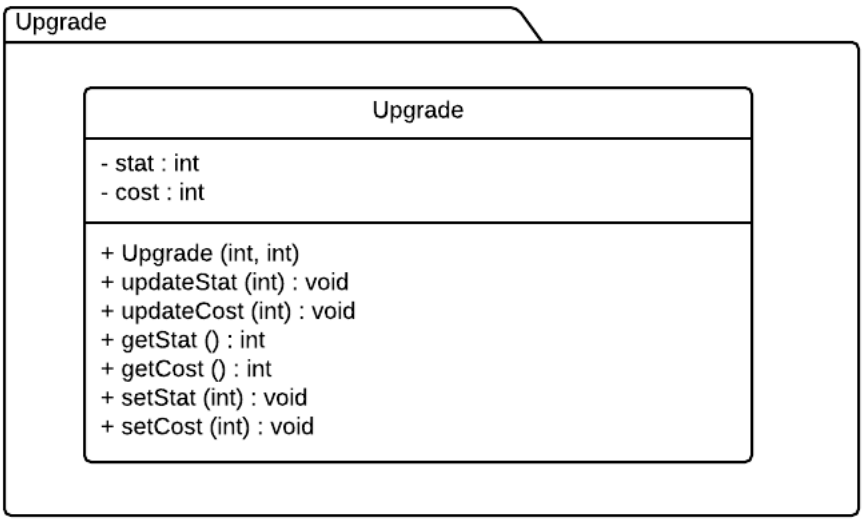
Package UML diagram:



3.9 Upgrade

Contains the class Upgrade which is the class representation of an upgrade in this game, used in Shop and Home, where one can buy upgrades.

3.9.1 Diagrams



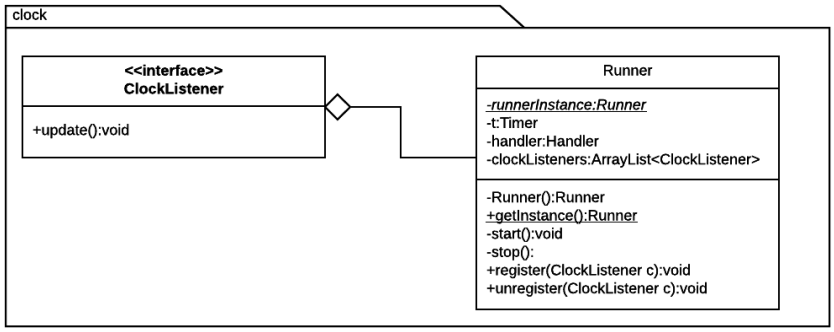
Package UML diagram:

3.9.2 Quality

3.10 Clock

The clock package is the implementation of the game-loop. The Runner class is implemented as a singelton so that everone that wants to register to the loop can get an instance of the runner.

3.10.1 Diagrams



Package UML diagram:

3.10.2 Quality

4 Persistent data management

Gem Clicker saves the state of the app when the app is closed. The data is represented as a simple key-value storage, which is handled by android internaly.

5 Access control and security

There are no different roles for using this application. The only role is that of the user, and the only permission required of the user is to use the storage space of the phone.

6 References

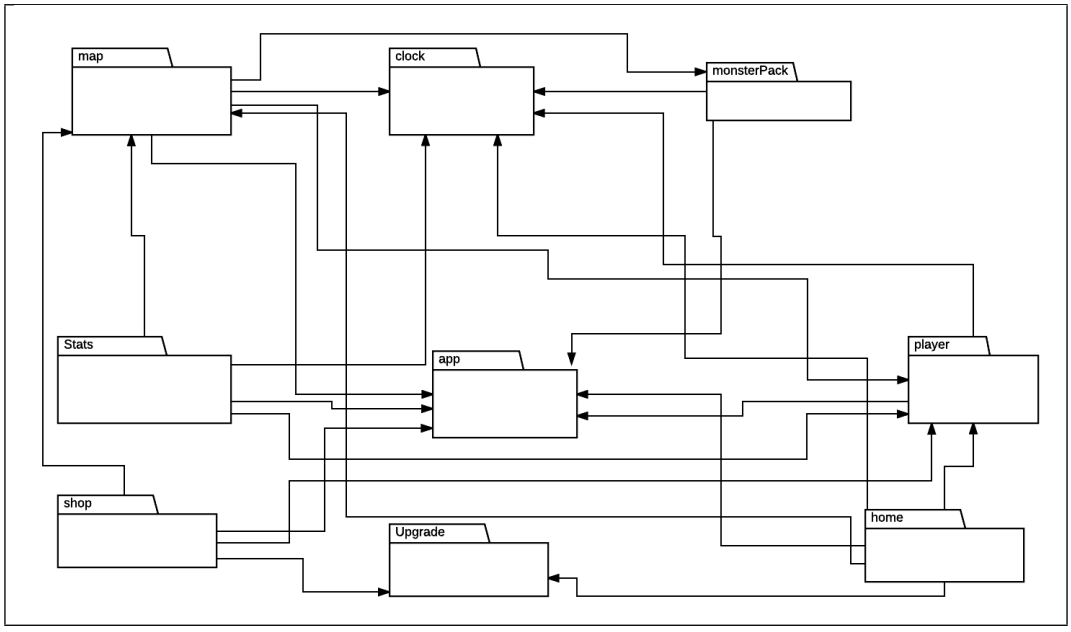
References

[1] http://gameprogrammingpatterns.com/game-loop.html

[2] https://en.wikipedia.org/wiki/Model–view–presenter

7 Appendix

7.1 Package structure



7.2 Class diagram for whole project