Space Game

Software Requirements Specifications

Version 1.6

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Change History

Version	Summary	Author	Date
0.1	Initial template created	Brian Tillery	2/12/2014
1.0	Initial writeup	Johnathan Snyder Craig Robinson Brian Tillery	2/22/2014
1.1	Split non-functional requirements into two categories.	Craig Robinson Brian Tillery	2/24/2014
1.2	Added diagrams to section 5	Johnathan Snyder	2/24/2014
1.3	Added diagram descriptions	Johnathan Snyder	2/25/2014
1.4	Added Collaboration Diagram and Description	Craig Robinson	3/19/2014
1.5	Added Sequence Diagrams and Description	Brian Tillery	3/19/2014
1.6	Added Detailed Class Diagram and Description	Johnathan Snyder	3/20/2014

Note: This table summarizes all changes made to this document.

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1. Introduction

This section discusses the purpose, scope, and goals of the game. Also included are definitions that clarify any jargon used in this document.

1.1 <u>Motivation</u>

The successes of the many great free-to-play games on the current mobile app market are an inspiration to put out a fresh new take on the classic arcade-style spaceship games of yesterday mixed with the technological capabilities of today.

1.2 <u>Scope</u>

Space Game has been designed for Google's Android Platform, and is intended purely as a form of entertainment for any participating user on android based smart phones. All progress, high scores, and other data will be stored locally in a database.

1.3 <u>Goal(s)</u>

The goal of Space Game is simple: to create a fun, free, and engaging interactive mobile application that appeals to a general audience.

1.4 <u>Definitions</u>

<u>Perks</u> – Bonuses attainable in-game that can be purchased with Space Coins to modify long-term gameplay to the user's advantage.

<u>Space Coins</u> – Currency attainable in-game during the course of a flight that can be used to purchase perks as well as increase the player's score.

<u>Powerups</u> – Bonuses attainable in-game during the course of a flight that can temporarily modify gameplay to the user's advantage.

<u>2D Scroller</u> – A type of game whose artistic style typically consists of a two-dimensional level where the character(s) may progress as the screen scrolls to the next portion of the level.

Achievements – A set of sub-goals attainable in-game that may either yield in-game rewards or may not affect gameplay whatsoever.

2. Overall Description

2.1 User Interfaces

User interfaces will be touch screen menus found in typical games. The main menu will give the user the functionality to start the game, view the player's high score, view the player's achievements, buy perks for the player's ship, and change the game's settings. The in-game interface will allow the player to dodge obstacles and pickup coins or any other form of reward.

2.2 Communication Interfaces

At the moment, the game will not need to communicate with any outside source. This will obviously change if a social media sharing option is implemented. The game will communicate with a database used for storing information about settings, scores, and other data.

2.3 Constraints

Currently there are no perceived constraints that will affect the game.

2.4 Application Features

The user will move the spaceship to avoid obstacles and pick up space coins. Collision detection will be implemented to detect whether the player's spaceship touches an obstacle or space coin. Gameplay will continue infinitely until an obstacle hits the spaceship. Space coins will be used to buy perks. The player's high score and coin balance will be saved locally.

2.5 Optional Functionality

In addition to the functionality described above, the following items could also be implemented if time permits:

1. The ability to share your high score on a social media site. Sharing high scores on social media would promote competition against friends.
2. The ability to buy more space ships and change them before each round. Customization adds replay value to games. The user will play the game longer is there is an incentive to keep collecting space coins.
3. Implementation of a health system that would allow more perks and

customization. The health system would allow the user's spaceship to sustain more damage. Also, the user could buy shields, repair kits, etc. to further his/her survival.

2.6 Assumptions and Dependencies

The minimum SDK version supported is Android 2.3 (Gingerbread), the maximum SDK version supported is SDK 4.4(KitKat), and the target SDK is 4.3 (Jelly Bean).

3. Functional Requirements

This section contains the functional requirements for the game. The requirements are arranged by level of priority.

Name	Description	Priority
Capturing touch events	Touch events will need to be captured so that the user can navigate menus and also control the space ship.	High Priority
Collision Detection	The game will need to handle the collisions that take place between the spaceship and the obstacles.	High Priority
Storage	The game will need to store information such as the user's high score, achievements unlocked, coins available, and perks bought.	High Priority
In-game Pausing	The ability to pause live games is needed in the case of the user receiving a phone call, or in the event the user needs to accomplish some other task.	Med. Priority
Game Settings	The user will be able to modify game settings such as sound, vibration, or reset game progress.	Low Priority

4. Non-Functional Requirements

This section contains the non-functional requirements for the game.

4.1 Developer Non-Functional Requirements

Name	Description	Priority
Git Repository	Application files will be stored in a Git repository to track versioning.	High Priority
AndEngine	This game engine will aid in the production of the game.	High Priority
Box2D	This extension of AndEngine handles object collisions and physics.	Med. Priority

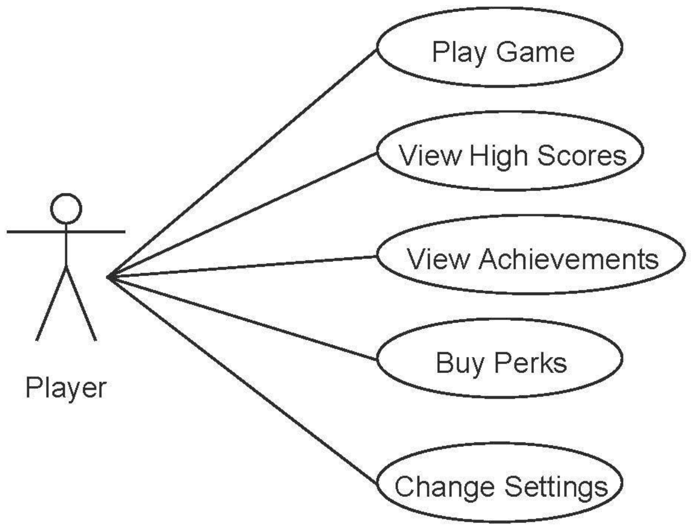
4.2 User Non-Functional Requirements

Name	Description	Priority
Precise collision detection	Collision calculations should be accurate so errors in collision detection do not occur. Errors in collision detection hurt gameplay experience.	High Priority
Responsive swiping	The capturing and handling of touch events needs have little to no latency. A high degree of latency will cause users to stop playing the game.	High Priority
Ease of Use	Everything in application is accessible from the main menu by no more than two button touches.	Med. Priority

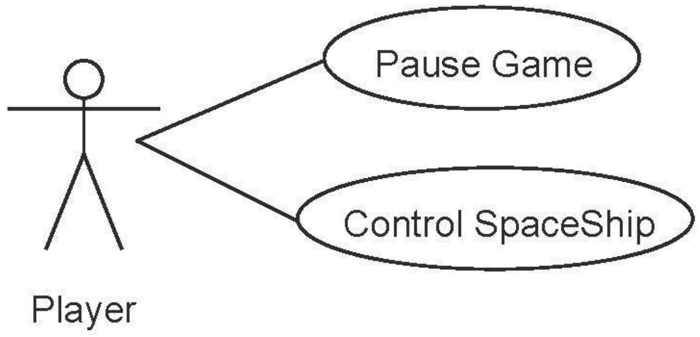
5. Requirements Diagrams

This section contains the use case diagrams, user activity diagrams, and high level class diagrams associated with the game.

5.1 **Use Case Diagrams**

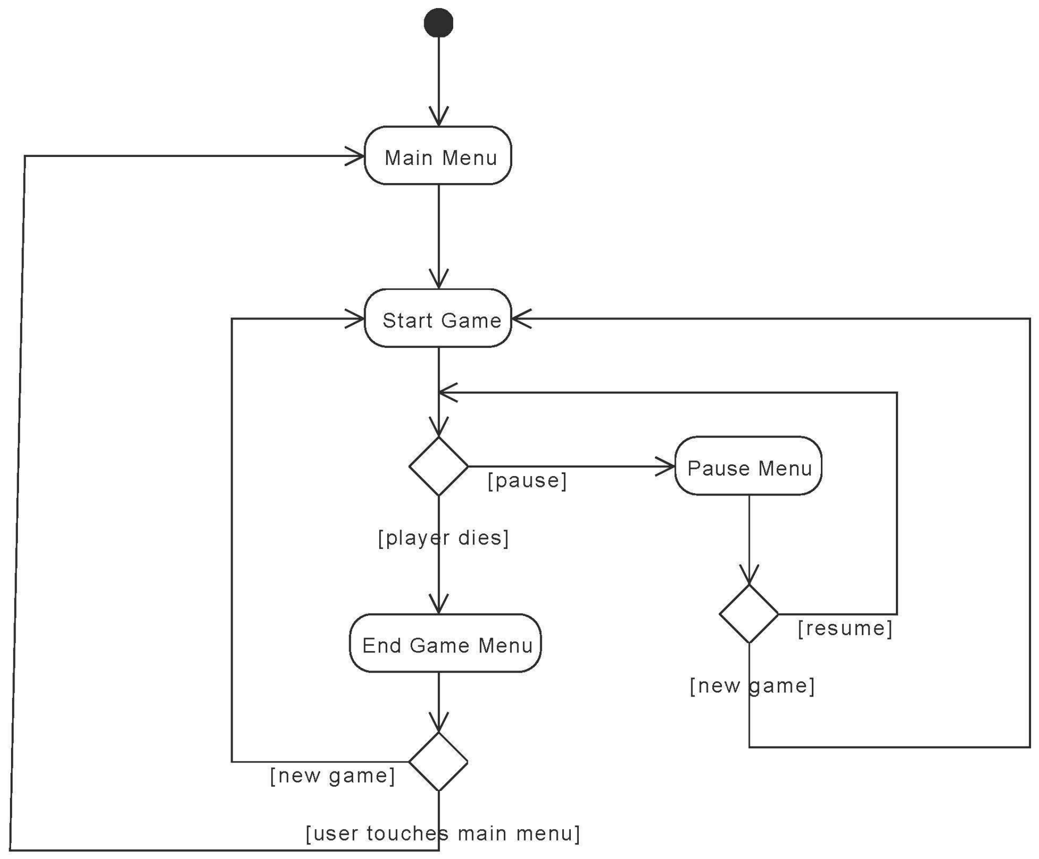


The use case diagram when the player is at the main menu.

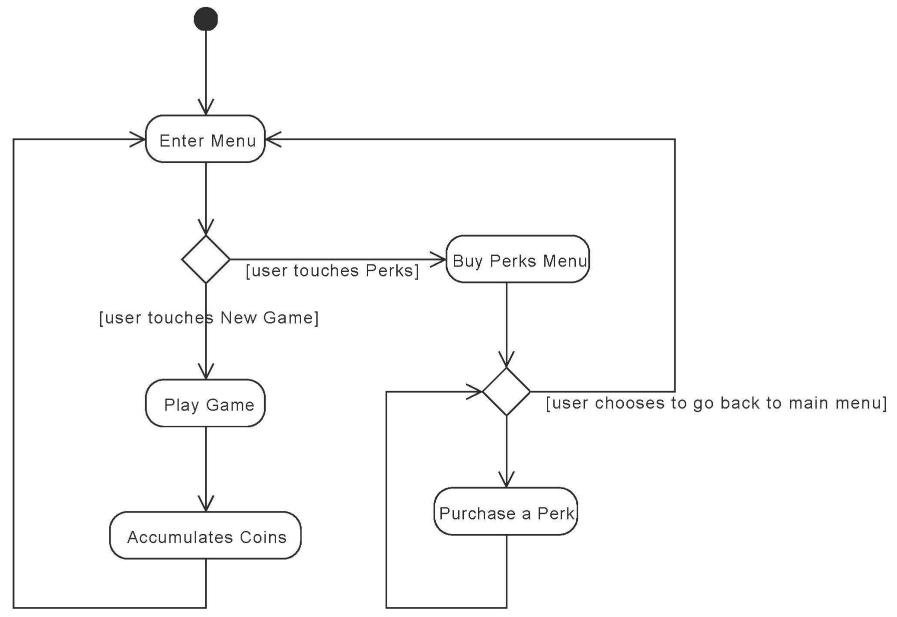


The use case diagram when the player is playing the game.

5.2 **User Activity Diagrams**

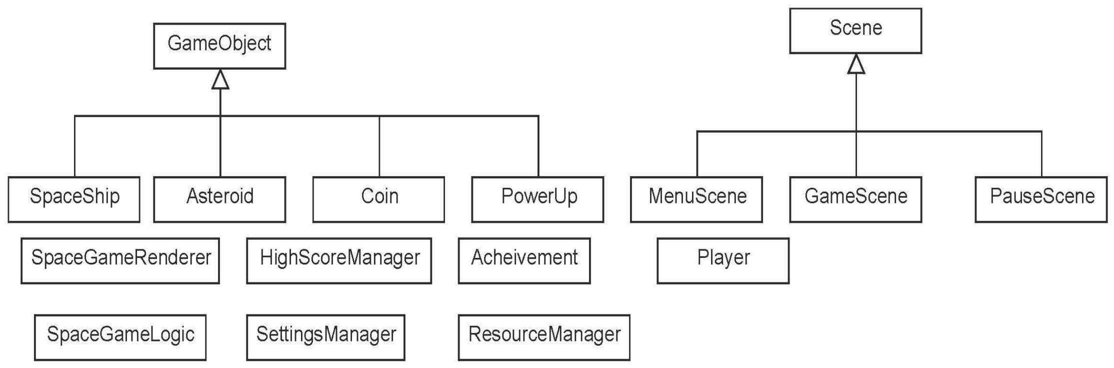


The activity diagram for when the player is playing the game. When the player is in the game, the player can either die or pause the game. If the player pauses the game, the player can then resume the game or start a new game. If the player dies, an end game menu pops up with the options to start a new game or go back to the main menu.



The activity diagram for the perk system. When the player enters the main menu, the player has the option to buy perks. In order to buy perks, the user has to accumulate coins during game play.

5.3 **High Level Class Diagram**

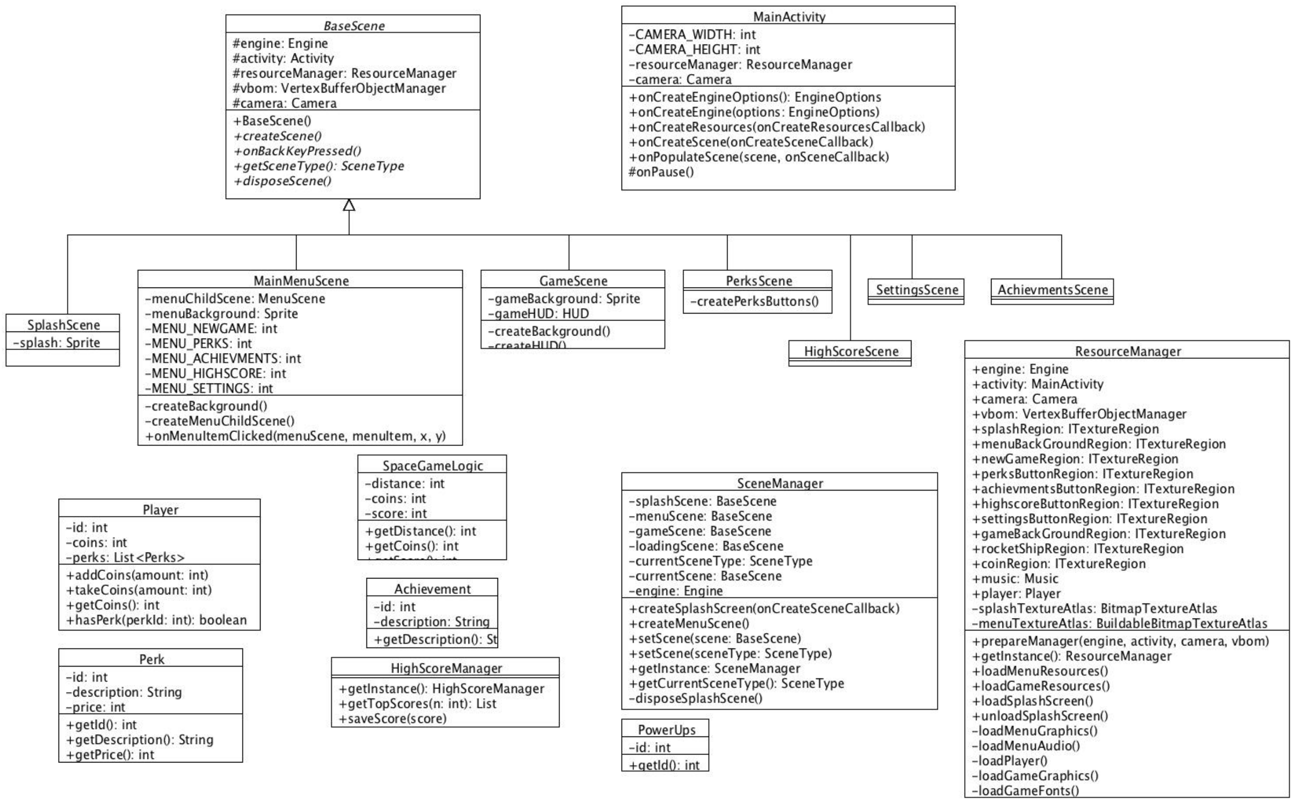


The high level diagram for the whole system. This diagram only includes classes that we think we might need. We might have to add or remove some of the classes when we get to the design phase.

6. Design Documentation

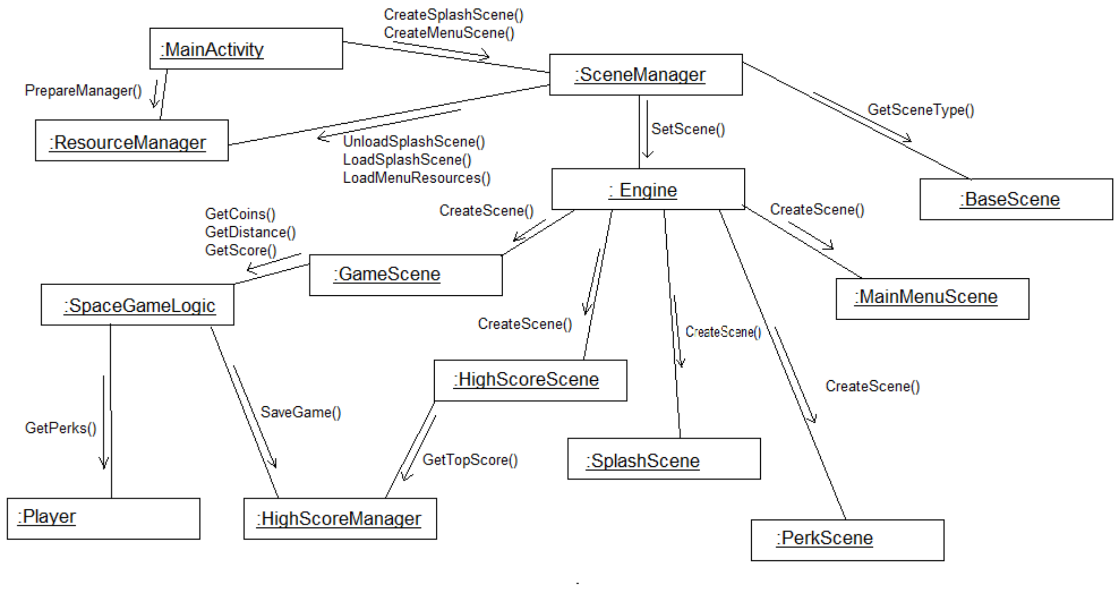
This section contains the diagrams crafted for the design phase of the project as well as descriptions for each.

6.1 **Detailed Class Diagram**



This a detailed and almost complete diagram of the system. The ResourceManager, SceneManager, and HighScoreManager are singleton classes. Subclasses of BaseScene provide the interface logic for the user. Classes such as Perk, Achievment, and PowerUp do not have much functionality but they serve more as data structures.

6.2 **Collaboration Diagram**

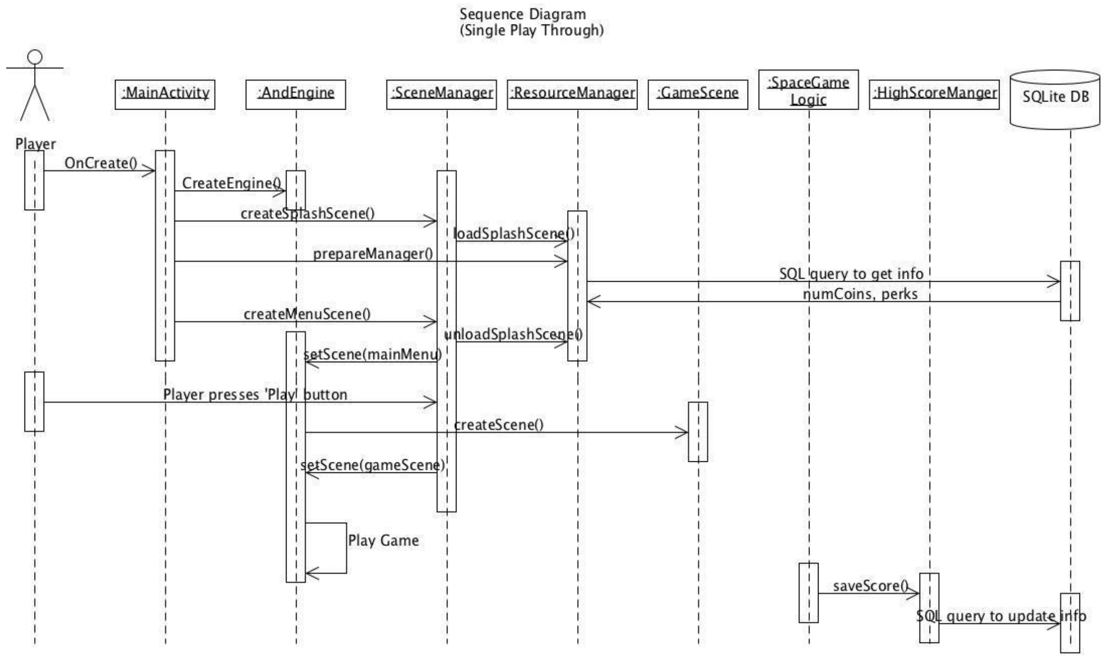


This collaboration diagram presents a visualization of the way that specific objects in the Space Game project communicate as well as implies associations between the classes. At the top of the "tree" is the MainActivity class, which communicates with ResourceManager and SceneManager through some initialization functions. SceneManager also communicates with ResourceManager in the initial stages of the game. SceneManager also communicates with BaseScene to determine a given scene's type, as well as the AndEngine's core "engine" class to create a various number of scenes – some of which even have more objects to communicate. The GameScene object communicates with SpaceGameLogic to determine current calculations, and both SpaceGameLogic and HighScoreScene communicate with the HighScoreManager to handle end-game results. Additionally, SpaceGameLogic communicates with the Player object to determine current active perks.

6.3 **<u>Sequence Diagrams</u>**

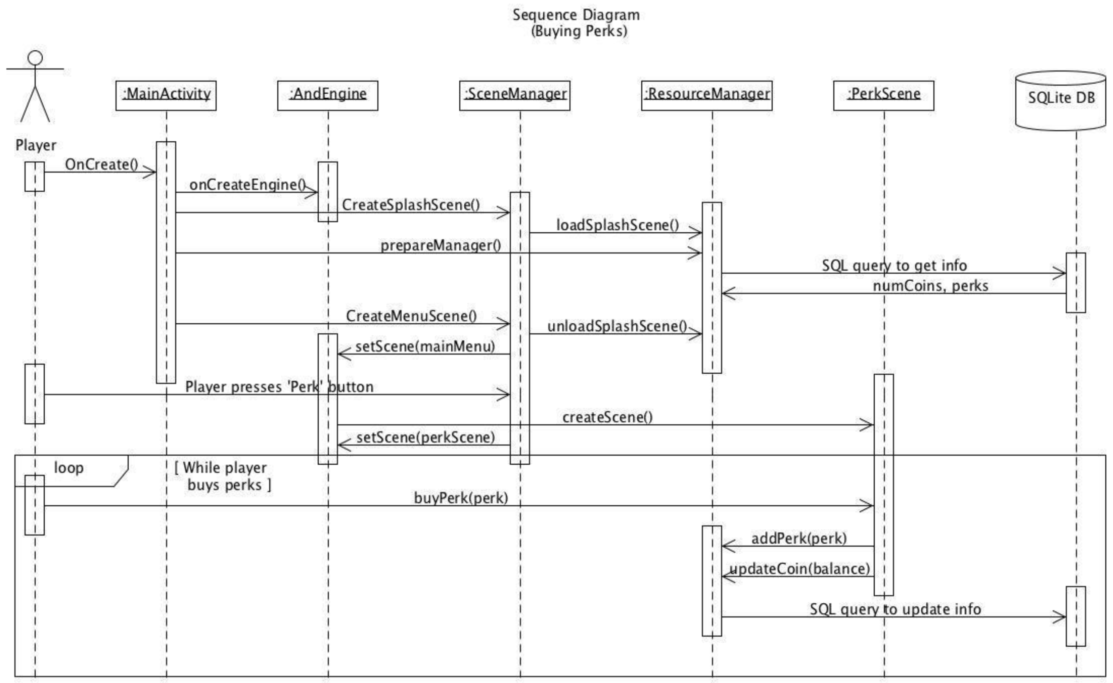
This section contains two sequence diagrams. The first represents a player playing through the game one time. The second diagram represents a player buying perks.

6.3.1 **<u>Top Level – Single Play Through</u>**



This diagram represents a temporal view of a single game play through. When the player initiates the application, the OnCreate() function of the MainActivity class is called. This function creates the AndEngine instance and also creates and loads the splash scene. While the splash scene is displayed, the ResourceManager instance is created, the SQLite database is queried for player information, and the main menu scene is created. Next, the splash scene is unloaded and the main menu scene is loaded. Assuming the player clicks the 'Play' button, the game scene is created, the menu scene in unloaded, and the game scene is loaded. The AndEngine assumes control and the player plays until they reach game over status. Their score is then saved into the SQLite database. All the classes in the diagram (excluding MainActivity, AndEngine, and ResourceManager) were our creation used to handle certain aspects of the game. The SceneManager handles transitions between scenes. The GameScene class handles all the objects contained in the game scene. The HighScoreManager saves high scores to the SQLite database. The SpaceGameLogic class handles the game logic.

6.3.2 **Top Level – Buying Perks**



This diagram represents a temporal view of a player buying perks. When the player initiates the application, the OnCreate() function of the MainActivity class is called. This function creates the AndEngine instance and also creates and loads the splash scene. While the splash scene is displayed, the ResourceManager instance is created, the SQLite database is queried for player information, and the main menu scene is created. Next, the splash scene is unloaded and the main menu scene is loaded. Assuming the player clicks the 'Buy Perks' button, the perk scene is created, the menu scene in unloaded, and the perk scene is loaded. The player can then browse through the available perks. When the player finds a perk he/she likes, they click on it to buy it. The cost of the perk is deducted from their coin total. This process can be repeated until the player has bought all the perks they want, the player has run out of money, or the player has bought all of the perks in the "store". The newly bought perks and update coin total is then saved into the SQLite database. All the classes in the diagram (excluding MainActivity, AndEngine, and ResourceManager) were our creation used to handle certain aspects of the game. The SceneManager handles transitions between scenes. The PerkScene class handles the buying of perks.