

# Design Specifications

## To The Sky

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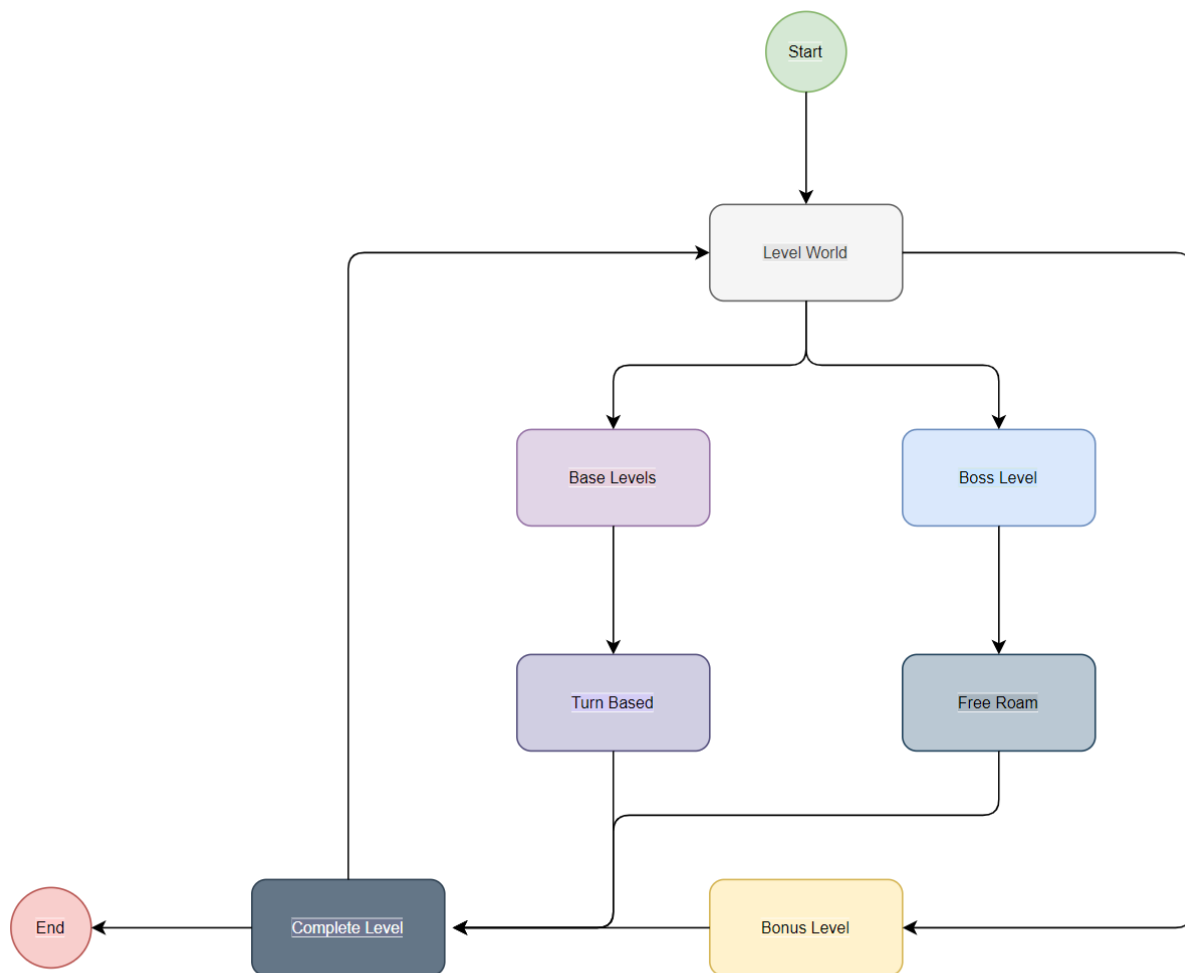
# Abstract

This document specifies architecture and software design decisions for the PC game: To The Sky. This describes the software architecture and software design decisions for the implementation of To The Sky. The target audience of this document is the developers, designers, and quality assurance engineers. This document begins with five critical activities that define how our multiple level formats work, how puzzle focused gameplay works, enemy AIs, our 4 element theme, and how the star rating works along with how each one interacts with our game. Following the activity diagrams are our Architecture Specifications that include a Class Diagram and a Site Map. The Class Diagram describes the overall structure and classes we will need when we build our game. The Site Map describes the overall system in which players choose a level or world.

# Activity diagrams

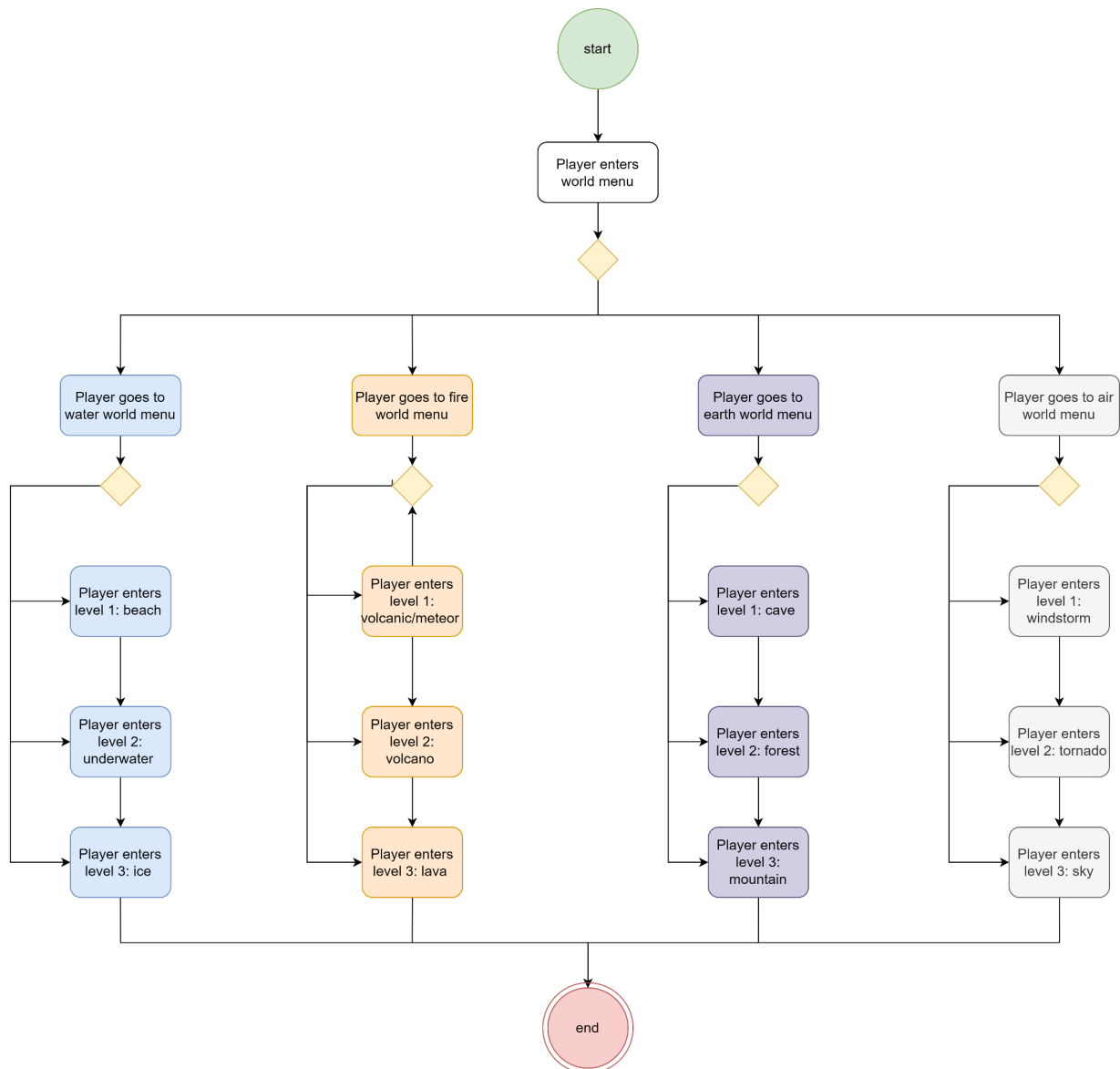
## Activity 1 - Multiple Level Formats

To The Sky will implement three different level formats. The two primary formats will be turn based and free roam. The first three base levels of each world will be turn based. The boss level for each world will be free roam. Bonus levels are optional to complete to progress in the game. Refer to the site map to see how the base levels and boss levels connect.



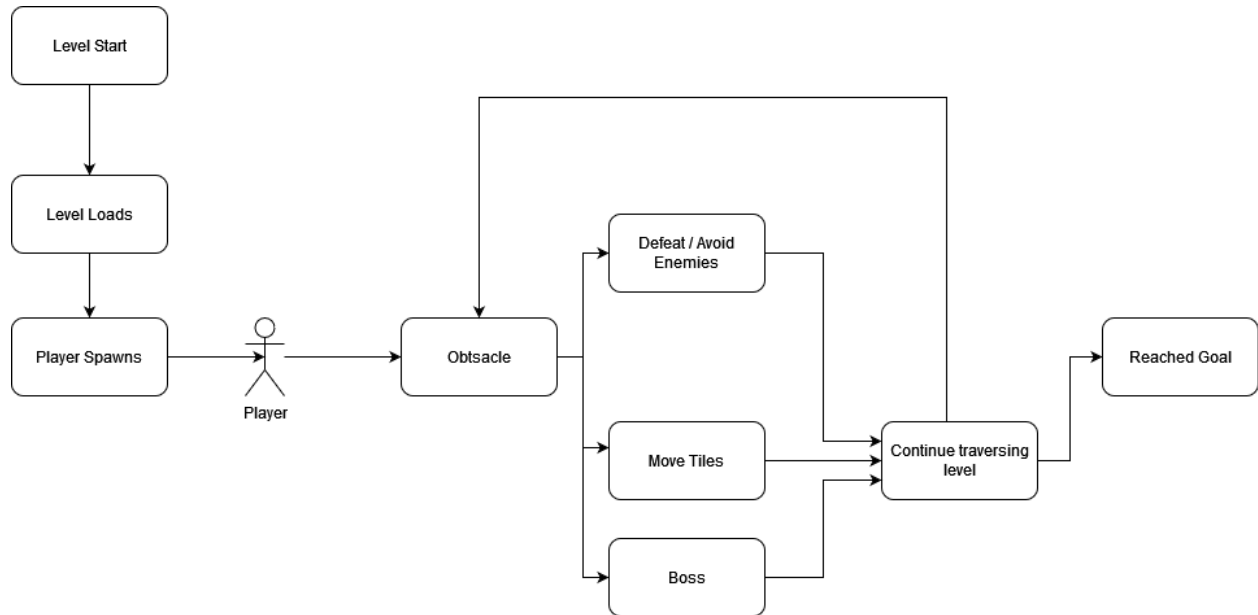
## Activity 2 - 4 Element world theme

The game will incorporate a theme consisting of the 4 elements: fire, earth, air, and water. When the player enters the world menu there will be 4 worlds available. When a player selects a world, they will be taken to the world's level selection menu which will have 3 levels available to play. If the player chooses the water world, they will be able to choose between a beach level, underwater level, and ice level. If the player chooses the fire world, they will be able to choose between a volcanic debris/ meteor level, volcano level, and lava river level. If the player chooses the earth world, they will be able to choose between a cave level, forest level, and mountain level. If the player chooses the air world, they will be able to choose between a wind/lightning storm level, tornado level, and sky level.



### Activity 3 - Puzzle focused gameplay

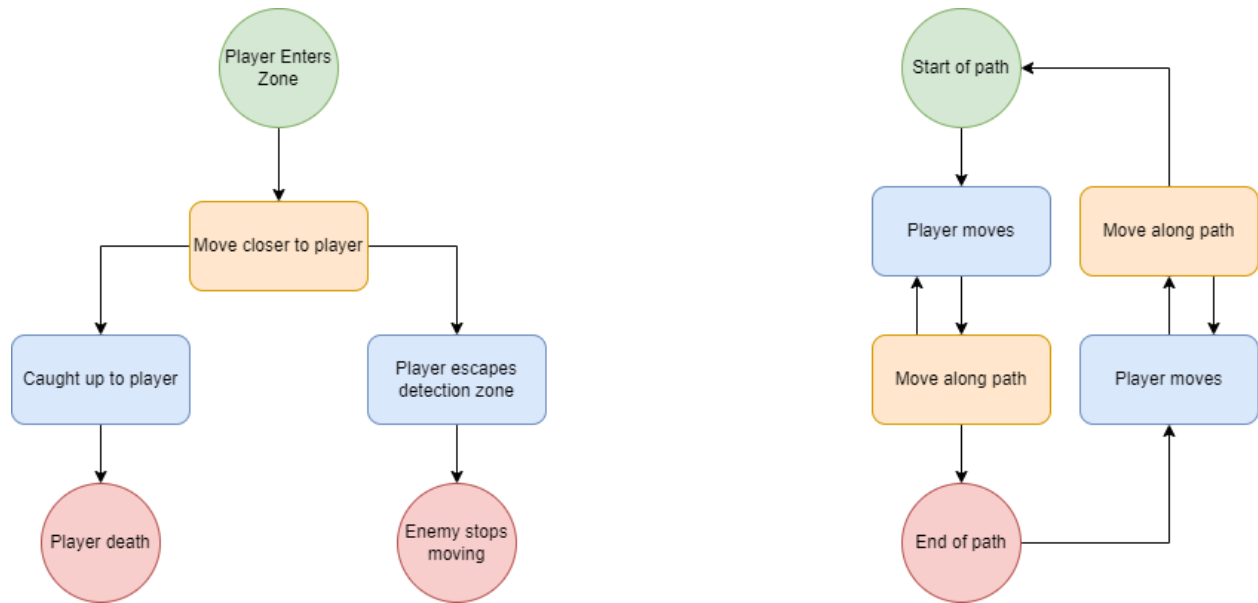
Each level will be oriented around a puzzle that needs to be solved before the player can advance to the next level. These puzzles will have the player navigating around the level and traversing through obstacles in the form of enemies or interactable tiles.



## Activity 4 - Enemy AI

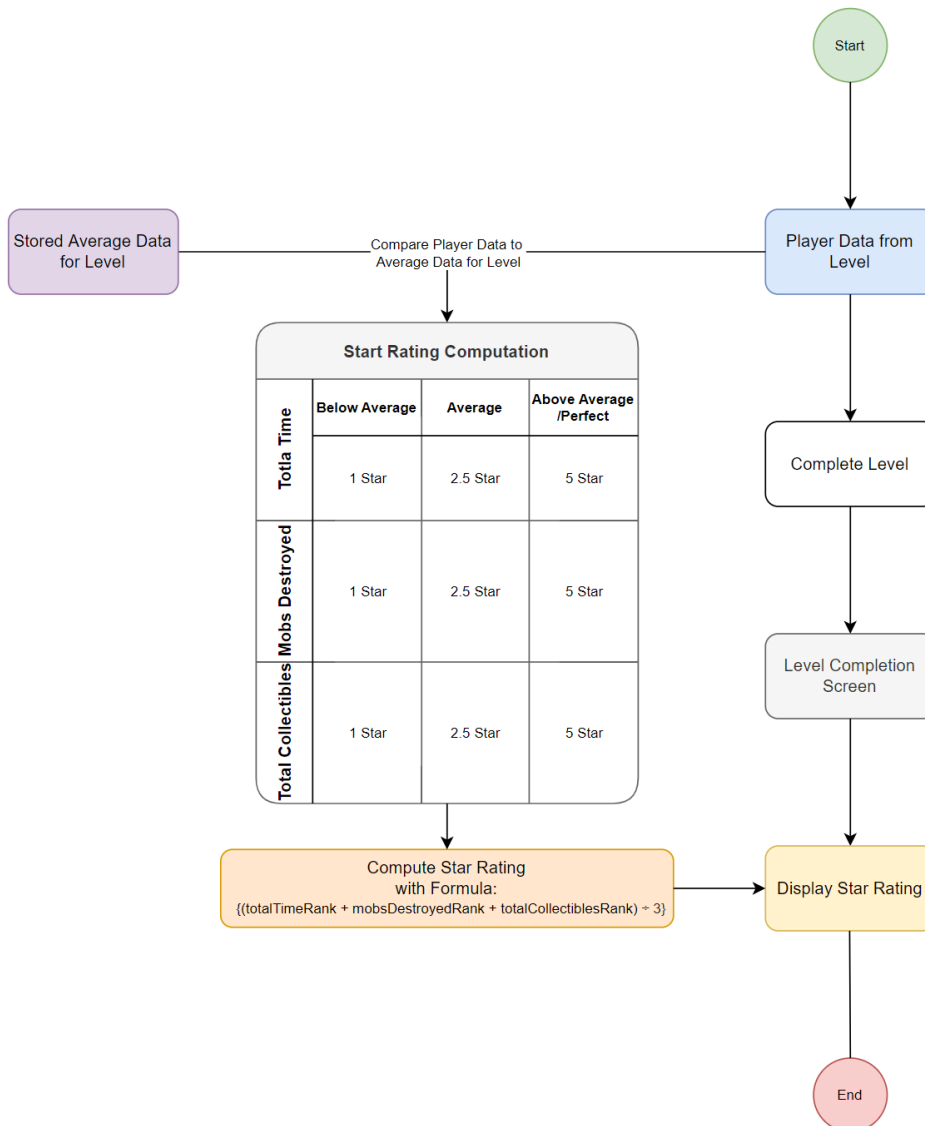
There will be two main enemy types in the game, aggressive and passive. Enemies with an aggressive behavior loop have an area around them where they can see the player. If the player enters their detection zone the enemy will actively go after the player, and continue to do so, until the player exits their zone. Enemies with the passive behavior loop follow a predetermined path which the player will have to navigate around.

Bosses use special attacks that the player has to counter in order to defeat them. These attacks will incorporate the elemental theme of their respective world.



## Activity 5 - Star rating

After each level the player completes, an end-level screen is displayed with various information, such as the player's star rating they received. While completing a level, the player's data is stored. Once they complete the level, the final data is compared to the level's average data. With this comparison made, the player receives a rating in each category that'll determine the final rating; total time to complete the level, total mobs destroyed in the level, and total amount of collectibles. With this information, the final star rating is computed and displayed to the player on the level completion screen.

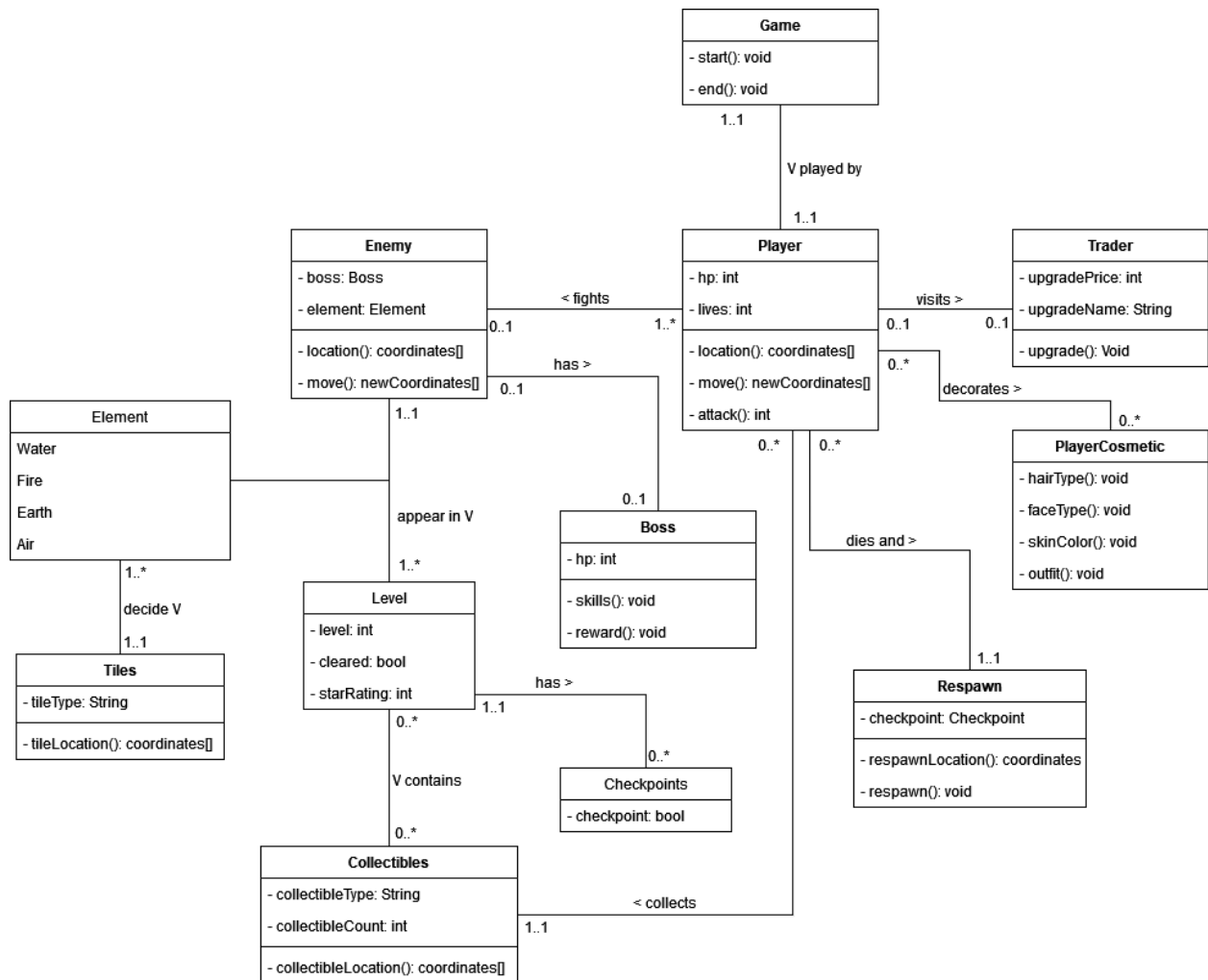




# Architecture

## Class diagram

Shown below is the UML class diagram for the project as well as the relationships between them. It lists all of the classes required for the project to run. We have the *Game* class which starts and ends the game itself. The *Player* class sets up the player and its avatar before entering the game. After the game starts, the player then fights the *Enemy* in the *Levels* which consists of four different *Elements*, where each element will have different types of *Tiles* which are located right on top of each coordinate. And within the level, there are a number of collectibles that can help the player get through the stage with higher scores. Also there is a *Boss* in each stage, where the player has to fight until the boss's health point reaches 0. The player can also visit the *Trader*, which allows the player to upgrade the character's abilities. Lastly, whenever the avatar dies, it will automatically run the *Respawn* class to allow the player to restart the game.



## Site map

Below is our proposed site map for our level selection and hub world system. It has detailed mapping between each world and its levels. Each world is color coded to its element type. Blue for water, red for fire, green for earth, white for air. Each world has three levels and one boss. Players access the levels by first accessing the world type starting at level 1 and progressing to level 2 then 3 then to the boss. After the boss stage is completed, players move on to the next world.

