EECS3311-W20 — Project Report

Submitted electronically by:

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# Requirements for Project - Simodyssey

Our clients supplied us with the following requirements for the game Simodyssey: The topic at hand is game development. This space exploration game will allow a player to choose between two playing modes. The first mode is referred to as “test”, this mode provides a more detailed outlook on the current state of the galaxy and as well as, the amount and type of entities generated. This entity creation can be influenced by the number that is passed when the test mode is created. The higher the number implies that the probability of generating more planets increases. The second mode is referred to as “play” , this mode will provide less information about the current state of the galaxy and the number of entities that are initially created cannot be influenced.

Within both modes, random numbers are generated in a sequential manner that is always the same and maintained, but changes often from “play” to “play” mode. After a game has started, a 5-by-5 galaxy is created. This would also place an explorer entity at quadrant (1,1) and a blackhole entity at (3,3). The other entities that are stationary and movable are randomly placed in the galaxy. Moreover, these entities are placed in sectors within the galaxy; each sector can contain a maximum of four quadrants. This means that each sector can only hold a maximum of four entities ( one entity per quadrant).

After the galaxy is created, the player would be able to issue commands to move the explorer through the galaxy. Some of these commands would be considered as a turn, which may then cause some of the movable entities to shift their position in the galaxy. However, other commands would not modify the entities within the galaxy but may just display the status of the explorer. The game can end in a few ways, such as; when the explorer runs out of fuel, lives, or when a planet with life is found or when the game is aborted. Once a game has ended a new game can be started.

The document in the appendix will provide further details on the user interface grammar. Also, the acceptance tests in the report will provide further details on the input and output status of the game operating in console mode.

# BON class diagram overview (architecture of the design)

A description of the design needs to be included

# Table of modules — responsibilities and information hiding

Ask jackie about this

|  |  |  |  |
| --- | --- | --- | --- |
| 1.1 | ETF\_MODEL | **Responsibility**: Handles all the user commands for the game | **Alternative**: none |
| Concrete | **Secret** : Implemented by initializing each attribute to a default value of the current model |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.2 | GAME | **Responsibility**: see ETF\_MODEL | **Alternative**: none |
| Concrete | **Secret:** implemented via Arrays, entities that moved this turn and entities that died this turn |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.2.1 | GALAXY | **Responsibility**: see GAME | **Alternative**: none |
| Concrete | **Secret:** none |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.2.1.1 | SECTOR | **Responsibility**: see GALAXY | **Alternative**: none |
| Concrete | **Secret:** none |

|  |  |  |  |
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| 2 | SHARED\_INFORMATION\_ACCESS | **Responsibility**: provides a singleton access for shared information | **Alternative**: none |
| Abstract | **Secret:**  none |

|  |  |  |  |
| --- | --- | --- | --- |
| 2.1 | SHARED\_INFORMATION | **Responsibility**: contains attributes that are constants, which are used to generate stationary and movable entities | **Alternative**: none |
| Concrete | **Secret:** implemented via linked lists that stores the movable entities and rng usage |

|  |  |  |  |
| --- | --- | --- | --- |
| 3 | ENTITY\_COMPARATOR | **Responsibility**: compares the entities based on their id | **Alternative**: none |
| Concrete | **Secret**: none |

# Expanded description of design decisions

*Only for the most important module in your design.*

*What alternative designs were considered and rejected based on the criteria of reliability, simplicity, and maintainability?* The design is maintainable if it exhibits conceptual integrity that defines the key abstractions so that designers and programmers can reason about the system you describe and predict its behaviour. Software developers reading your SDD should be able to grasp your design without having to read thousands of lines of code. This will make you system extendible and re-usable.

* discuss entities cluster and inheritance hierarchy
* old design: reproducing entities inherit from effective cloneable class as well as movable entity, all other movable entities simply inherit from movable entity
* new design: movable entities inherit from a combination of reproducing entity, cpu entity, sentient entity depending on their needed functionality
* why? needed shared features/attributes from reproducing entities, class needed to be deferred as having a make feature did not make sense in the design
  + reproducing entities were already effective classes with make features

# Significant Contracts (Correctness)

(only for the module with the most significant contracts)

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# Summary of Testing Procedures

|  |  |  |
| --- | --- | --- |
| **Test file** | **Description** | **Passed** |
| *at001.txt* | when the explorer wins in play mode | ✓ |
| *at002.txt* | When the explorer wins in Test mode | ✓ |
| *at003.txt* | When the explorer loses by running out of fuel | ✓ |
| *at004.txt* | When explorer passes through a wormhole and then tries to land | ✓ |
| *at005.txt* | When the explorer gets destroyed by an asteroid | ✓ |
| *at006.txt* | When the explorer wins with multiple movement and passes | ✓ |
| *at007.txt* | Attempting to start another game when the user is already in a game | ✓ |
| *at008.txt* | Starting and aborting multiple games using the commands Test and abort | ✓ |
| *at009.txt* | Using the command pass x20 | ✓ |
| *at010.txt* | Moving the explorer before a game has started | ✓ |
| *at011.txt* | Checking the position of the explorer after passing the boundaries of the board | ✓ |
| *at012.txt* | Checking the position of the explorer after moving pass the boundaries of the board (movement West) | ✓ |
| *at013.txt* | Landing on a planet then lifting off | ✓ |
| *at014.txt* | When the Explorer get devoured by a blackhole | ✓ |
| *at015.txt* | When the Explorer lands in a sector with two planets and a yellow dwarf | ✓ |
| *at016.txt* | Checking the status of the Explorer | ✓ |
| *at017.txt* | When explorer and multiple astroids die | ✓ |
| *at018.txt* | when explorer tries to move to a sector that is full | ✓ |
| *at019.txt* | When planets and janitaur gets devoured by blackhole | ✓ |
| *at020.txt* | when asteroids get imploded by janitaur | ✓ |
| *at021.txt* | Checking if the position of the explorer remains consistent after multiple pass and move commands | ✓ |
| *at022.txt* | Scenario when the explorer moves in multiple directions, attempting to land on a planet | ✓ |
| *at023.txt* | Scenario when a game is recreated with a very low threshold in test mode | ✓ |
| *at024.txt* | Scenario when a game is created with a very high threshold in test mode | ✓ |
| *at025.txt* | Scenario when the user starts and ends a game multiple times while allowing multiple passes to occur | ✓ |
| *at026.txt* | Scenario when the explorer navigates through the galaxy creates with a low threshold | ✓ |
| *at027.txt* | Scenario when the asteroid threshold is set to a lower number compared to the other movable entities | ✓ |
| *at028.txt* | Scenario when the explorer tries to navigate through the galaxy with the aim of getting destroyed by an asteroid | ✓ |
| *at029.txt* | Scenario that checks the status multiple times after the initial play mode is executed | ✓ |
| *at030.txt* | Checking status command correctness in multiple scenarios | ✓ |

(b) Provide a screen shot of the *ESpec* unit tests that you ran. Ensure that the test comments are descriptive.

# Appendix (Contract view of all classes)

(Only classes that you created; do not include user input command classes, only model classes)