Queen's University Belfast

ArtemisLite Technical Report

Date of submission: 20th April 2021

Group 3

Conor Bradley *[CB]*	Laura Gaffey *[LG]*	Michelle Oakes *[MO]*	Sancha O'Neill *[SON]*
40108536	29057949	18769004	40126203

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CSC7053 Peer Assessment: ArtemisLite

This Assessment Document is intended to provide you and your assessor with an overview of each group member's involvement delivery of the CSC7053 Project.
Each group should complete one Assessment Document and its content must be agreed by all group members. The completed form should be included at the start of your group's PDF report. ***Don't forget to fill in the Group Number.***
There are three main parts to the Assessment Document – the Evaluation, the Declaration and the Personal Statements (spaces for each team member's personal statement are provided on the reverse of this sheet). All parts must be completed – otherwise your group's report will not be marked. Arrange a group meeting to discuss the evaluation and personal statements, and see the note below!

Evaluation **Group Number: 3**

Name	Contribution to team-working and motivation[1]	Contribution to documented analysis, design and testing [1,2]	Contribution to working system code[1,2]	Peer Score (Range 85 – 115)
Conor Bradley	5	4	5	115
Laura Gaffey	5	5	4	113
Sancha O'Neill	5	5	4	113
Michelle Oakes	5	5	3	113

[1] Values for contribution: 1 = Minimal Contribution; 2 = Reasonable Contribution; 3 = Good Contribution; 4 = Very Good Contribution; 5 = Excellent Contribution

[2] This value should consider contributions in the round – direct contributions to required deliverables, and contributions that have made the deliverables possible.

Declaration
"I declare that I have read the Queen's University regulations on plagiarism, and that any contribution I have made to the attached submission is my own original work, except for any elements that I have clearly attributed to third parties. I understand that this submission will be subject to an electronic test for plagiarism and will also be subject to the University's regulations concerning late submission if it is received after the deadline."

Name	Date	Confirmation *(use the words shown in the example below!)*
Conor Bradley	19/04/21	*I agree to the terms of the declaration*
Laura Gaffey	19/04/21	*I agree to the terms of the declaration*

Sancha O'Neill	**19/04/21**	***I agree to the terms of the declaration***
Michelle Oakes	**19/04/21**	***I agree to the terms of the declaration***

A note on the Evaluation:

Complete all the columns in the Evaluation Table. The Contribution columns are intended to help team members quantify each other's input to the project, before they award agreed Peer Scores. There will not necessarily be a precise correlation between the Peer Score and the Contribution values. However, high Contribution values, as an indicator of the importance of the team member's work to the success of the project, should normally result in a high Peer Score for a team member. Likewise a low Peer Score would be the expected outcome if Contribution values are low. Students who have made a high-value Contribution in all three contribution categories (e.g. 5,5,5) should expect to receive a higher Peer Score than students who have made a lower-value Contribution in one or more categories (e.g. 5,5,3).

If, having reviewed the Contribution values, the team agrees that Team Member 1 made a minimal contribution overall, a Peer Score of 85 would be appropriate for Team Member 1. If Team Member 1's contribution was excellent (critical to the success of the project in all areas of engagement), consider a peer score of 115. If Team Member 1 made a generally good contribution, doing what was expected of them, they could expect to receive a Peer Score of 100. It may be that a team member (for whatever reason) has disengaged from the project entirely, and in such circumstances a Peer Mark of 0 may be acceptable. ***Please inform the module Lecturer if a team member has left your group or has ceased to play an active role in the group.***

Each team member's overall score for the project will be calculated according to the following formula, where S_i is Team Member *i*'s overall score, P_i is the Peer Score received by Team Member *i*, N is the number of members in the team, and M is the raw mark awarded to the report by the assessor.

Any Peer Score within the range 85 – 115 will normally be accepted by the module Lecturer. However, students are expected to award a range of marks within a team: it is very unusual in a project for everyone to display exactly the same level of ability and commitment, and the Peer Scores should reflect this. Be fair: be prepared to recognise someone who has adopted a leading role in the project, and acknowledge the fact that some contributions will be weaker than others. Uniform marks, or marks outside the range 85 – 115, may require that the Team discuss its decision with the module Lecturer, in order to agree a fair distribution of marks. Throughout the project, team members should use appropriately named folders in GitLab to help them co-ordinate their work and maintain a record of their contributions. Where team members cannot agree a distribution, or the distribution is unreasonable, the module Lecturer's judgement will be final.

Personal statement of (enter name):	***Conor Bradley***
The following were my most significant contributions to the project (100 words or less):	
Developing and designing the system code. Authored the ArtemisLite main class, comparators and made significant contributions to all other source code classes. Contributed to authoring of sequence diagrams, use cases and main report.	

Personal statement of (enter name):	*Laura Gaffey*
The following were my most significant contributions to the project (100 words or less):	
Facilitating team working, motivation and positive team morale. Organising meetings and sprints. Coded Player class and PlayerTest class working collaboratively with other team members to ensure integration of code. Ensuring product thoroughly tested. Contributed to the development of use cases, sequence diagrams and main report.	

Personal statement of (enter name):	*Sancha O'Neill*
The following were my most significant contributions to the project (100 words or less):	
I was the principal author of the block objects that form the game's board (the abstract, action and do nothing blocks). I J Unit tested these classes and implemented the use of enums for the system names. I drew up the board game virtual layout and ensured consistency between this code, this diagram, and the UML Class diagram. I co-wrote the requirement analysis section of the report with MO and contributed to the development of the main report also. I helped ensure the group's checklist of requirements were met with regards to the code and report.	

Personal statement of (enter name):	*Michelle Oakes*
The following were my most significant contributions to the project (100 words or less):	
I wrote the use case descriptions following collaborative team work. I contributed to code developing the roll dice class and assisted with paired programming to develop the logic and code for the pass go sequence. Collated weekly team meeting minutes. I developed the requirements section and a checklist to ensure the final system complied with the specified requirements. Contributed to the development of the use case diagram, sequence diagrams, class diagrams and the main report.	

MSc Software Development

CSC7053: Software Engineering

Introduction

The group was tasked with delivering a virtual board game to be played through the console of an Integrated Development Environment (IDE); in this case, Eclipse IDE, and utilising a natural language interface. The board game's theme is based on NASA's Artemis mission to land the first woman and next man on the moon but reflects a simplified representation of some of the challenges faced by the mission as the object of the game's gameplay and story. With this, the group employed a use-case driven development process to produce an object-oriented solution to the outlined requirements.

Requirements Analysis, including game layout [*MO / SON*]

To begin, the group determined the core requirements of the game (Appendix V). The group then identified any: actors, scenarios the game would be used for, use cases and relationships between use cases.

The below figure is the groups final use case diagram which displays the *main* behaviour of the game through the actor's interaction with the system. The final use cases were refined from initial diagrams that contained excessive terms which went against the idea that each use case is a complete set of sequence of actions in itself (Appendix VI shows the evolution of the use case diagram). To refine the use case diagram, the group focused solely on what an actor would want to achieve from the system. This resulted in an illustration of use cases at a high-level with only key functionality and their relationships. This provided a solid structure for development of the game, as well as an effective and clear way to communicate the game's functionality to stakeholder(s) and end users.

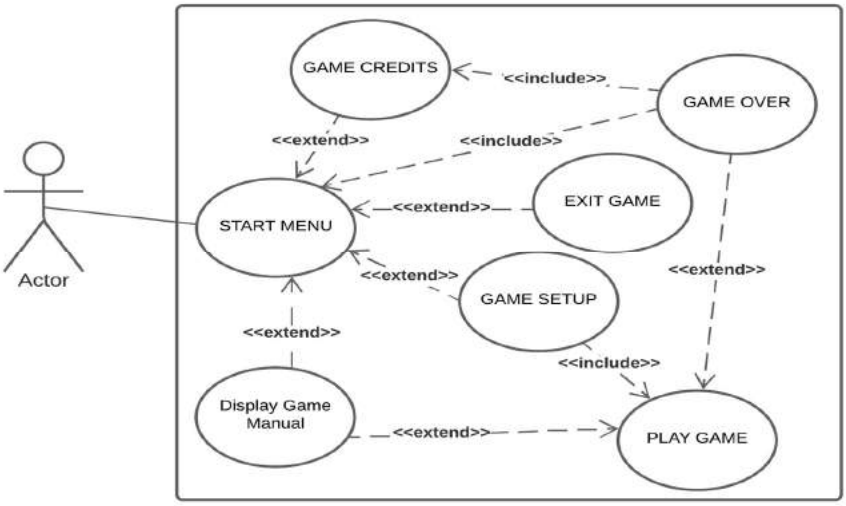


Figure 1 showing the groups final UML Use Case diagram

Use Case Descriptions

The below descriptions for each use case from the UML Use Case diagram concentrate on the main sets of sequences of actions that will be realised by the system.

Flow of events for *Start Menu* Use Case	
Objective	To start a new game
Pre-condition	● User runs program on IDE and presented with options ● Previous game just ended and user presented with options
Main flow	The user, when presented with the below menu, makes a selection 1. Start new game 2. Game manual/rules (see display game manual use case) 3. Game credits (see display game credits use case) 4. Exit (see exit game use case) This calls the gameSetUp and playGame methods
Alternative flows	If user enters an invalid int or character, start menu is displayed for selection
Post-condition	User is displayed the selected option from 1-4

Flow of events for *Game SetUp* Use Case	
Objective	To set up a new game
Pre-condition	User has indicated they wish to play a new game
Main flow	1. System prompts for number of players (1-4) 2. Enter User Name(s) 3. Initial game resources allocated (Child description of Game Set Up Appendix VII) 4. Board created for new game (12 Blocks) 5. Roll Dice (Child description of game set up Appendix VII) method called to determine order of play, players take turn in descending order 6. Users will begin the game with 100 hours of resources
Alternative flows	At 2, if the same name is entered twice a message is displayed to the user telling them the name is already taken and to input a different name.
Post-condition	The selected number of player objects are created (1-4 players), initial resources are allocated for the players, the 12 blocks of the board are created and the game can begin (1-4 players)

Flow of events for *Play Game* Use Case

Objective	The users are allocated a starting dice roll. The highest goes first and the player turns are commenced
Pre-condition	It is the user's turn
Main flow	1. Dice rolled for each user 2. User turn is commenced 2.1 The user has rolled the dice to take their turn and outputs the result to screen 2.2 The user moves the corresponding number of squares on the board 2.3 The square that the user has landed on is outputted to screen 2.4. The current status of the square is displayed to screen. The user is prompted to pick an option: 3. Includes game over use case diagram
Alternative flows	At 2.4, If the system the square resides in has not been invested in by any other user, the user may invest in the system: 2.4.1 The name of the system and square is displayed to the user 2.4.2 The user selects to invest in the square (only the owner of a square can develop blocks in the system) 2.4.3 The investment amount is deducted from the user's total resources 2.4.4 The user's current and new balance after investment is output to screen 2.4.5 Option to develop / end turn / end game At 2.4, A user can choose to develop any block in the system(s) they own (if sufficient resources) even if they are not positioned on that block. A user can undertake as many developments as they wish on their turn 2.4.1 Development options for the user are displayed, Tier 1, Tier 2, Tier 3 2.4.2 User chooses to develop a block, current resources and resources after development displayed, user prompted to choose y or n 2.4.3 Option to exit development, and /or not enough resources and avoid bankruptcy At 2.4.1, If a user has developed a system 3 times the option to make a major development is displayed to user 2.4.1. The user selects to make a major development 2.4.2. The investment amount is deducted from the user's resources 2.4.3. The user's new balance is output to screen At 2.4, User can do nothing and end their turn 2.4.1: Options displayed to user 2.4.2: End player turn At 2.4, User end the game 2.4.1: Options displayed to user 2.4.2: End game calls game over use case At 2.4, User can view all player's positions on the board. At 2.4, User can pay resources if they have landed on a square owned by another user and they choose to charge the service fee 2.4.1 Owner is asked if they want to collect the charge 2.4.2 Owner collects charge and service fee deducted from current user's resources. Current user and owner's updated hours are displayed 2.4.3 Owner does not collect charge, current user's hours are displayed and current user continues with their turn

	(Child descriptions of Play Game set up Appendix VII) At 2.4, at any stage only relevant options available to current player shown At 2.4, at any stage if the user's resource balance will be 0 they will be warned they do not have enough resources and player turn options displayed: Invest, develop, End Turn, End Game
Post-condition	Option sequence initiated

Flow of events for *Game Over* Use Case	
Objective	End game
Pre-condition	User chooses to exit game, all systems have been developed or one player is made bankrupt
Main flow	1 All major developments are completed in each system, Team Victory 2 Player chooses to end game and the game ends for all users 3 Player runs out of resources and the game ends for all users
Alternative flows	At 2, User will be asked to confirm end game option and must enter 'y' or 'n' to continue to prevent game accidentally ending
Post-condition	Game ends for all users

Flow of events for *Exit Game* Use Case	
Objective	Exit Game
Pre-condition	User selects exit from start menu
Main flow	Message displayed Exit Game
Alternative flows	
Post-condition	Program terminates to end game

Flow of events for *Game Credits* Use Case

Objective	View developer credits
Pre-condition	User selects Game Credits from the start menu, or game over initiated
Main flow	Names of game developers displayed
Alternative flows	
Post-condition	Returns to start menu

Flow of events for *Display Game Manual* Use Case	
Objective	Read game manual
Pre-condition	User selects game manual from start menu, option 2 or play game
Main flow	Game manual is displayed to screen
Alternative flows	
Post-condition	Return to start menu or play game

Game Outline

The virtual board consists of 12 blocks: 10 action blocks and 2 non-action blocks. Action blocks belong to a system, there are two 3 block systems and two 2 block systems (figure 3). The systems are a representation of key elements of the real life Artemis mission program and each block within the 4 systems represents a component to be developed. The aim of the game is to reach the moon; in order to do so, each block on the board that is a component in the system must be entirely developed. Development of a system is accomplished following three developments and one major development; enabling the system to be utilised in the launch program. If a player lands on a block which is part of a system that has not yet been invested in the player is offered the opportunity to invest in the system. If the player declines investment the system remains available for other players to invest if they land on a block within the system on their turn (as per requirements).

There are two ways that a game can be won, firstly a team victory in which players work collaboratively to develop the 4 systems therefore reaching the moon or when all 4 systems are not fully developed but the game ends; an overall winner is declared by calculating the total points which is based on developments made, major developments made and service charges forgiven. A player can decide to end the game on their turn or bankrupt another player forcing the game to end, in that instance the final scores are tallied and a winner declared.

```
Players end of game summary:

laura:
                    Block No.       Block Title     Development to:          System
                    10              Gateway         2               GATEWAYANDLUNARLANDERS
                    11              Lunar landers   0               GATEWAYANDLUNARLANDERS
                    12              Lunar landers Deployment 0              GATEWAYANDLUNARLANDERS
                    ------------------------------------------------------------
                    Total Blocks Owned:         3               x100 = 300   points
                    Total Developments Made:    2               x50  = 100   points
                    Major Developments Made:    0               x200 = 0     points
                    Service charges forgiven:   0               x75  = 0     points
                                                                       400   Total points
chris:
                    Block No.       Block Title     Development to:          System
                    8               PLSS            1                     SPACESUIT
                    9               Cooling Garment 0                     SPACESUIT
                    ------------------------------------------------------------
                    Total Blocks Owned:         2               x100 = 200   points
                    Total Developments Made:    1               x50  = 50    points
                    Major Developments Made:    0               x200 = 0     points
                    Service charges forgiven:   0               x75  = 0     points
                                                                       250   Total points

Final Leader Board:

Rank  Name       Final Score
1     laura      400
2     chris      250
```

Figure 2 end of game summary

During the sprint, the team discussed different ideas regarding game design. With regards to resources, the group identified various appropriate resource currencies, including professional characters (e.g. a software engineer) and money. However, given the system blocks were to be invested and developed, the group decided to use hours as resources.

Due to the requirements regarding custodianship of a system (i.e. player must own a system before any developments); the group decided the best method to avoid conflicts during game play was that if a user landed on a block of a system that is not yet owned, the user can invest in that system. This user then becomes the owner of that system, enabling them to develop all its blocks.

The team researched the main components being developed by NASA in the Artemis mission and condensed the main features of the mission to create the 4 systems of the game. Based on the group's research, each block represents a component of a real life system and the naming conventions for systems and blocks reflect the real Artemis mission.

Figure 3 virtual board game

The board layout is based on the group's analysis of the requirements. The above diagram shows the board at the start of any game. The following attributes will change throughout game play: development tier and service charge, as per the requirements that each block has 3 development tiers and any service charge will increase along with the block's development status.

Realisation *[LG & CB]*

A sequence diagram displays an interaction as a two-dimensional chart. The time axis is represented vertically as in time proceeds down the page. The horizontal dimension shows the roles that represent individual objects in the collaboration. Each role is represented by a vertical column with a head symbol and a vertical dashed line known as a lifeline. The group applied an agile approach to developing the sequence diagrams working collaboratively to evolve the diagrams as the project progressed. The below represents the final iteration of the diagrams.

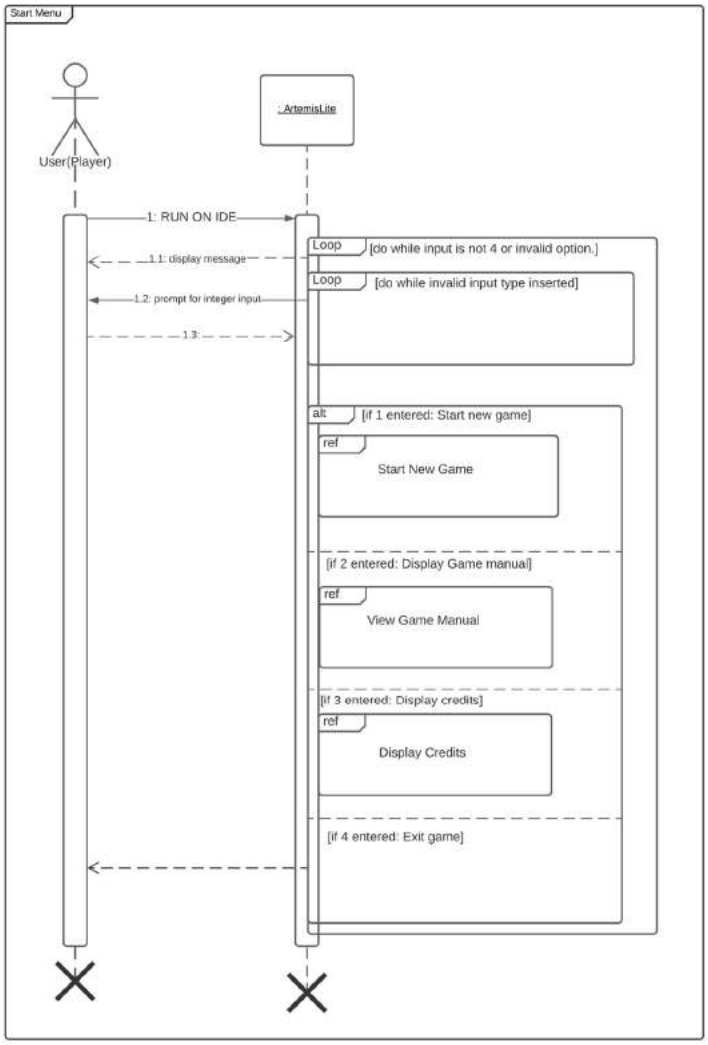


Figure 4 start menu sequence diagram

The *Start Menu* sequence diagram demonstrates a user initiating a game and represents the Start Menu use case. The user will run the ArtemisLite class on IDE as it contains the main method from which the game is run. A welcome message and 4 options will be displayed. The user will be prompted to input an integer between 1 & 4. If the user enters an invalid input the user will be prompted to re-enter a valid integer and if a user enters an integer outside the range of 1-4, they will be prompted to re-enter an integer within the valid range.

- **1: Start New Game** This will display a message "Setting up new game" and call 2 methods *gameSetUp()* and *playGame().* Refer to sequence diagrams below for further details.
- **2: Game Manual/ Rules** This will call a method *displayGameManual()*. See below for sequence diagram.
- **3: Game Credits** This will call a method *gameCredits().* See below for sequence diagram.
- **4: Exit Game** This will exit the game see sequence diagram below.

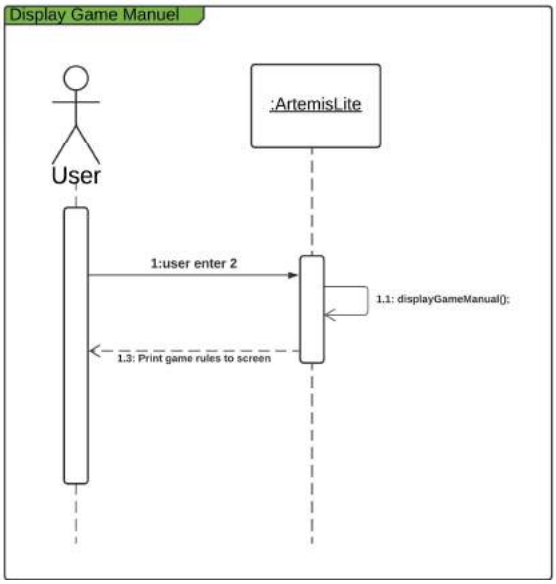


Figure 5 Display Game Manual sequence diagram

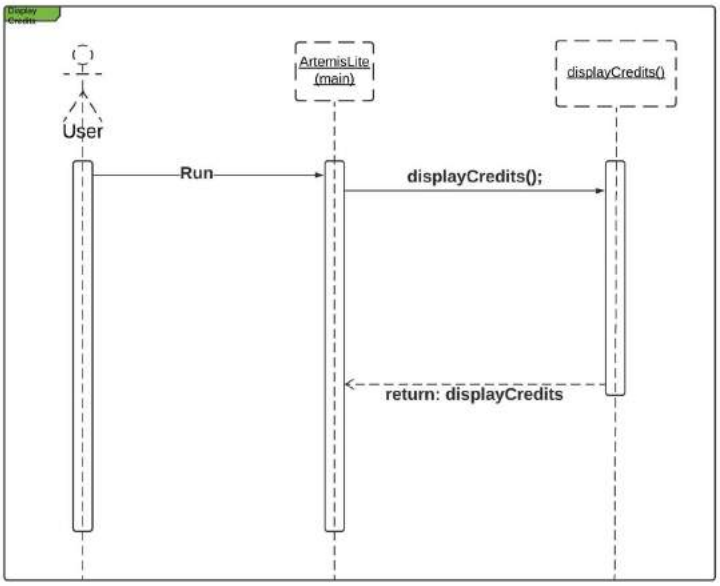


Figure 6 Game Credits sequence diagram

The display game manual sequence diagram represents the display manual use case. This displayGameManual() method can be called from the Start Menu and also from Player Turn.
The game credits sequence diagram represents the game credits use case. It can be called from the start menu and is also displayed at the end of a game.

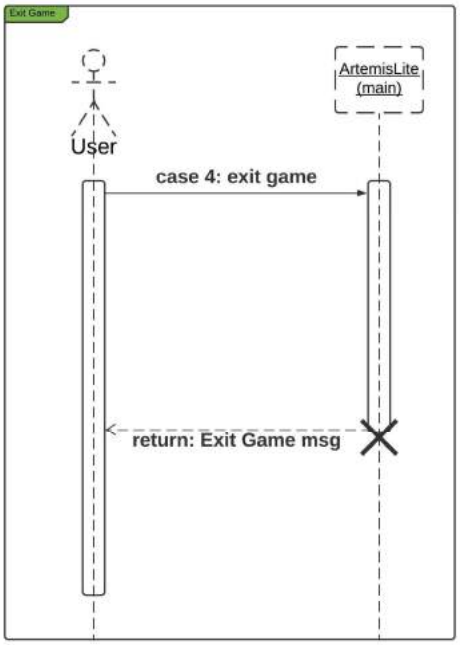


Figure 7 Exit sequence diagram

The Exit Game sequence diagram is a representation of the exit game use case. This is called from the start menu and is an option in a case statement which then terminates the ArtemisLite main method and therefore the game.

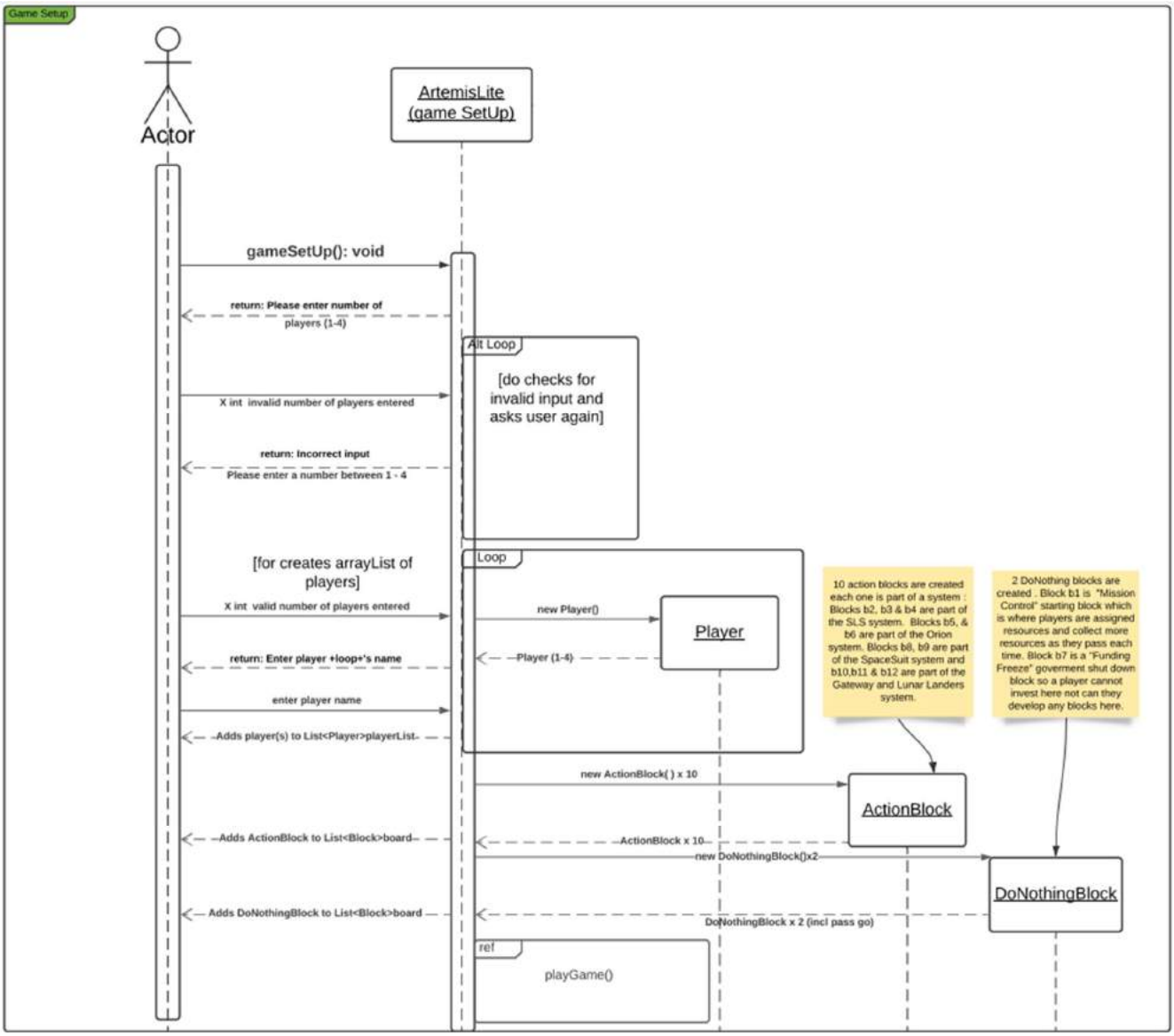


Figure 8 game setup sequence diagram

The Game Set Up use case is represented in the Game Set Up sequence diagram.

- When the user selects option **1 : Start New Game** from the start menu, the *gameSetUp()* method is called which prompts the user to enter the number of players (between 1-4). A do while loop checks if the user enters a number outside this range they will be notified of an incorrect input and asked to re-enter a valid number between 1 &4.
- Once a valid number of players are entered the player object is instantiated and players created. Users are prompted to enter their names (users must enter at least 1 character otherwise they will be notified of an invalid input) and input will be verified to ensure that 2 or more players have not entered the same name. Each player will have a unique player ID (between 1 -4, depending on number of players) and will also be assigned resource hours for investing and developing blocks. The players will be added to List<Player>playerList.
- The *gameSetUp* method will also initiate set up of the board (List<Block>board) by instantiating the block objects including two DoNothingBlocks (block 7 (the funding freeze block) and block 1 where players pick up more hours when they pass) and ten ActionBlocks.

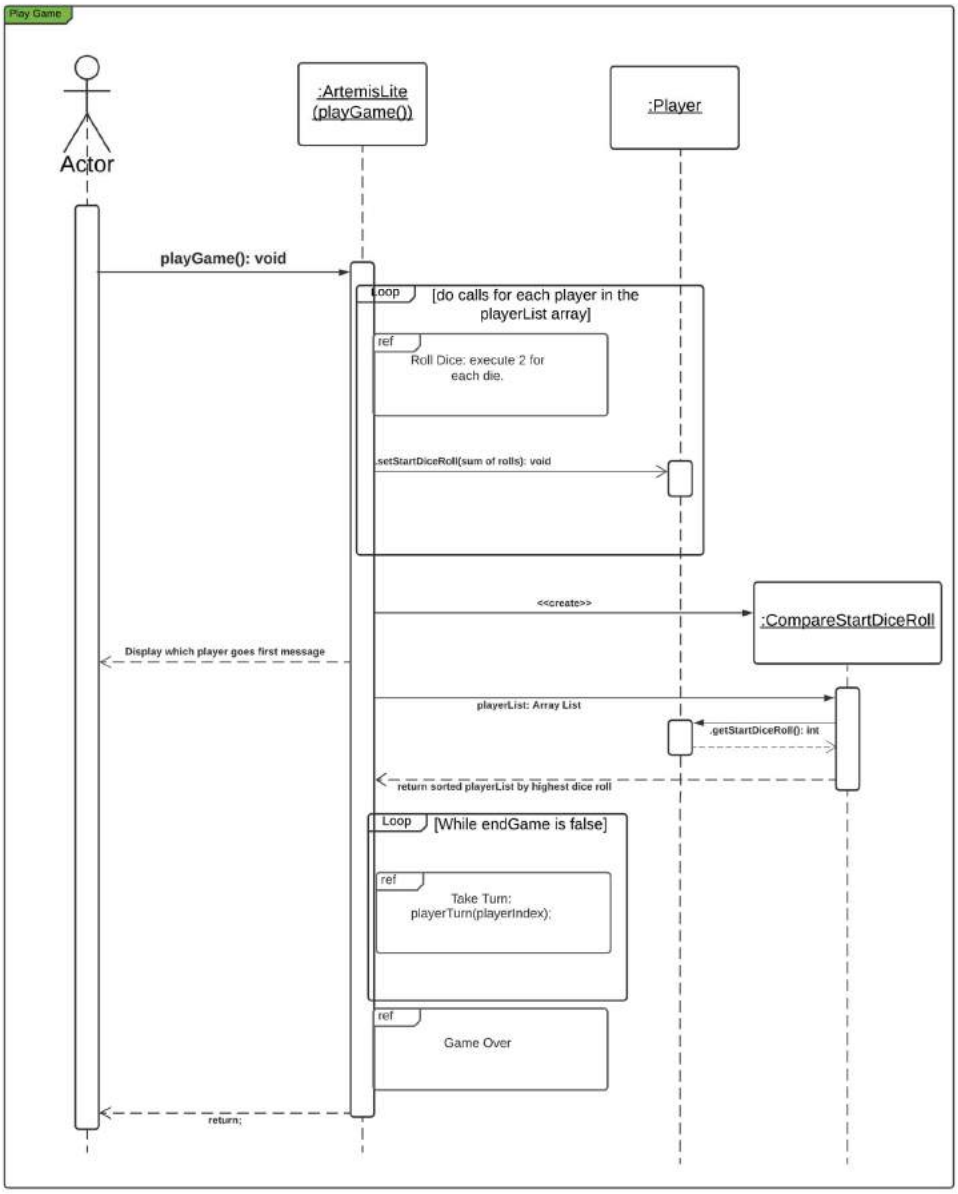


Figure 9 play game sequence diagram.

The Play Game sequence diagram represents a user initiating a game by selecting **1: Start New Game** from the start menu and entering a valid number of players with valid names.

- The do while loop calls each player in the playerList to roll 2 die. The results of each player's roll of the die are returned.
- The total of the die for each player is compared via a comparator, *CompareStartDiceRoll*. This then determines which order the players take turns, starting from the highest total descending.

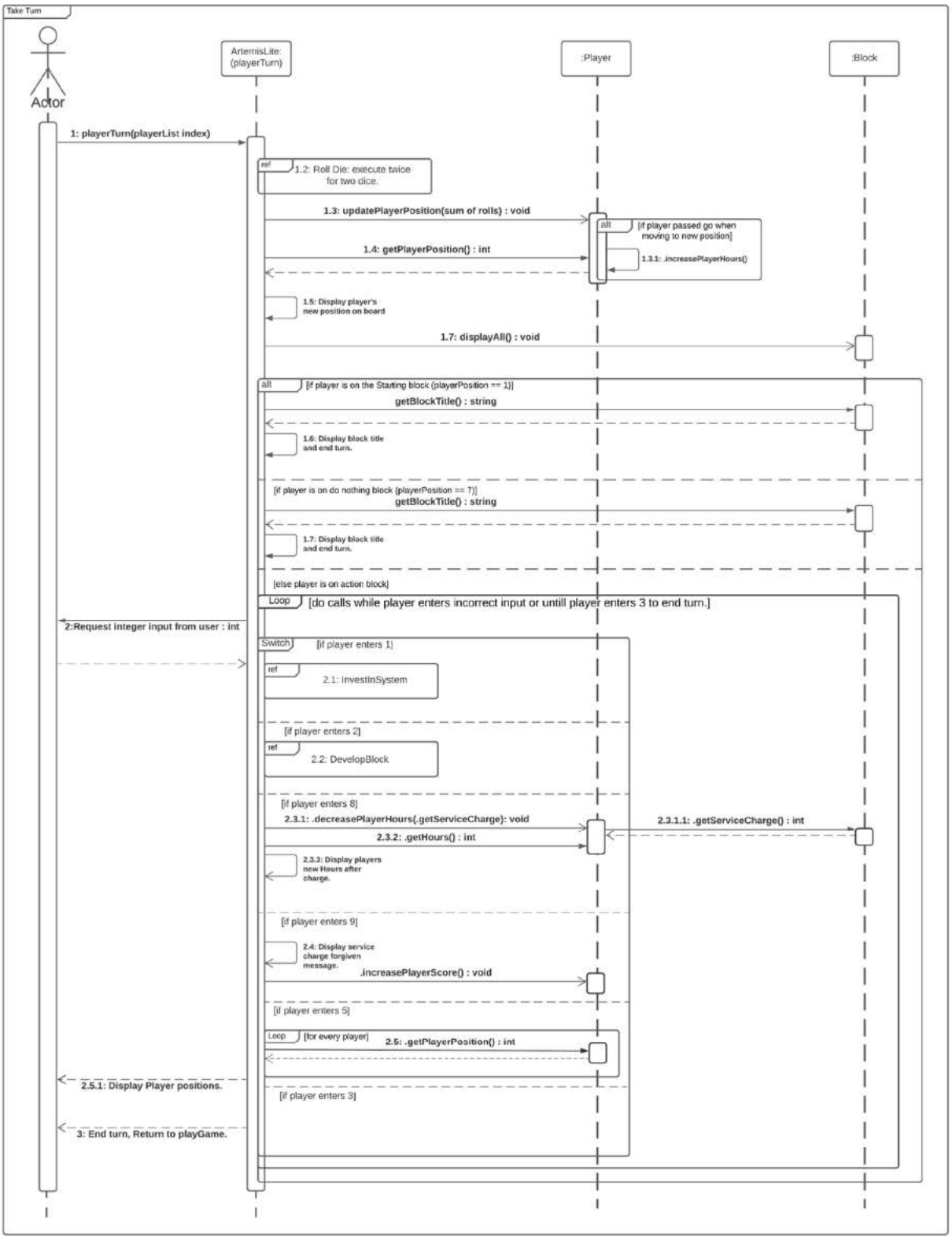


Figure 10 player turn sequence diagram

The Player Turn sequence diagram represents the Player Turn sequence within the Play Game use case and demonstrates a player taking their turn. The player turn is determined by which index they are located in the playerList.

- The player rolls 2 dice which then calls the *player.updatePlayerPosition(sum of rolls*). If they pass go (b1), the player picks up additional resource hours which increases *player.increasePlayerHours()*.
- The new player position on the board is displayed to the user.
- Alternative flow: If player lands on position 1 (b1) additional resources will be allocated, the player and the square title will be displayed and the turn terminated.
- Alternative flow: If player lands on position 7 (b7) then the player cannot invest or develop therefore the turn is ended and the turn goes to the next player in the playerList index.
- If the player lands on the other blocks then the user is displayed with a number of options within a do while loop.
- Do:
    - **1. Invest in System:** This will only be displayed if the system the block is part of is not already invested in by another player. (Appendix VIII)
    - **2.Development options:** See develop sequence diagram (Appendix VIII)
- While player enters invalid entry or until player enters ***"3 End Turn"***
    - **3.End Turn:** If user enters "3" turn ends and returns to playGame.
- **4. End Game:** See game over sequence diagram and description (figure 11).
- If a player lands on a block in a system that is owned by another player then an option is given to the other player if they wish to make the charge or forgive the charge. If they forgive the charge, they will receive points to their score.

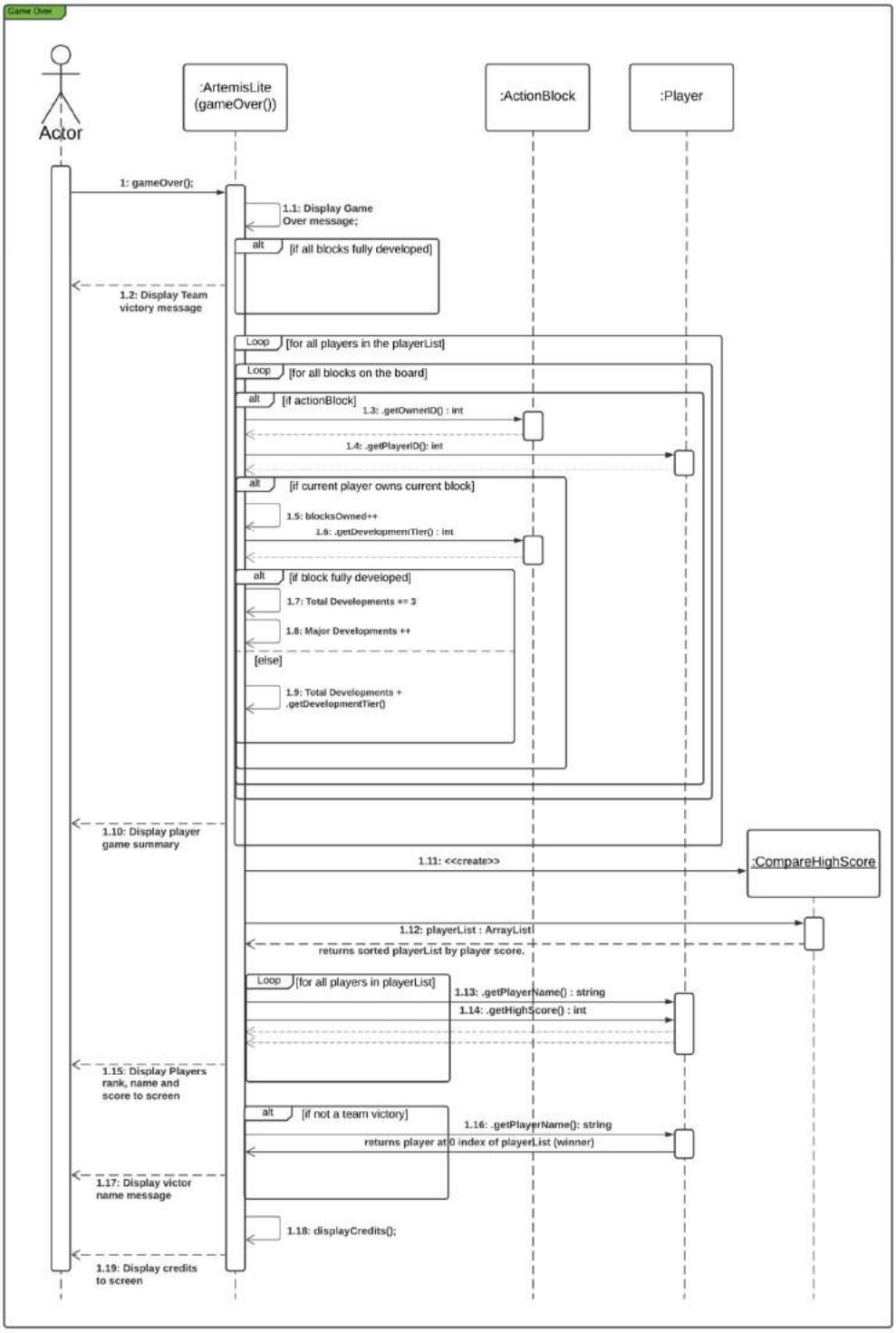


Figure 11 game over sequence diagram

The Game Over sequence diagram represents the Game Over use case. There are 3 scenarios in which the game can end.

- Alternative flow: If all blocks are fully developed then display the team victory message.
- Main Flow: On playerTurn a user can select the option 4 to ***End Game***
- Main Flow: Alternatively, if on playerTurn, a player lands on another player's square. If that player who owns the system takes payment and bankrupts the current player the game will end.

- For all of the above flows, a display Player Game summary is returned. A for loop loops through all the players and an inner for loop loops through all blocks on the board checking for ownerID. Points are assigned on the number of action blocks owned, total developments made, major developments made and points for player charity (i.e. not taking payment from a player who lands on a block in an owned system).
- A comparator is created to determine the player with the most points and descending player positions and details are returned.
- A message is displayed declaring the victor.
- Finally the displayCredits() method is called to display the game creators. Reference appendix VI sequence diagram for displayCredits.

Design *[CB]*

An Object Orientated Design was adopted with each object being composed of varying different methods and attributes necessary to fulfil the laid out requirements and functionality determined in the requirements analysis. The objects are created in the ArtemisLite class, which houses the main method and is where the key sequences of the game take place. The objects represent the main components of the game; such as the block class from which each block on the board is created during the game set up. Likewise the Player class houses all the appropriate attributes and methods, encapsulated within to the appropriate levels of visibility for the game, so its created objects can represent the different players. The classes have been developed in such a way as to reduce any dependencies of the objects on each other. The blocks can exist independently from each other as can the different player objects. This allows for good cohesion of the objects while maintaining only a loose coupling between them, being brought into concert for the game by method calls from the ArtemisLite class. This modular approach allows for extensibility of the game, minor changes could allow for a larger board by simply adding more block objects, likewise for more players by creating more player objects. The independent nature of the classes would even allow for a different game theme with not much effort. The block and player classes can be instantiated with any description or other game parameters, such as the cost of development, by changing the values passed into the constructor parameters in the ArtemisLite game setup method. Hard coding values have been kept at a minimum where possible, fostering flexible code that is easy to update and change for maintainability. Enums for the system names have also been taken advantage of, for this same reason and ensuring code robustness.

The use of OOP design also allowed for the easy division of tasks in the coding sprint as each member could build, using the class diagram (figure 13), and test an object which were then implemented successfully in the main method.

Navigation/ user input:

To get the input for the players decision making, a numbered approach was taken for the menu inputs and a simple “y/n” format, indicating yes or no respectively, for confirmation inputs. During the course of a game the user will encounter 3 types of menu; the start menu when first running the program and after finishing a game, the player turn menu presented to each player on their turn and the development menu when the development option is selected from the player turn menu. These menus accept only int inputs, they are safeguarded from incorrect input types by the use of a while loop which checks if the input is of the correct type and will prompt the user for the correct input type, if incorrect, before assigning the input to variable for processing. Likewise, if a logically incorrect value is entered, e.g. 5 when there are only 4 options, a message will be outputted and the user prompted again. Likewise, the same process is performed for the y/n inputs.

The menus within a played game (i.e. the player turn menu and the development menu) are dynamically generated to aid useability and the users navigation through a game. To a large degree only options the user can actually perform on that current turn are presented to the player, for example if the player lands on a block that has no current owner, the invest in system option will be presented. However, if it is owned it will not be displayed. For the player turn menu this is achieved with the use of a string builder, which builds a custom output for each new display of the turn menu, depending on the players and or blocks current conditions.

The input for the entry of the players names utilizes the .next() function of the Scanner class, this enables the input to accept characters of any kind. Including spaces, numbers and special characters. This allows the user to input any name they wish, including for example company names.

Domain Model:

A simple domain model acted as an initial starting point for building the game, being the basis for the class diagram. During the requirements analysis, the team dived deep into the requirements specifications and identified use cases as common nouns; this gave inspiration for the classes needed, and verbs revealed the possible method calls and functions an object should perform.

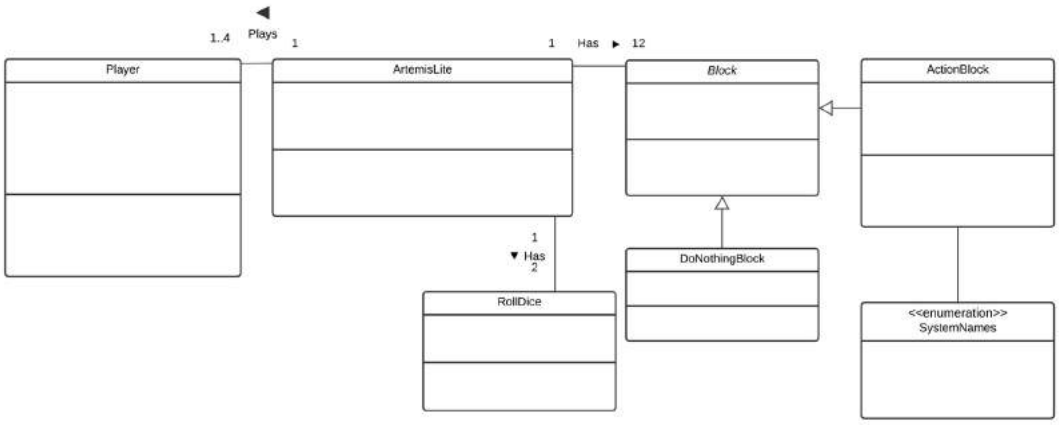


Figure 12 displaying the group's final domain model

UML Class Diagram:

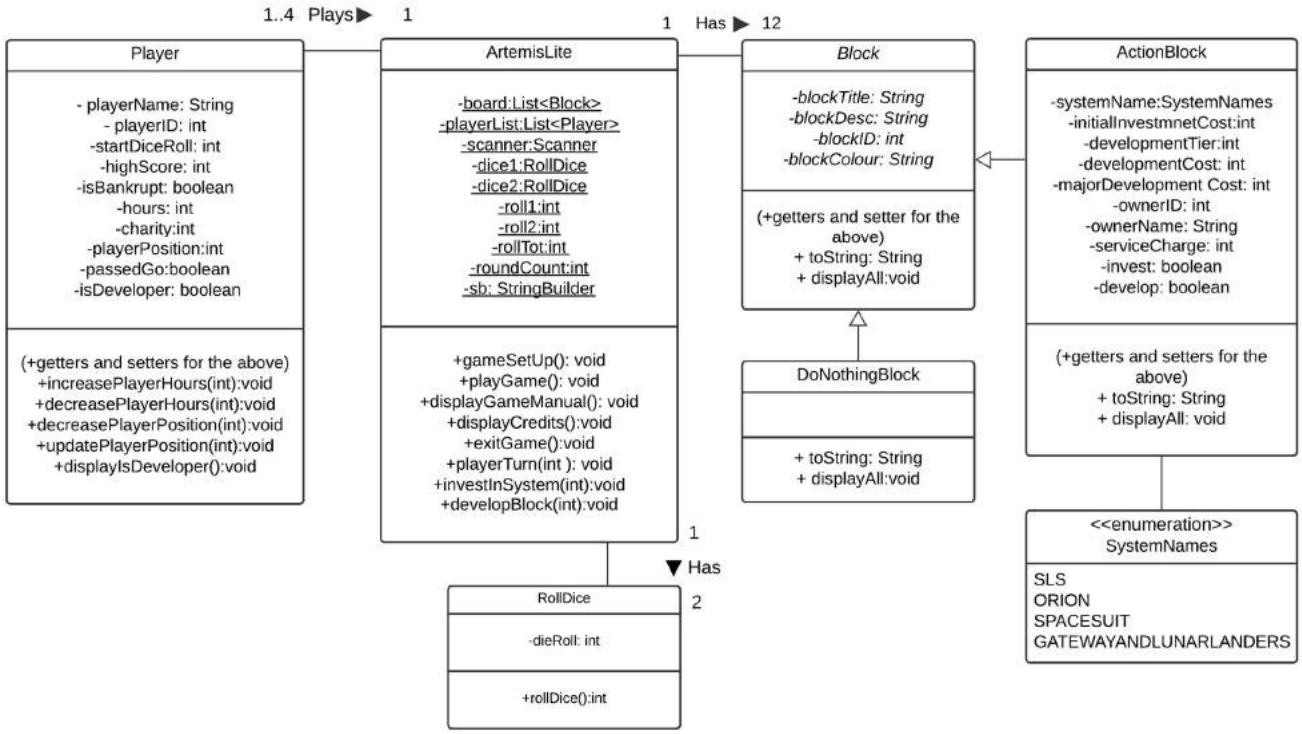


Figure 13 the group's final UML Class diagram

The UML class diagram displays the different classes and methods that are referenced in the above Realisation section via the various sequence diagrams. The above diagram shows the use of the objects: player, dice and block and their respective relationships with the main method (ArtemisLite). This structure laid out in the class diagram acted as the blueprint for the working system, being realized into working Java class files.

System Components:

Public Classes/Methods: An important aspect of the design, as all classes within the project need to provide access to their methods, although in this system, it is only the ArtemisLite class that will do any method calls to another class and their methods, as mentioned previously.

Superclass/ Abstract class: The Block class is abstract and acts as the superclass to the ActionBlock and DoNothingBlock. These methods inherit the Block classes methods, and also add specialised functions for individual blocks, hence the need to create Block as abstract. The use of inheritance reduces code duplication which in turn makes the code less prone to errors and easier to update and change. This use of abstraction here also leaves the door open for further development of different kinds of blocks for different game designs. For example, a more complex game could be created with the addition of a new block; where if a player lands on it they lose so many resources and/or points or have to skip a turn. This new block would inherit from the abstract block and easily slide into the current game design.

Testing [LG]

The team applied a bottom-up testing strategy as it seemed most relevant and useful for the object orientated approach to the game design. This involved unit testing the block classes (DoNothing and Action) and the Player class as the code was being developed. The group implemented an agile methodology and re-tested the unit tests when any amendments were made to code in all classes. Reference Appendix I for screen grabs of unit tests.

Based on the use cases a number of test cases were developed and tested as the game was run. For example G3-0001v2 is the test case for use case *Start Game.* The test data is identified including all valid entries at the start menu and a number of invalid entries. The program is run and each option is imputed to check if the expected output is displayed. In version 1 (v1) of test case G3-0001 there are a number of failures (reference appendix I) however after a team debugging session all of the issues were resolved and the test case re-evaluated.

Test Case ID	G3-0001	Test Case Description	Start Game: Start Menu		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log	Review comments from Bill incorprate in version 2.1

Tester's Name	Laura	Date Tested	April 17, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	
4	

S #	Test Data
1	1 valid input
2	2 valid input
3	3 valid input
4	4 valid input
5	0 invalid input
6	5 invalid input
7	"a" or any non int invalid input

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Open ArtemisLite class in artemisLite package om ArtemisLite project. Hit run	1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	As Expected	Pass
2	User to enter option 1	Setting up new game. Please enter number of players (1-4)	As Expected	Pass
2	User to enter option 2	Display manual and shows start menu	*Display manual* Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2	User to enter option 3	Displays creator credits and start menu	Developers..... Conor Braldey Michelle Oakes Sancha O'Neill Laura Gaffey 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2	User to enter option 4	Exiting Game... See you next time.	Exiting Game... See you next time.	Pass
2 invalid	User to enter invalid option 0	Incorrect input... Please enter numbers 1 - 3 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Incorrect input... Please enter numbers 1 - 4 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2 invalid	User to enter invalid option 5	5 Incorrect input... Please enter numbers 1 - 3 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	5 Incorrect input... Please enter numbers 1 - 4 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2 invalid	User to enter invalid option a	a Incorrect input type... Please enter a NUMBER from 1 - 4.	a Incorrect input type... Please enter a NUMBER from 1 - 4.	Pass

Figure 14 displaying sample test plan Start Game : Start Menu

The group members individually played the game and collated a bug document. The group then held 2 debugging sessions where the majority of bugs and issues were resolved collaboratively. See Appendix I for bug document.

Adherence to process (further documented in appendices)/ conclusion *[SON / MO/ LG/ CB]*

The group adopted an agile approach throughout the project. At the beginning, the group met to broadly discuss the deliverables and implementation of the requirements. The group continued to meet twice a week throughout the project lifecycle. The continuous interactions between group members provided an opportunity to constantly and consistently develop ideas at a steady pace.

The group undertook requirements analysis together to identify the core elements and components of the system under development. This analysis provided the group the direction to begin to design and write use case diagrams, descriptions and sequence diagrams. The group sought feedback on these draft proposals during weekly advisory sessions in which the group utilized the advisor as a potential user for ideas on usability and user interface. The group updated any diagrams/ descriptions together after advisory sessions, using the feedback and set tasks to achieve ahead of any future meetings. The group created the UML Class diagram together, ahead of the first sprint. During the sprint, the team met almost daily and developed areas of the code individually. Each class had a principal author with frequent cross over between group member's classes. With the use of GitLab collaborative functionality, the group was able to successfully push the code together using branches. These were then merged with master and any code conflicts resolved. The group worked collaboratively through the bug report during two SBT sessions and adopted paired programming when necessary. The use of GitLab allowed the team to work successfully despite being entirely remote. Due to the current restrictions the group utilised Microsoft Teams to hold meetings, paired programming and debugging sessions. The group also used Lucidchart, Trello and a Hartmann Orona spreadsheet to keep track of tickets and the overall development of the project.

Following the above steps, the group believes the project is successful in that it meets all requirements and is fit for purpose.

Appendix

Contents

Appendix I - Testing

Figure below showing the 'do nothing block' J Unit test running successfully

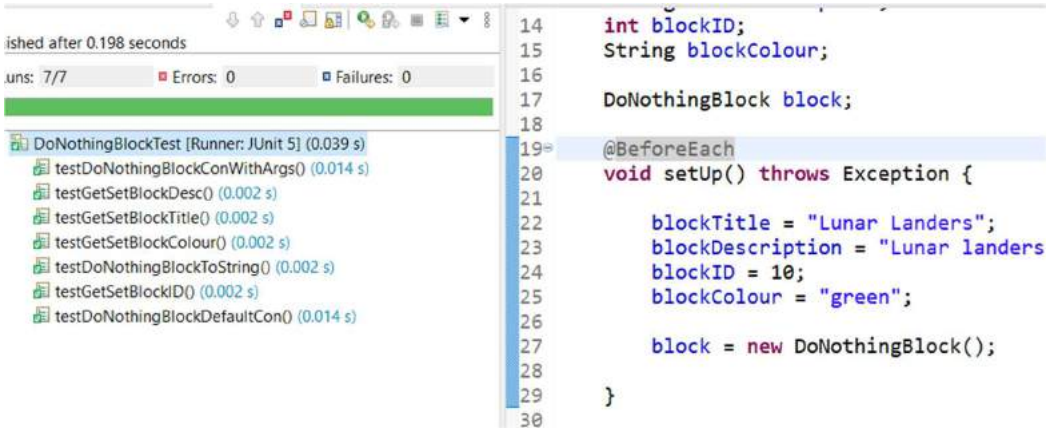


Figure below showing the 'action block' J Unit test running successfully

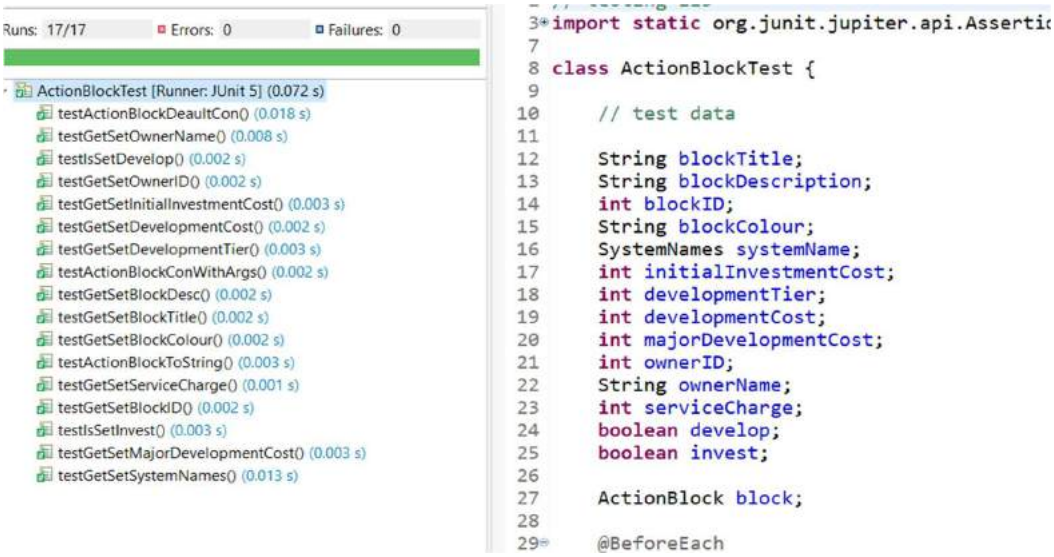
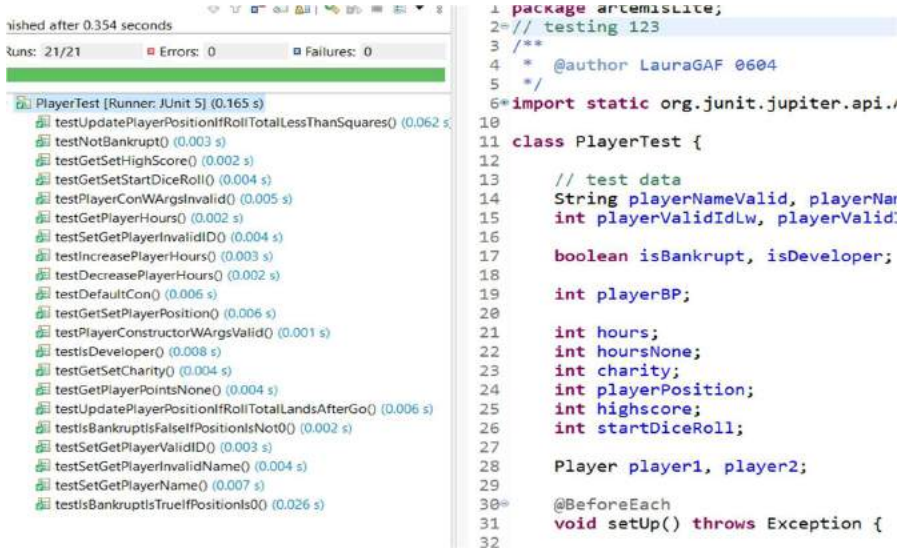


Figure showing the 'player' J Unit test running successfully



Test Case ID	G3-0001	Test Case Description	Start Menu		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log	Review comments from Bill incorprate in version 2.1

Tester's Name	Laura	Date Tested	April 17, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	
4	

S #	Test Data
1	1 valid input
2	2 valid input
3	3 valid input
4	4 valid input
5	0 invalid input
6	5 invalid input
7	"a" or any non int invalid input

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Open ArtemisLite class in artemisLite package om ArtemisLite project. Hit run	1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	As Expected	Pass
2	User to enter option 1	Setting up new game. Please enter number of players (1-4)	As Expected	Pass
2	User to enter option 2	Display manual and shows start menu	*Display manual* Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2	User to enter option 3	Displays creator credits and start menu	Developers.... Conor Braldey Michelle Oakes Sancha O'Neill Laura Gaffey 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2	User to enter option 4	Exiting Game... See you next time.	Exiting Game... See you next time.	Pass
2 invalid	User to enter invalid option 0	Incorrect input... Please enter numbers 1 - 3 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Incorrect input... Please enter numbers 1 - 4 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2 invalid	User to enter invalid option 5	5 Incorrect input... Please enter numbers 1 - 3 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	5 Incorrect input... Please enter numbers 1 - 4 for desired option. 1: Start new game 2: Game manual/rules 3: Game credits 4: Exit Please enter your desired option 1 - 4:	Pass
2 invalid	User to enter invalid option a	a Incorrect input type... Please enter a NUMBER from 1 - 4.	a Incorrect input type... Please enter a NUMBER from 1 - 4.	Pass

Appendix I testing

Test Case ID	G3-0001	Test Case Description	Start Menu		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log	Review comments from Bill incorprate in version 2.1

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	Fail

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	
4	

S #	Test Data
1	1 valid input
2	2 valid input
3	3 valid input
4	0 invalid input
5	4 invalid input
6	"a" or any non int invalid input

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Open ArtemisLite class in artemisLite package om ArtemisLite project. Hit run	Console should display the following message: Welcome to ArtemisLite 1: Start new game 2: Game manual/rules 3: Game credits Please enter your desired option 1 - 3:	As Expected	Pass
2	User to enter option 1	Setting up new game. Please enter number of players (1-4)	As Expected	Pass
2	User to enter option 2	Display manual	Display manual works but no return to main menu	FAIL
2	User to enter option 3	"Nothing to display yet"	Doesn't work	FAIL
2 invalid	user to enter invalid option 0	"Invalid entry try again"	Doesn't work	FAIL
2 invalid	User to enter invalid option 4	"Invalid entry try again"	Doesn't work	FAIL
2 invalid	User to enter invalid option a	"Invalid entry try again"	Doesn't work	FAIL

Appendix I testing

Test Case ID	G3-0002	Test Case Description	Game Set up : Enter number of players		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 17, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	

S #	Test Data
1	1 - one player
2	2 - two players
3	3 -three players
4	4- four players
5	0 -zero players invalid qty
6	5 -five players invalid qty
7	"a" - any other non int invalid entry

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	User enters 1 player	Enter Player 1's name:	As Expected	Pass
1	User to enter 2 players	Enter Player 1's name: (enter name) Enter Player 2's name:	As Expected	Pass
1	User to enter 3 players	Enter Player 1's name: (enter name) Enter Player 2's name: (enter name) Enter Player 3's name:	As Expected	Pass
1 invalid	User to enter 4 players	Enter Player 1's name: (enter name) Enter Player 2's name: (enter name) Enter Player 3's name: (enter name) Enter Player 4's name: (enter name)	As Expected	Pass
1 invalid	User to enter 0 players	Incorrect input. Please enter a number between 1 - 4:	Incorrect input. Please enter a number between 1 - 4:	Pass
1 invalid	User to enter 5 players	"Incorrect input. Please enter a number between 1 - 4:	Incorrect input. Please enter a number between 1 - 4:	Pass
1 invalid	User to enters nothing (carriage return)	blank until user enters something	As Expected	Pass
1 invalid	User to enter "a" players	a Incorrect input type... Please enter a NUMBER from 1 - 4.	a Incorrect input type... Please enter a NUMBER from 1 - 4.	Pass

Appendix I testing

Test Case ID	G3-0002	Test Case Description	Game Set up : Enter number of players		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	FAIL

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	

S #	Test Data
1	1 - one player
2	2 - two players
3	3 -three players
4	4- four players
5	0 -zero players invalid qty
6	5 -five players invalid qty
7	"a" - any other non int invalid entry

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	User enters 1 player	Enter Player 1's name:	As Expected	Pass
1	User to enter 2 players	Enter Player 1's name: (enter name) Enter Player 2's name:	As Expected	Pass
1	User to enter 3 players	Enter Player 1's name: (enter name) Enter Player 2's name: (enter name) Enter Player 3's name:	As Expected	Pass
1 invalid	User to enter 4 players	Enter Player 1's name: (enter name) Enter Player 2's name: (enter name) Enter Player 3's name: (enter name) Enter Player 3's name:	As Expected	Pass
1 invalid	User to enter 0 players	"Invalid entry try again"	Doesn't work errors Rolls dice then fails	FAIL
1 invalid	User to enter 5 players	"Invalid entry try again"	Doesn't work allows player to enter 5 players name then fails	FAIL
1 invalid	User to enters nothing (carriage return)	blank until user enters something	As Expected	Pass
1 invalid	User to enter "a" players	"Invalid entry try again"	Doesn't work errors	FAIL

Appendix I testing

Test Case ID	G3-0003	Test Case Description	Game Set up: Enter player names		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Conor	Date Tested	April 14, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players

S #	Test Data
1	1 - "One"
2	2- "Two"
3	3 - "Three"
4	4 - "Four"
5	blank (invalid entry)
6	"Two Names"
7	"same" "same"

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Enter Player 1's name: Enter "One"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two" Enter Player 3's name: Enter "Three"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two" Enter Player 3's name: Enter "Three" Enter Player 4's name: Enter "Four"	The desc of game and dice roll	As Expected	Pass
1 invalid	User to enters nothing (carriage return)	blank until user enters something	As Expected	Pass
1 invalid	Enter Player 1's name: Enter "Two Names"	Asign name "Two Names" to player one then The desc of game and dice roll	Asign name "Two Names" to player one then The desc of game and dice roll	Pass
1 invalid	Enter same name for two players	Enter Player 1's name: same Enter Player 2's name: same Name already taken. Please enter a different Name. Enter Player 2's name:	Enter Player 1's name: same Enter Player 2's name: same Name already taken. Please enter a different Name. Enter Player 2's name:	Pass

Appendix I testing

Test Case ID	G3-0003	Test Case Description	Game Set up: Enter player names		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Michelle	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	FAIL

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players

S #	Test Data
1	1 - "One"
2	2- "Two"
3	3 - "Three"
4	4 - "Four"
5	blank (invalid entry)
6	"Two Names"

Test Scenario

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Enter Player 1's name: Enter "One"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two" Enter Player 3's name: Enter "Three"	The desc of game and dice roll	As Expected	Pass
1	Enter Player 1's name: Enter "One" Enter Player 2's name: Enter "Two" Enter Player 3's name: Enter "Three" Enter Player 4's name: Enter "Four"	The desc of game and dice roll	As Expected	Pass
1 invalid	User to enters nothing (carriage return)	blank until user enters something	As Expected	Pass
1 invalid	Enter Player 1's name: Enter "Two Names"	Asign name "Two Names" to player one then The desc of game and dice roll	Asigns player 1s name as "Two" and Player 2's name as "Names"	FAIL

Appendix I testing

Test Case ID	G3-0004	Test Case Description	Game set up & Play Game - Roll Dice		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Michelle	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	"One"
2	"Two"

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	2 players an names entered Players "One" and "Two". Dice rolls automatically. Player with the highest total on the dice roll goes first. 2 dii both are random between 1-6.	Which player goes first? Lets roll the dice for everyone and who ever gets the highest sum of two rolls goes first. Rolling... One rolls a X and a X for a total roll of X Rolling... Two rolls a X and a X for a total roll of X XXX goes first! First turn. ---------- ---------- XXX Turn	Which player goes first? Lets roll the dice for everyone and who ever gets the highest sum of two rolls goes first. Rolling... One rolls a 2 and a 5 for a total roll of 7 Rolling... Two rolls a 6 and a 6 for a total roll of 12 Two goes first! First turn. ---------- --- Two's Turn ---------- ---	Pass
2	After player "ends turn" next player automatically rolls dice	Ending xxx turn... ---------- ---------- xxx's Turn ---------- ---------- Rolling dice.... Rolling... ...x....x Laura rolled a xx They landed on block x PLSS	Ending Chris's turn... ---------- --- Laura's Turn ---------- --- Rolling dice.... Rolling... ...4....6 Laura rolled a 10 They landed on block 8. PLSS	Pass

Appendix I testing

Test Case ID	G3-0004	Test Case Description	Game Set up & Play Game - Roll Dice		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Conor	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	"One"
2	"Two"

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	2 players an names entered Players "One" and "Two". Dice rolls automatically. Player with the highest total on the dice roll goes first. 2 dii both are random between 1-6.	Which player goes first? Lets roll the dice for everyone and who ever gets the highest sum of two rolls goes first. Rolling... One rolls a X and a X for a total roll of X Rolling... Two rolls a X and a X for a total roll of X XXX goes first! First turn. ---------- ---------- XXX Turn	Which player goes first? Lets roll the dice for everyone and who ever gets the highest sum of two rolls goes first. Rolling... One rolls a 2 and a 5 for a total roll of 7 Rolling... Two rolls a 6 and a 6 for a total roll of 12 Two goes first! First turn. ---------- --- Two's Turn ---------- ---	Pass
2	After player "ends turn" next player automatically rolls dice	Ending xxx turn... ---------- ---------- xxx's Turn ---------- ---------- Rolling dice.... Rolling... ...x....x Laura rolled a xx	Ending Chris's turn... ---------- --- Laura's Turn ---------- --- Rolling dice.... Rolling... ...4....6 Laura rolled a 10	Pass

Appendix I testing

Test Case ID	G3-0005	Test Case Description	Play Game - Invest Display		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	player 1 = "One"

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "One"'s turn. Player rolls dice and lands on a square on the board and given a number of options. Player not yet invested in any system and system landed on not yet invested in.	one's hours: 100 What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules 1 This is the SLS system. Cost of system investment is: 30 Your resources are: Current After Investment 100 70 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	one's hours: 100 What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules 1 This is the SLS system. Cost of system investment is: 30 Your resources are: Current After Investment 100 70 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	Pass

Appendix I testing

Test Case ID	G3-0005	Test Case Description	Play Game - Invest Display		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names
Test Scenario	

S #	Test Data
1	player 1 = "One"

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "One"'s turn. Player rolls dice and lands on a square on the board that has not been developed	One's Turn ---------- Rolling dice.... Rolling... ...X....X One rolled a X They landed on block X Cooling Garment Current Block Status: Block 9: Cooling Garment. Special water tubes keep astronuats cool during long spacewalks. Block colour : Blue System : SPACESUIT Owner name : No owner yet Initial investment cost : 1 Current Development tier : 0 Development cost : 2 Major development cost : 3 Service charge : 1 What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game	---------- One's Turn ---------- Rolling dice.... Rolling... ...5....3 One rolled a 8 They landed on block 9. Cooling Garment Current Block Status: Block 9: Cooling Garment. Special water tubes keep astronuats cool during long spacewalks. Block colour : Blue System : SPACESUIT Owner name : No owner yet Initial investment cost : 1 Current Development tier : 0 Development cost : 2 Major development cost : 3 Service charge : 1 What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game	Pass

Test Case ID	G3-0006	Test Case Description	Play Game: Player turn selecting options		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Laura	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new
4	Enter valid
5	Enter valid player names

Test Scenario

S #	Test Data
1	1 valid input
2	3 valid input
3	4 valid input
4	5valid input
5	6 vakid input
5	0 invalid input
6	7invalid input
7	"a" or any non int invalid input
	Note "2" will be displayed until system invested in

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: *What would you like to do? Select option from below:* *What would you like to do? Select option from below:* ***1: Invest in this System*** *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	1 This is the SPACESUIT system. Cost of system investment is: 1 Your resources are: Current 100 After Investment 99 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	1 This is the SPACESUIT system. Cost of system investment is: 1 Your resources are: Current After Investment 100 99 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	Pass
1	Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: *What would you like to do? Select option from below:* *1: Invest in this System* ***3: End Turn*** *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	3 Ending One's turn... --- Two's Turn --- ---	3 Ending One's turn... --- Two's Turn ---	Pass
1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below:* *What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* ***4: End Game*** *5: Show all players positions on the board* *6: Display Game Rules*	4 This will end the game for everyone, are you sure you want to end the game? Enter y/n	4 This will end the game for everyone, are you sure you want to end the game? Enter y/n	Pass

1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below: What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***5: Show all players positions on the board*** *6: Display Game Rules*	5 Player name: Block Laura 8 Chris 1	5 Player name: Block Laura 8 Chris 1	Pass
1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below: What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* *5: Show all players positions on the board* ***6: Display Game Rules***	*6* *Displays rules*	*6* *Displays rules*	Pass
1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter a***	a Incorrect input type... Please enter a NUMBER	a Incorrect input type... Please enter a NUMBER	Pass
1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below: What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules* ***Enter 0***	0 Incorrect input... Please enter specified numbers for desired option.	0 Incorrect input... Please enter specified numbers for desired option.	Pass
1	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: What would you like to do? Select option from below: What would you like to do? Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules* ***Enter 7***	7 Incorrect input... Please enter specified numbers for desired option.	7 Incorrect input... Please enter specified numbers for desired option.	Pass

Test Case ID	G3-0006	Test Case Description	Play Game: Player turn selecting options		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	FAIL

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names
Test Scenario	

S #	Test Data
1	1 valid input
2	3 valid input
3	4 valid input
4	0 invalid input
5	5 invalid input
6	"a" or any non int invalid input
	Note "2" will be displayed

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter 1 "Invest in this System"***	This is the SPACESUIT system. Cost of system investment is: 1 Your resources are: Current 100 After Investment 99 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	This is the SPACESUIT system. Cost of system investment is: 1 Your resources are: Current After Investment 100 99 Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)	Pass
2	Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options: *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter 3 "End turn"***	3 Ending One's turn... ---------- ---------- Two's Turn ---------- ----------	3 Ending One's turn... --- --- Two's Turn --- ---	Pass
3	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options:* *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter 4 "End Game"***	Are you sure you want to end this game?	Incorrect input... Please enter specified numbers for desired option.	FAIL
3	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options:* *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter a***	Incorrect input... Please enter specified numbers for desired option.	Error msg displayed scanner int	FAIL
4	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options:* *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter 0***	Incorrect input... Please enter specified numbers for desired option.	Incorrect input... Please enter specified numbers for desired option.	Pass
4	*Player "One"'s turn. Player rolls dice and lands on a square on the board. Player given a number of options:* *What would you like to do?* *Select option from below:* *1: Invest in this System* *3: End Turn* *4: End Game* ***Enter 5***	Incorrect input... Please enter specified numbers for desired option.	Incorrect input... Please enter specified numbers for desired option.	Pass

Appendix I testing

Test Case ID	G3-0007	Test Case Description	Play Game : Player Turn Invest System		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input
3	5 invalid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "Three"'s turn and decides to invest in system they have landed on. **Enter 1** "Invest in this System" *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* ***Enter y***	y Investment complete: three now owns the SLS system. What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules	y Investment complete: three now owns the SLS system. What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules	Pass
1	Player "Three"'s turn and decides to invest in system they have landed on. ***Enter 1*** *"Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter n**	Investment cancelled... returning to player turn menu. Threes hours: 120 What would you like to do? Select option from below: 1: Invest in this System 2: Development options 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules	Investment cancelled... returning to player turn menu. Threes hours: 120 What would you like to do? Select option from below: 1: Invest in this System 2: Development options 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules	Pass
1	Player "Three"'s turn and decides to invest in system they have landed on. *Enter 1 "Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter a**	a Incorrect input. Please enter either 'y' for Yes or 'n' for No:	a Incorrect input. Please enter either 'y' for Yes or 'n' for No:	Pass
1	Player "Three"'s turn and decides to invest in system they have landed on. *Enter 1 "Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter 5**	5 Incorrect input. Please enter either 'y' for Yes or 'n' for No:	5 Incorrect input. Please enter either 'y' for Yes or 'n' for No:	Pass

Appendix I testing

Test Case ID	G3-0007	Test Case Description	Play Game : Player Turn Invest System		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input
3	1 invalid input
4	A invalid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Player "Three"'s turn and decides to invest in system they have landed on. **Enter 1** "Invest in this System" *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* ***Enter y***	y Investment complete: three now owns the SLS system. What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game	y Investment complete: three now owns the SLS system. What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game	Pass
2	Player "Three"'s turn and decides to invest in system they have landed on. ***Enter 1*** *"Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter n**	Investment cancelled... returning to player turn menu. What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game	Investment cancelled... returning to player turn menu. What would you like to do? Select option from below: 1: Invest in this System 3: End Turn 4: End Game	Pass
3	Player "Three"'s turn and decides to invest in system they have landed on. *Enter 1 "Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter a**	a Incorrect input. Please enter either 'y' for Yes or 'n' for No:	a Incorrect input. Please enter either 'y' for Yes or 'n' for No:	Pass
	Player "Three"'s turn and decides to invest in system they have landed on. *Enter 1* *"Invest in this System"* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current* *After Investment* *100 90* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system* **Enter 5**	5 Incorrect input. Please enter either 'y' for Yes or 'n' for No:	5 Incorrect input. Please enter either 'y' for Yes or 'n' for No:	Pass

Appendix I testing

Test Case ID	G3-0008	Test Case Description	Play Game : Player Turn Develop Gateway and Lunar landers system		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Michelle	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player can continue to develop a block of their system. If player tries to invest in system not having enough hours they should not be allowed to develop that block further or bankrupt themselves. They should be returned to the development menu	This block is ready for a major development. Major Development will cost 50 Your resources are: Current After Major Development 50 0 You do not have enough hours for a major development of this component. You need at least 1 more hours to perform a major development of this component, and avoid bankruptcy. Returning to development menu.... Option: Block No. Block Title Development Tier System 2 RS-25 Engines Fully Developed SLS 2 3 Solid Rocket Boosters 0 SLS 3 4 Orion adapter 0 SLS 4 8 PLSS 0 SPACESUIT 5 9 Cooling Garment 0 SPACESUIT 6 10 Gateway 3 GATEWAYANDLUNARLANDERS 7 11 Lunar landers 0 GATEWAYANDLUNARLANDERS 8 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player turn menu.	*This block is ready for a major development.* *Major Development will cost 50* *Your resources are: Current After Major Development* *50 0* *You do not have enough hours for a major development of this component.* *You need at least 1 more hours to perform a major development of this component, and avoid bankruptcy.* *Returning to development menu....* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 8 PLSS 0 SPACESUIT* *5 9 Cooling Garment 0 SPACESUIT* *6 10 Gateway 3 GATEWAYANDLUNARLANDERS* *7 11 Lunar landers 0 GATEWAYANDLUNARLANDERS* *8 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn*	Pass
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu.	*Block 11 Lunar landers has a 1 tier development cost of 20* *Your resources are: Current After Development* *50 30* *Are you sure you want to develop this block? y/n* *n* *Development cancelled. Going back to development menu.* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 8 PLSS 0 SPACESUIT* *5 9 Cooling Garment 0 SPACESUIT* *6 10 Gateway 3 GATEWAYANDLUNARLANDERS* *7 11 Lunar landers 0 GATEWAYANDLUNARLANDERS* *8 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.*	Block 11 Lunar landers has a 1 tier development cost of 20 Your resources are: Current After Development 50 30 Are you sure you want to develop this block? y/n n Development cancelled. Going back to development menu. Option: Block No. Block Title Development Tier System 2 RS-25 Engines Fully Developed SLS 2 3 Solid Rocket Boosters 0 SLS 3 4 Orion adapter 0 SLS 4 8 PLSS 0 SPACESUIT 5 9 Cooling Garment 0 SPACESUIT 6 10 Gateway 3 GATEWAYANDLUNARLANDERS 7 11 Lunar landers 0 GATEWAYANDLUNARLANDERS 8 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player turn	Pass
1	~~In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu.Player developing LUNAR LANDERS DEPLOYMENT "3"~~	~~Option: Block No. Block Title Development Tier System~~ ~~10 Gateway Fully Developed GATEWAYANDLUNARLANDERS~~ ~~11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS~~ ~~3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS~~ ~~Press '0' to exit development and return to the player turn menu.~~ ~~3~~ ~~Block 12 Lunar landers Deployment has a 3 tier development cost of 20~~ ~~Your resources are: Current After Development~~ ~~20 0~~ ~~Are you sure you want to develop this block? y/n~~ ~~n~~ ~~Development cancelled. Going back to development menu.~~ ~~Option: Block No. Block Title Development Tier System~~ ~~10 Gateway Fully Developed GATEWAYANDLUNARLANDERS~~ ~~11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS~~ ~~3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS~~ ~~Press '0' to exit development and return to the player turn menu.~~	~~Option: Block No. Block Title Development Tier System~~ ~~10 Gateway Fully Developed GATEWAYANDLUNARLANDERS~~ ~~11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS~~ ~~3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS~~ ~~Press '0' to exit development and return to the player turn menu.~~ ~~3~~ ~~Block 12 Lunar landers Deployment has a 3 tier development cost of 20~~ ~~Your resources are: Current After Development~~ ~~20 0~~ ~~Are you sure you want to develop this block? y/n~~ ~~n~~ ~~Development cancelled. Going back to development menu.~~ ~~Option: Block No. Block Title Development Tier System~~ ~~10 Gateway Fully Developed GATEWAYANDLUNARLANDERS~~ ~~11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS~~ ~~3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS~~ ~~Press '0' to exit development and return to the player turn menu.~~	SUSPENDED

Appendix I testing

Test Case ID	G3-0008	Test Case Description	Play Game : Player Turn Develop Gateway and Lunar landers system		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Michelle	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	FAIL

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input
2	1 gateway
3	2 lunar landers
4	3 lunar landers deployment

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player can continue to develop a block of their system. Once developed no further development permited. If player tries to invest in system not having enough hours or having fully developed a block they should be returned to development menu. Player developing GATEWAY "1"	*Development complete: laura has developed the Gateway block!* *Gateway block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 10 Gateway 3 GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 0 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *1* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development 30 0* *Would you like to proceed? y/n* *y* *You do not have enough hours to invest in this system.* *You need at least 1 more hours to invest in and own this system, and avoid bankruptcy.* *Returning to development menu....* *Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.*	*Development complete: laura has developed the Gateway block!* *Gateway block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 10 Gateway 3 GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 0 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 0 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *1* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development 30 0* *Would you like to proceed? y/n* *y* *You do not have enough hours to invest in this system.* *You need at least 1 more hours to invest in and own this system, and avoid bankruptcy.* *Returning to development menu....*	FAIL (doesn't return to dev menu)
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu. Player developing LUNAR LANDERS "2"	*Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *2* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development 20 -10* *Would you like to proceed? y/n* *n* *Development cancelled. Going back to development menu.* *Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.*	*Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *2* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development 20 -10* *Would you like to proceed? y/n* *n* Development cancelled. Going back to development menu. Development cancelled. Going back to development menu. Development cancelled. Going back to development menu.	FAIL (doesn't return to dev menu and is in a contineous loop)
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu.Player developing LUNAR LANDERS DEPLOYMENT "3"	Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS 11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS 3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player turn menu. 3 Block 12 Lunar landers Deployment has a 3 tier development cost of 20 Your resources are: Current After Development 20 0 Are you sure you want to develop this block? y/n n Development cancelled. Going back to development menu. Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS 11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS 3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player turn menu.	Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS 11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS 3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player turn menu. 3 Block 12 Lunar landers Deployment has a 3 tier development cost of 20 Your resources are: Current After Development 20 0 Are you sure you want to develop this block? y/n n Development cancelled. Going back to development menu. Option: Block No. Block Title Development Tier System 10 Gateway Fully Developed GATEWAYANDLUNARLANDERS 11 Lunar landers Fully Developed GATEWAYANDLUNARLANDERS 3 12 Lunar landers Deployment 2 GATEWAYANDLUNARLANDERS Press '0' to exit development and return to the player	Pass returns to dev meu

Appendix I testing

Test Case ID	G3-0009	Test Case Description	Play Game : Player Turn Develop space suit system		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Conor	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names
Test Scenario	

S #	Test Data
1	y valid input
2	n valid input
3	a invalid input
4	0 invalid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player can continue to develop a block of their system. Once developed no further development permited. Player developing COOLING GARMENT "2"	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 8 PLSS 0 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1 Block 8 PLSS has a 1 tier development cost of 2 Your resources are: Current After Development 649 647 Are you sure you want to develop this block? y/n y Development complete: laura has developed the PLSS block! PLSS block new development tier: 1 Option: Block No. Block Title Development Tier System 1 8 PLSS 1 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1 Block 8 PLSS has a 2 tier development cost of 2 Your resources are: Current After Development 647 645 Are you sure you want to develop this block? y/n y Development complete: laura has developed the PLSS block! PLSS block new development tier: 2 Option: Block No. Block Title Development Tier System 1 8 PLSS 2 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1	---------- *Development* ---------- *Which of your Blocks would you like to develop?* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 0 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1* *Block 8 PLSS has a 1 tier development cost of 2* *Your resources are: Current After Development* *649 647* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the PLSS block!* *PLSS block new development tier: 1* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 1 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1* *Block 8 PLSS has a 2 tier development cost of 2* *Your resources are: Current After Development* *647 645* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the PLSS block!* *PLSS block new development tier: 2* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 2 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1* *Block 8 PLSS has a 3 tier development cost of 2* *Your resources are: Current After Development* *645 643*	Pass

Appendix I testing

	On player turn player can continue to develop a block of their system. Once developed no further development permited. Player developing PLSS "1"	*Major Development complete: laura has fully developed the PLSS block!* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 1 tier development cost of 2* *Your resources are: Current After Development* *640 638* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 1* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 1 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 2 tier development cost of 2* *Your resources are: Current After Development* *638 636* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 2* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 2 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 3 tier development cost of 2*	*Major Development complete: laura has fully developed the PLSS block!* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 1 tier development cost of 2* *Your resources are: Current After Development* *640 638* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 1* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 1 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 2 tier development cost of 2* *Your resources are: Current After Development* *638 636* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 2* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 2 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 3 tier development cost of 2* *Your resources are: Current After Development* *636 634* *Are you sure you want to develop this block? y/n*	Pass
1	On player turn player can continue to develop a block of their system. Player is displayed resource cost. If they decline they should be returned to deveopment menu	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n n Development cancelled. Going back to development menu. Option: Block No. Block Title Development Tier System 1 8 PLSS 0 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n n Development cancelled. Going back to development menu. Option: Block No. Block Title Development Tier System 1 8 PLSS 0 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT	Pass
1	On player turn player can continue to develop a block of their system. Player is displayed resource cost. If they enter anything other than y/n they should be notified and asked to re-enter valid input input "a"	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n a Incorrect Input: Enter 'y' for Yes or 'n' for No	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n a Incorrect Input: Enter 'y' for Yes or 'n' for No	Pass
1	On player turn player can continue to develop a block of their system. Player is displayed resource cost. If they enter anything other than y/n they should be notified and asked to re-enter valid input "0"	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n 0 Incorrect Input: Enter 'y' for Yes or 'n' for No	Block 8 PLSS has a 1 tier development cost of 10 Your resources are: Current After Development 90 80 Are you sure you want to develop this block? y/n 0 Incorrect Input: Enter 'y' for Yes or 'n' for No	Pass

Test Case ID	G3-0009	Test Case Description	Play Game : Player Turn Develop space suit system		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player can continue to develop a block of their system. Once developed no further development permited. Player developing COOLING GARMENT "2"	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 8 PLSS 0 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1 Block 8 PLSS has a 1 tier development cost of 2 Your resources are: Current After Development 649 647 Are you sure you want to develop this block? y/n y Development complete: laura has developed the PLSS block! PLSS block new development tier: 1 Option: Block No. Block Title Development Tier System 1 8 PLSS 1 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1 Block 8 PLSS has a 2 tier development cost of 2 Your resources are: Current After Development 647 645 Are you sure you want to develop this block? y/n y Development complete: laura has developed the PLSS block! PLSS block new development tier: 2 Option: Block No. Block Title Development Tier System 1 8 PLSS 2 SPACESUIT 2 9 Cooling Garment 0 SPACESUIT Press '0' to exit development and return to the player turn menu. 1	---------- *Development* ---------- *Which of your Blocks would you like to develop?* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 0 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1* *Block 8 PLSS has a 1 tier development cost of 2* *Your resources are: Current After Development* *649 647* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the PLSS block!* *PLSS block new development tier: 1* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 1 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1* *Block 8 PLSS has a 2 tier development cost of 2* *Your resources are: Current After Development* *647 645* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the PLSS block!* *PLSS block new development tier: 2* *Option: Block No. Block Title Development Tier System* *1 8 PLSS 2 SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *1*	Pass
	On player turn player can continue to develop a block of their system. Once developed no further development permited. Player developing PLSS "1"	*Major Development complete: laura has fully developed the PLSS block!* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 1 tier development cost of 2* *Your resources are: Current After Development* *640 638* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 1* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 1 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 2 tier development cost of 2* *Your resources are: Current After Development* *638 636* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 2* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 2 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 3 tier development cost of 2*	*Major Development complete: laura has fully developed the PLSS block!* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 0 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 1 tier development cost of 2* *Your resources are: Current After Development* *640 638* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 1* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 1 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 2 tier development cost of 2* *Your resources are: Current After Development* *638 636* *Are you sure you want to develop this block? y/n* *y* *Development complete: laura has developed the Cooling Garment block!* *Cooling Garment block new development tier: 2* *Option: Block No. Block Title Development Tier System* *8 PLSS Fully Developed SPACESUIT* *2 9 Cooling Garment 2 SPACESUIT* *Press '0' to exit development and return to the player turn menu.* *2* *Block 9 Cooling Garment has a 3 tier development cost of 2*	Pass

Appendix I testing

Test Case ID	G3-0010	Test Case Description	Play Game : Player Turn Develop Orion		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Michelle	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player lands on an Orion square that has not already been invested in by another player. Player wishes to invest in the system.	*1* *This is the ORION system.* *Cost of system investment is: 100* *Your resources are: Current After Investment* *350 250* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)* ***y*** *Investment complete: L now owns the ORION system.* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	*1* *This is the ORION system.* *Cost of system investment is: 100* *Your resources are: Current After Investment* *350 250* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)* *y* *Investment complete: L now owns the ORION system.* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	Pass
2	Having already invested in Orion. The player is going to develop a block	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 5 Service Module 0 ORION 2 6 Crew Module 0 ORION Press '0' to exit development and return to the player turn menu. 1 Block 5 Service Module has a 1 tier development cost of 200 Your resources are: Current After Development 250 50 Are you sure you want to develop this block? y/n	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 5 Service Module 0 ORION 2 6 Crew Module 0 ORION Press '0' to exit development and return to the player turn menu. 1 Block 5 Service Module has a 1 tier development cost of 200 Your resources are: Current After Development 250 50 Are you sure you want to develop this block? y/n	Pass
3	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures if insufficent they will be returned to the development menu	*Development complete: L has developed the Service Module block!* *Service Module block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.* *4* *This block is ready for a major development.* *Major Development will cost 300* *You do not have enough hours to develop this component.* *You need at least 101 more hours to make this development in this component, and avoid bankruptcy.* *Returning to development menu....* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.*	*Development complete: L has developed the Service Module block!* *Service Module block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.* *4* *This block is ready for a major development.* *Major Development will cost 300* *You do not have enough hours to develop this component.* *You need at least 101 more hours to make this development in this component, and avoid bankruptcy.* *Returning to development menu....* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.*	Pass

Appendix I testing

Test Case ID	G3-0010	Test Case Description	Play Game : Player Turn Develop Orion		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	FAIL

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player lands on an Orion square that has not already been invested in by another player. Player wishes to invest in the system.	*1* *This is the ORION system.* *Cost of system investment is: 100* *Your resources are: Current After Investment* *350 250* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)* ***y*** *Investment complete: L now owns the ORION system.* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game*	*1* *This is the ORION system.* *Cost of system investment is: 100* *Your resources are: Current After Investment* *350 250* *Would you like to invest in this system? Enter 'y' or 'n'. (Only you will be able to develop blocks in this system)* *y* *Investment complete: L now owns the ORION system.* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game*	Pass
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu. Player developing LUNAR LANDERS "2"	*Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System* *10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *2* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development* *20 -10* *Would you like to proceed? y/n* *n* *Development cancelled. Going back to development menu.* *Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System* *10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3*	*Development complete: laura has developed the Lunar landers block!* *Lunar landers block new development tier: 3* *Option: Block No. Block Title Development Tier System* *10 Gateway Fully Developed GATEWAYANDLUNARLANDERS* *2 11 Lunar landers 3 GATEWAYANDLUNARLANDERS* *3 12 Lunar landers Deployment 1 GATEWAYANDLUNARLANDERS* *Press '0' to exit development and return to the player turn menu.* *2* *This block is ready for a major development.* *Major Development will cost 30* *Your resources are: Current After Major Development* *20 -10* *Would you like to proceed? y/n* *n* Development cancelled. Going back to development menu. Development cancelled. Going back to development menu. Development cancelled. Going back to development menu.	FAIL (doesn't return to dev menu and is in a contineous loop)

Appendix I testing

2	Having already invested in Orion. The player is going to develop a block	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 5 Service Module 0 ORION 2 6 Crew Module 0 ORION Press '0' to exit development and return to the player turn menu. 1 Block 5 Service Module has a 1 tier development cost of 200 Your resources are: Current After Development 250 50 Are you sure you want to develop this block? y/n	---------- Development ---------- Which of your Blocks would you like to develop? Option: Block No. Block Title Development Tier System 1 5 Service Module 0 ORION 2 6 Crew Module 0 ORION Press '0' to exit development and return to the player turn menu. 1 Block 5 Service Module has a 1 tier development cost of 200 Your resources are: Current After Development 250 50 Are you sure you want to develop this block? y/n	
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu. Player developing ORION	*Development complete: L has developed the Service Module block!* *Service Module block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.* *4* *This block is ready for a major development.* *Major Development will cost 300* *Your resources are: Current After Major Development* *140 -160* *Would you like to proceed? y/n* *n* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.*	*Development complete: L has developed the Service Module block!* *Service Module block new development tier: 3* *Option: Block No. Block Title Development Tier System* *1 2 RS-25 Engines 0 SLS* *2 3 Solid Rocket Boosters 0 SLS* *3 4 Orion adapter 0 SLS* *4 5 Service Module 3 ORION* *5 6 Crew Module 0 ORION* *Press '0' to exit development and return to the player turn menu.* *4* *This block is ready for a major development.* *Major Development will cost 300* *Your resources are: Current After Major Development* *140 -160* *Would you like to proceed? y/n* *n* *Development cancelled. Going back to development menu.* *Development cancelled. Going back to development*	FAIL (doesn't return to dev menu and is in a contineous loop)

Appendix I testing

Test Case ID	G3-0011	Test Case Description	Play Game : Player Turn Develop SLS		
Created By	Laura	Reviewed By	Team 3	Version	2

QA Tester's Log

Tester's Name	Sancha	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names
Test Scenario	

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player lands on an SLS square that has not already been invested in by another player. Player wishes to invest in the system.	*1* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current After Investment* *200 190* *Would you like to invest in this system? Enter 'y' or 'n'.* *(Only you will be able to develop blocks in this system)* *Y* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *y* *Investment complete: player now owns the SLS system.*	*1* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current After Investment* *200 190* *Would you like to invest in this system? Enter 'y' or 'n'.* *(Only you will be able to develop blocks in this system)* *Y* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *y* *Investment complete: player now owns the SLS system.*	Pass
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu. Player developing SLS	*Major Development complete: laura has fully developed the Solid Rocket Boosters block!* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.* *3* *Block 4 Orion adapter has a 1 tier development cost of 20* *Your resources are: Current After Development* *10 -10* *Are you sure you want to develop this block? y/n* *n* *Development cancelled. Going back to development menu.* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.*	*Major Development complete: laura has fully developed the Solid Rocket Boosters block!* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.* *3* *Block 4 Orion adapter has a 1 tier development cost of 20* *Your resources are: Current After Development* *10 -10* *Are you sure you want to develop this block? y/n* *n* *Development cancelled. Going back to development menu.* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.*	Pass

Appendix I testing

Test Case ID	G3-0011	Test Case Description	Play Game : Player Turn Develop SLS		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 12, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On player turn player lands on an SLS square that has not already been invested in by another player. Player wishes to invest in the system.	*1* *This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current After Investment* *200 190* *Would you like to invest in this system? Enter 'y' or 'n'.* *(Only you will be able to develop blocks in this system)* *Y* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *y* *Investment complete: laura now owns the SLS system.*	*1 This is the SLS system.* *Cost of system investment is: 10* *Your resources are: Current After Investment* *200 190* *Would you like to invest in this system? Enter 'y' or 'n'.* *(Only you will be able to develop blocks in this system)* *Y* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *y* *Investment complete: laura now owns the SLS system.*	Pass
1	In player turn, player can continue to develop blocks in their system while they have sufficent "hours" to develop the block. Before commiting to investment player is notified current resoures and after development resources. If a player declines to invest the player should be returned to development menu. Player developing SLS	*Major Development complete: laura has fully developed the Solid Rocket Boosters block!* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.* *3* *Block 4 Orion adapter has a 1 tier development cost of 20* *Your resources are: Current After Development* *10 -10* *Are you sure you want to develop this block? y/n* *n* *Development cancelled. Going back to development menu.* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.*	*Major Development complete: laura has fully developed the Solid Rocket Boosters block!* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.* *3* *Block 4 Orion adapter has a 1 tier development cost of 20* *Your resources are: Current After Development* *10 -10* *Are you sure you want to develop this block? y/n* *n* *Development cancelled. Going back to development menu.* *Option: Block No. Block Title Development Tier System* *2 RS-25 Engines Fully Developed SLS* *3 Solid Rocket Boosters Fully Developed SLS* *3 4 Orion adapter 0 SLS* *Press '0' to exit development and return to the player turn menu.*	Pass

Appendix I testing

Test Case ID	G3-0012	Test Case Description	Game Over- Player ends game		
Created By	Laura	Reviewed By	Team 3	Version	1

QA Tester's Log

Tester's Name	Laura	Date Tested	April 18, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names

Test Scenario

S #	Test Data
1	y valid input
2	n valid input
3	N invalid
4	0 invalid

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	On PlayerTurn player decides to end the game.	What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game 5: Show all players positions on the board 6: Display Game Rules 4 This will end the game for everyone, are you sure you want to end the game? Enter y/n	*What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules* *4* *This will end the game for everyone, are you sure you want to end the game?* *Enter y/n*	Pass
2	On PlayerTurn player decides to end the game. When ased if they are sure they enter "n"	*n* *Play on...* *One's hours: 120* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	*n* *Play on...* *One's hours: 120* *What would you like to do? Select option from below:* *2: Development options* *3: End Turn* *4: End Game* *5: Show all players positions on the board* *6: Display Game Rules*	Pass
2	On PlayerTurn player decides to end the game. When ased if they are sure they enter "N"	*This will end the game for everyone, are you sure you want to end the game?* *Enter y/n* *N* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:*	*This will end the game for everyone, are you sure you want to end the game?* *Enter y/n* *N* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:*	Pass
2	On PlayerTurn player decides to end the game. When ased if they are sure they enter "0" invalid	*Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *0* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:*	*Incorrect input. Please enter either 'y' for Yes or 'n' for No:* *0* *Incorrect input. Please enter either 'y' for Yes or 'n' for No:*	Pass
2	On PlayerTurn player decides to end the game. When ased if they are sure they enter "y" valid	*##* *################## Game over ##################* *##* *Players end of game summary: SUMMARY DISPLAYED* *Final Leader Board:* *Rank Name Final Score* *1 One 300* *2 Two 200* *One is the winner!* *---* *Thank you for playing ArtemisLite....* *Developers....* *Conor Braldey* *Michelle Oakes* *Sancha O'Neill* *Laura Gaffey* *1: Start new game* *2: Game manual/rules* *3: Game credits* *4: Exit* *Please enter your desired option 1 - 4:*	*##* *################## Game over ##################* *##* *Players end of game summary: NOTE SUMMARY DISPLAYED ON IDE* *Final Leader Board:* *Rank Name Final Score* *1 One 300* *2 Two 200* *One is the winner!* *---* *Thank you for playing ArtemisLite....* *Developers....* *Conor Braldey* *Michelle Oakes* *Sancha O'Neill* *Laura Gaffey* *1: Start new game* *2: Game manual/rules* *3: Game credits* *4: Exit* *Please enter your desired option 1 - 4:*	Pass

Appendix I testing

Test Case ID	G3-0013	Test Case Description	Game Over Players reach the moon		
Created By	Laura	Reviewed By	Team 3	Version	1

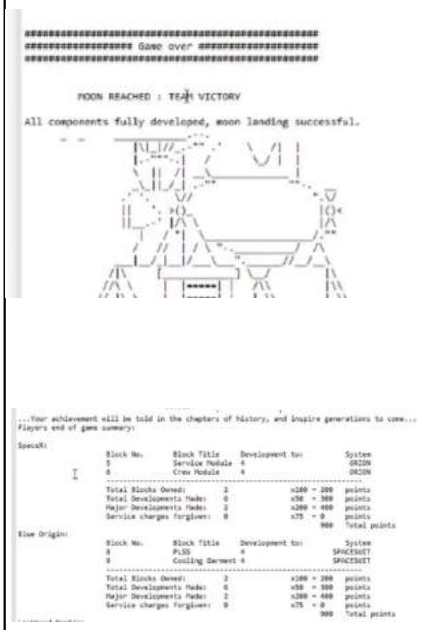
QA Tester's Log

Tester's Name	Conor	Date Tested	April 20, 2021	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:
1	Access to IDE
2	Access to artemisLite Game packgage
3	Select new game
4	Enter valid number of players
5	Enter valid player names
6	All systems full developed

Test Scenario

S #	Test Data

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	All systems developed fully.	Should display game over, a short narrative and also a summary for each player's developments.		PASS

Appendix I testing

Report from group's SBT meetings

Bugs found	Bugs fixed during SBT
Players manual need to be able to return to main menu	✓
If at start of game there are no credits (or players) so maybe add return message "no info yet" then return to main menu	✓
0 players – rolls dice then program falls over	✓
5 players will allow you to enter names then it falls over when it tries to enter the 5th player	✓
"a" or any other non int fails here because scanner is set to `userSetUpInput = scanner.nextInt();`	✓
Invalids need "Invalid entry try again" prompt	✓
If you put in your name with a space eg "Laura Gaffey" it thinks its 2 names e.g player1 "Laura" player2 "Gaffey". Maybe scanner reads scanner.nextline() (I tried this it fell over) rather than scanner.next(); or if that's an issue when asking for name just say one word 😊	✓
I entered 2 players with names player 1 "Laura" and player 2 "Birdie". Then we coincidentally both rolled the same total on the dice. But "Laura" went first	✓
If you enter a string "a" there is an error (pick 1-3 during player turn)	✓
Select 4 end game not yet finished.	✓

Also if you enter 2 it displays this:
`---`
`Development`
`---`
`Which of your Blocks would you like to develop?`
 	
`Option: Block No. Block Title Development Tier System`
`Press '0' to exit development and return to the player turn menu.`
	✓

See below don't think "Chris" got charged for landing on my block
`What would you like to do? Select option from below:`
`2: Development options`
`3: End Turn`
`4: End Game`
	✓

Laura owns this block. The service charge for this block is 50. Laura do you wish to collect this charge? Enter 8 to make the charge, or 9 to not make the charge. 8 Service charge made. Chris's hours is now: 200 Chris's hours is now: 200 What would you like to do? Select option from below: 2: Development options 3: End Turn 4: End Game	
didn't have enough money to invest but entered (y) as (n) throws an error. In other devs this doesn't happen but here we are getting an error (code at 1 below)	✓
didn't have enough money to invest but entered n. The program then went into an infinite loop (code at 2 below)	✓
Press 2 or 3 in game manual, the menu does not repeat	✓
Press 3 to show game credits need written	✓
Enter player of numbers (1-4), can input 0 and 5. Need error handling to re ask for no between 1 -4 as will get out of bounds if 0	✓
Need start message of game	✓
What happens if more than 1 player rolls the same number e.g. 2 people roll an 8, who goes first	✓
Test dice roll works with more than 1 player	✓
Doesn't allow you to end game when you select 4 : "Incorrect input... Please enter specified numbers for desired option."	✓
If user accidentally presses anything other than 0 falls over (code at 3 below)	✓
Service charge was not deducted	✓
Can't allow 2 people with the same name	✓

1.

```
Development complete: laura has developed the Lunar landers Deployment block!
Lunar landers Deployment block new development tier: 3
Option:         Block No.       Block Title     Development Tier          System
                8               PLSS            Fully Developed       SPACESUIT
                9               Cooling Garment Fully Developed       SPACESUIT
                10              Gateway         Fully Developed
GATEWAYANDLUNARLANDERS
                11              Lunar landers   Fully Developed
GATEWAYANDLUNARLANDERS
5               12              Lunar landers Deployment 3
GATEWAYANDLUNARLANDERS
Press '0' to exit development and return to the player turn menu.
5
This block is ready for a major development.
Major Development will cost 30
Your resources are:  Current             After Major Development
                     30                  0
Would you like to proceed? y/n
y
You do not have enough hours to invest in this system.
Exception in thread "main" java.lang.IndexOutOfBoundsException: Index 12 out of
bounds for length 12
      at
java.base/jdk.internal.util.Preconditions.outOfBounds(Preconditions.java:64)
      at
java.base/jdk.internal.util.Preconditions.outOfBoundsCheckIndex(Preconditions.java
:70)
      at
java.base/jdk.internal.util.Preconditions.checkIndex(Preconditions.java:248)
      at java.base/java.util.Objects.checkIndex(Objects.java:372)
      at java.base/java.util.ArrayList.get(ArrayList.java:459)
      at artemisLite.ArtemisLite.developBlock(ArtemisLite.java:688)
      at artemisLite.ArtemisLite.playerTurn(ArtemisLite.java:488)
      at artemisLite.ArtemisLite.playGame(ArtemisLite.java:342)
      at artemisLite.ArtemisLite.main(ArtemisLite.java:56)
```

2.

```
Development complete: L has developed the Service Module block!
Service Module block new development tier: 3
Option:         Block No.       Block Title     Development Tier
System
1               2               RS-25 Engines   0
SLS
2               3               Solid Rocket Boosters 0
SLS
3               4               Orion adapter   0
SLS
4               5               Service Module  3
ORION
5               6               Crew Module     0
ORION
Press '0' to exit development and return to the player turn menu.
4
This block is ready for a major development.
Major Development will cost 300
```

```
Your resources are:  Current              After Major Development
                     140                  -160
Would you like to proceed? y/n
n
Development cancelled. Going back to development menu.
Development cancelled. Going back to development menu.
Development cancelled. Going back to development menu.
Development cancelled. Going back to development menu.
```

3.

Appendix II Weekly team minutes

Minutes for Group 3 Week commencing 18.01.21 Date of this minute 21.01.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Sancha O'Neill	*Sancha O'Neill*
Conor Bradley	*Conor Bradley*
Laura Gaffey	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 1st meeting to introduce ourselves and have a brief chat about our understanding of the project.
- Agreed to schedule 2 short meetings per week (Tuesday and Thursday).
- Team to individually think about game design and discuss further at next meeting (Tuesday 26th)
- Ideally want to progress project in line with what is being taught during software engineering lectures.

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):
- *MO – analysis of project requirement document / game design proposals*

Name & Role (2):
- *SON – analysis of project requirement document / game design proposals*

Name & Role (3):
- *CB - analysis of project requirement document / game design proposals*

Name & Role (4):
- *LG - analysis of project requirement document / game design proposals*

Minutes for Group 3 Week commencing 25.01.2021 Date of this minute 26.01.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting *(Briefly list the progress for each team member in the last week.*)*

- 2nd group meeting
- Reviewed individual analysis of requirements document to find common ideas and discuss game implementation based on requirements agreed
- Reviewed draft lucid chart document CB designed
- Discussed design generally re:
  - no of squares
  - too many squares in first design
  - team player game (all work collectively) or each person races to moon
  - with regards to resources. The players can keep the ones they have collected and build on this for each round/ mission
  - players could be people with relevant backgrounds who work together to achieve the end goal. Similar to cludo; each player has a profile which helps in the building and collection of resources e.g. software engineer, aerospace engineer, biomedical scientist and physicists
  - Include "helper" cards to get to certain places e.g. "jump to JPL"
- Discussed gantt chart
- LG to prepare outline of one
- Use case: start modelling next week (W/C 01.02.2021)
- SON to prepare mins of this meeting

Name & Role (1):

- *SON – detailed initial analysis of requirements document*

Name & Role (2):

- *MO – detailed initial analysis of requirements document*

Name & Role (3):

- *CB - detailed initial analysis of requirements document*

Name & Role (4):

- *LG -*
- *detailed initial analysis of requirements document*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *SON – development of game design proposal*
- *Initial use case design*

Name & Role (2):

- *MO – development of game design proposal*
- *Initial use case design*

Name & Role (3):

- *CB - development of game design proposal*
- *Initial use case design*

Name & Role (4):

- *LG - development of game design proposal*
- *Initial use case design*

Minutes for Group 3 Week commencing 25.01.2021 Date of this minute 28.01.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 3rd group meeting
- Discussed and reviewed game design based on current ideas:
  - If players are assigned roles (Software Engineer, physicist etc) will play be possible for 1 player game. Roles in play needs to be defined, do they work as a team or as individuals – requires all 4 players
  - Should the game be a compulsory 4 player game to inclused all roles
  - Improve to design if the game is operational for 1 up to 4 players iclusive
  - Need to focus on one start point and one end point – game can become too complex
  - Determine how the game is one – is it who reached the moon first, if game is not complete whi has the most resources
  - 3 stages to game – Artemis 1, 2, 3 enter the game at stage of choice to accelerate play. Create a stage once and replicate it from an Artemis superclass, subclasses can contain unique features

- Consider the operation of the game, simplify the stages of play before adding detail
- Resources – can players trade amongst eachother during play, what are required to make equipment needted to progress in the game
- Start modelling from step 3 and add in previous steps

· Each member will create their own sketch of how the game will unfold – consider and collate ideas at next meeting
· Use case: consider following Software Engineering lecture today
· MO to prepare mins of this meeting

Name & Role (1):
· *SON – presented initial game design proposal based on agreed requirements*

Name & Role (2):
· *LG - presented initial game design proposal based on agreed requirements*

Name & Role (3):
· *CB - presented initial game design proposal based on agreed requirements*

Name & Role (4):
· *MO – presented initial game design proposal based on agreed requirements*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):
· *SON – further development of game design proposal*
· *Development of use case design*

Name & Role (2):
· *LG - further development of game design proposal*
· *Development of use case design*

Name & Role (3):
· *CB - further development of game design proposal*
· *Development of use case design*

Name & Role (4):
· *MO – further development of game design proposal*
· *Development of use case design*

Minutes for Group 3 Week commencing 01.02.2021 Date of this minute 02.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- *Forth group meeting*
- *Reviewed and discussed SO's initial game steps mock up.*
- *Discussed in general what some of the Use-Cases may be, such as Player turn.*
- *Initial thoughts are that since there seems to be essentially only one actor (player) and one overarching event that's repeated (player turn) that many use-cases can be abstracted away leaving a fairly simple use-case diagram.*
- *Determined to review more in depth the project requirements in the ArtemisLite project overview pdf in canvas in order to determine the key features and events of each turn while incorporating some of our original ideas.*
- *Will run our initial thoughts and layout across the advisory board upon first meeting, and plan further steps forward from there.*

Name & Role (1):

- *SON – Development of use case design - use case diagram developed following group review and discussion of work completed to date*

Name & Role (2):

- *LG - Development of use case design - use case diagram developed following group review and discussion of work completed to date*

Name & Role (3):

- *CB - Development of use case design - use case diagram developed following group review and discussion of work completed to date*

Name & Role (4):

- *MO – Development of use case design - use case diagram developed following group review and discussion of work completed to date*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *SON – continual development of game design proposal*
- *Development of use cases / use case descriptions*

Name & Role (2):

- *LG – continual development of game design proposal*
- *Development of use cases/ use case descriptions*

Name & Role (3):

- *CB – continual development of game design proposal*
- *Development of use cases / use case descriptions*

Name & Role (4):

- *MO – continual development of game design proposal*
- *Development of use cases / use case descriptions*

Minutes for Group 3 Week commencing 01.02.21 Date of this minute 04.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Sancha O'Neill	*Sancha O'Neill*
Conor Bradley	*Conor Bradley*
Laura Gaffey	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- *5th group meeting*
- *Discussed how the game would develop – initial set up, determine how players will take turns, roll the dice,*
- *How will the winner be determined, block allocation, resources: introduce the idea od Software Engineers, Scientists – what weighting would each individual have*
- *Create use case in lucid chart for next week group meeting for group discussion and analysis*

Name & Role (1):

- *SON – presentation to the group of case design / use case descriptions*

Name & Role (2):

- *LG - presentation to the group of case design / use case descriptions*

Name & Role (3):

- *CB - develop use case design presentation to the group of case design / use case descriptions*

Name & Role (4):

- *MO – presentation to the group of case design / use case descriptions*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *SON – continual development of game design proposal / resources*
- *Further development of use cases / use case descriptions*

Name & Role (2):

- *LG – continual development of game design proposal / resources*
- *Further development of use cases/ use case descriptions*

Name & Role (3):

- *CB – continual development of game design proposal / game set up*
- *Further development of use cases / use case descriptions*

Name & Role (4):

- *MO – continual development of game design proposal /game set up*
- *Further development of use cases / use case descriptions*

Minutes for Group 3 Week commencing 08.08.2021 Date of this minute 09.02.21 (Tues 2PM)

The following team members were present

Michelle Oakes	*Michelle Oakes*
Sancha O'Neill	*Sancha O'Neill*
Conor Bradley	*Conor Bradley*
Laura Gaffey	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 6th group meeting
- Discussed and reviewed game design based on current ideas:
- Administrator – should the administrator track the position of players / resources: Display Function
- Use Cae Diagram: 1 elispe = take a turn
  - Roll Dice: is this part of the normal flow of a players turn
  - Should player turn include all details of take a turn

- Attended meeting with advisor Micheal: things to consider for the game/use case diagram
  - Do players have different roles: Banker has a role, players have a role – same actor?
  - Develop element – major / minor element: monolply houses/hotels
  - How many major developments can you build – 1 or more than 1
  - Moving and roll dice are part of the same use case – can you move without rolling the dice or roll the dice without moving.
  - The use case is a HIGH LEVEL FEATURE LIST
  - Amazon – not many use cases for such a large organisation: refund would be part of a different flow not a use case (logged in vs not logged in
  - Actions are included in the use case description
  -
- Michael reviewed 3 use cases that we had drawn up
  - Display – not a use case (a player would not intend something not to be displayed – feedback to the player
  - Part of Take Turn – describe display in the use case description it is a feature of a use case
  - Take turn – Develop inside or as a separate mini use case
  - AFI: if x happens call the sub use case
  - Can encapsulate a lot of the game in one use case: Player Turn
  - Put extension points into the use case description
- Team crated a refined use case form Michaels feedback which is a simplified version of previous designs
- Use case: cask Michael to review at next advisor meeting on Tuesday 16th.
- Continue to work on use case descriptions, consider class diagram and sequence diagram
- MO to prepare mins of this meeting
- Reviewed and discussed further about game development and use case diagrams
- Agreed to individually explore use case diagram and develop one each then discuss on the 9th of February
- Further review game requirements with a view to agree game design meeting the clients requirements.

Name & Role (1):

- *SON – Use case diagram created collectively following advisors feedback*
- *Develop use case descriptions*

Name & Role (2):

- *LG - Use case diagram created collectively following advisors feedback*
- *Develop use case descriptions*

Name & Role (3):

- *CB - Use case diagram created collectively following advisors feedback*

Name & Role (4):

- *MO – Use case diagram created collectively following advisors feedback*
- *Develop use case descriptions*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *SON – continual development of game design proposal / resources*
- *Develop use case descriptions bases on use case diagram*

Name & Role (2):

- *MO – continual development of game design proposal /game set up*
- *Develop use case descriptions bases on use case diagram*

Name & Role (3):

- *CB – continual development of game design proposal / game set up*
- *Develop use case descriptions bases on use case diagram*

Name & Role (4):

- *LG – continual development of game design proposal / resources*
- *Develop use case descriptions bases on use case diagram*

Minutes for Group 3 Week commencing 08.02.2021 Date of this minute 11.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 7th group meeting
- Discussion of game
- Pass go, get X each time - how many resources will be allocated to each player
- Discussed ownership / block development / major development
- Invest small amount and whoever invest in more squares in that block wins the chace to own the whole block?
- Make it a gamble for players - no guarantee that a block can be secured

Mins of meeting with advisor 09.02.21 at 14:33

- *Keep it simple for now*
- *Hit all in specification right now: main focus*
- *Discuss use cases*
- *Can have separate use cases for branching of e.g. take turn or alternate flow*

Name & Role (1):

- *SON – development of ideas on resource allocation / weighting / determining ownership*

Name & Role (2):

- *MO – development of ideas on resource allocation / weighting / determining ow*

Name & Role (3):

- *CB – development of ideas on resource allocation / weighting / determining ownership*

Name & Role (4):

- *LG – development of ideas on resource allocation / weighting / determining ownership*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *MO – Develop sequence diagrams - start game / roll dice*

Name & Role (2):

- *LG - Develop use sequence diagrams - player turn*

Name & Role (3):

- *CB - Develop use sequence diagrams – player resources*

Name & Role (4):

- *SON – Develop sequence diagrams – block developments*

Minutes for Group 3 Week commencing 16.02.21 Date of this minute 22.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 8th group meeting – brief discussion at 9.30 followed by further discussions with Michael (advisor at 2pm) followed by quick team debrief.
-
- Attended meeting with advisor Micheal: things to consider for the game/use case diagram

- Team agreed to revisit use case diagram.
- Team progressing to look at class diagrams, sequencing diagrams and creating some classes in java.

Mins of meeting with advisor 16.02.21 at 14:28

- Meet with advisor to discuss use case diagram and descriptions
- Discuss use case diagram
- Player turn; there is a precondition that the game has been set up
- Use case: functionality that client can do. What is useful to a client.
- Go through requirements: if function there, make it a use case

Name & Role (1):blocks

- *SON – initial ideas for sequence diagrams – block developments*

Name & Role (2):

- *LG - initial ideas for sequence diagrams - player turn*

Name & Role (3):

- *CB - initial ideas for sequence diagrams – player resources*

Name & Role (4):

- *MO – initial ideas for sequence diagrams - start game*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *MO – Develop sequence diagrams - start game / roll dice*
- *Consider how all game play will interact and combine*

Name & Role (2):

- *LG - Develop use sequence diagrams - player turn*
- *Consider how all game play will interact and combine*

Name & Role (3):

- *CB - Develop use sequence diagrams – player resources*
- *Consider how all game play will interact and combine*

Name & Role (4):

- *SON – Develop sequence diagrams – block developments*
- *Consider how all game play will interact and combine*

Minutes for Group 3 Week commencing 22.02.2021 Date of this minute 23.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*

Appendix II *Meeting minutes*

Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting *(Briefly list the progress for each team member in the last week.*)*

- 9th group meeting
- Reviewed SO'N draft sequence diagrams.
- Discussed the possibility of the need to specify the alternate flow types in the use case descriptions. E.g. a gameplay flow vs an implementation(error) flow.
- S'ON suggests amalgamating sequence diagrams into one single flow for a single player's turn and the different actions they could perform. Team will meet Thursday to develop a master diagram together.
- Team to continue to develop use case descriptions and remain vigilant for "common nouns" or commonly mentioned behaviours which could be the basis of further use cases or methods within our classes.
-

Mins of meeting with advisor 23.02.21 at 14:28

- Use cases: things you want to use system for
- Have set up and take turn as use cases
- Don't have display game rules and balance off take turn but do need it somewhere
- End game isn't a use case
- Would you use the game to end it ?
- Use case diagram: purely what is useful for the client. What the system can do for the client
- End game can be a use case
- Pass go: not a use case
- Can explain why you have picked a use case as one
- Update resources not relevant to user
- 5 eclipses is enough
- Domain model: MD not aware of them so can't comment
- Sequence diagram discussed:
- Give resources: can start rolling dice from that
- Take out start game
- Update display – precision will be needed
- Update display, create new game object
- Need precision with regards to what is being sent back
- Create players and create board
- Set up game: need board and stuff first
- End game can be alternative flow; be clear when happening and when returning
- End game: who wins. Need a calculation with regards to that
- Player sequence diagram
- Manager moves people around board, allocate resources
- Resource manager not needed for dice roll

- Resource manager identify very specific tasks that they do
- Would need to be realised in use case diagrams and would need to be very obvs how that is happening
- Main components
- Bit of precision
- Identify what objects needed
- Looks good
- Show how these are options; syntax for showing options. In a UML book

Name & Role (1):

- *SON – presented initial sequence diagram designs*

Name & Role (2):

- *LG - presented initial sequence diagram designs*

Name & Role (3):

- *CB - presented initial sequence diagram designs*

Name & Role (4):

- *MO – presented initial sequence diagram designs*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1)

- *CB - Develop use sequence diagrams – player resources*
- *Consider how all game play will interact and combine*

Name & Role (2):

- *LG - Develop use sequence diagrams - player turn*
- *Consider how all game play will interact and combine*

Name & Role (3):

- *MO – Develop sequence diagrams - start game / roll dice*
- *Consider how all game play will interact and combine*

Name & Role (4):

- *SON – Develop sequence diagrams – block developments*
- *Consider how all game play will interact and combine*

Minutes for Group 3 Week commencing 22.02.2021 Date of this minute 25.02.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*

Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 10th group meeting
- Create sequence diagrams
- Write out basic steps (pseudo code) with group
- Think about what to use as resources over weekend
- Development of idea that initial resources given to players could be profiles e.g. scientist, astronaut etc
- Use money until solid foundation with game

Name & Role (1):

- *LG - Pseudo code for sequence diagrams to develop understanding of game play development*

Name & Role (2):

- *SON - Pseudo code for sequence diagrams to develop understanding of game play development*

Name & Role (3):

- *MO - Pseudo code for sequence diagrams to develop understanding of game play development*

Name & Role (4):

- *CB - Pseudo code for sequence diagrams to develop understanding of game play development*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1)

- *CB – Further development of sequence diagrams following group discussion and creation of pseudo code– player resources*
- *Consider how all game play will interact and combine*

Name & Role (2):

- *LG - Further development of sequence diagrams following group discussion and creation of pseudo code– - player turn*
- *Consider how all game play will interact and combine*

Name & Role (3):

- *MO – Further development of sequence diagrams following group discussion and creation of pseudo code– - start game / roll dice*
- *Consider how all game play will interact and combine*

Name & Role (4):

- *SON – Further development of sequence diagrams following group discussion and creation of pseudo code– – block developments*
- *Consider how all game play will interact and combine*

Minutes for Group 3 Week commencing 01.03.21 Date of this minute 02.03.21

The following team members were present

Name (printed/typed)	*Signature*
Laura Gaffey	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Michelle Oaks	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 11th group meeting
- Discuss where we are with regards to the project in general
- Game design point: the status of the player will determine what options the player has i.e. if they have the resources; they will be presented with develop/ invest/ do nothing or if a square is taken, invest will not be presented to the player as an option
- Discuss sequence diagram

Split player turn into separate sequence diagrams:

- Invest
- Develop
- Give resources
- No action

CB to do sequence diagram for develop

MO to do sequence diagram for start game

LG to do sequence diagram for player turn (alt flow and loop)

SON to do sequence diagram for invest, give resources and no action (update the current one)

Game design point: Don't return default

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1)

- *CB – Further development of sequence diagrams following group discussion and creation of pseudo code– player develop*
- *Consider how all game play will interact and combine*

Name & Role (2):

- *LG - Further development of sequence diagrams following group discussion and creation of pseudo code– - player turn*
- *Consider how all game play will interact and combine*

Name & Role (3):

- *MO – Further development of sequence diagrams following group discussion and creation of pseudo code– - start game / roll dice*
- *Consider how all game play will interact and combine*

Name & Role (4):

- *SON – Further development of sequence diagrams following group discussion and creation of pseudo code– – block developments*
- *Consider how all game play will interact and combine*

Mins of meeting with advisor 02.03.21 at 14:30

- Controller: use interface
- Look at design patterns
- https://github.com/RefactoringGuru/design-patterns-java
- https://blog.cleancoder.com/uncle-bob/2012/08/13/the-clean-architecture.html
- if you press a button to do it: use case
- validation for name
- Take turn, precondition that a game has been started
- Use case diagram: what you can do as an actor in the system
- One use case = one sequence diagram
- MD re group 3:
- LG player turn, can do something like that
- Develop game, player , 1,2,3,4 take turns until game over
- Good English explanations
- Good to have functions which are also invoked

- Alt flows re: what happens during players turn re developing squares and not developing squares
- Nail down use case diagram and descriptions first
- If player turn a use case, need to have alt flows in there
- CB makes sense : really good explanation
- Looks 100%
- Alt flows are repeated, alt if else and then below that repeated
- If have low level going through everything, don't need high level going through everything;
- Combine LG and CB uses cases
- In player turn : put in LG's use case roll dice, move and show where all different functions can be called
- That would verify UML makes sense
- RE method overloading. Use polymorphism , use displayable object
- Have one display object, have interface: display state/ print all
- Inside player, have functions for each thing player.ownBlock
- Look through design patterns to get a clean way to do this (worth lot of marks)

Minutes for Group 3 Week commencing 08.03.2021 Date of this minute 09.02.21 (Tues 9am & 1PM)

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting *(Briefly list the progress for each team member in the last week.*)*

- 12th group meeting
- Meeting with advisor(02/03), mentioned design patterns
  - Display method – display only information needed
- Time organisation for upcoming Sprints
  - Spreadsheet
  - Trello

- Items to focus on:
  - Relationship diagrams
  - Update use case descriptions based on sequence diagram
  - Look at Test Plans
    - How will we test
    - Create Test plans
    - Sample test cases
    - SON located test case template
- Sequence diagrams created by each member of the team relating to different sections of the game play
- Meeting again at 2pm to consolidate sequence diagrams: need to be consistent design
  - Discussed sequence diagrams
  - Revised the Start Game sequence diagram collectively
  - High level sequence diagram with element within broken into smaller sequence diagrams eg. Set up players, set up board

Notes from Advisor meeting general (Michael)

- Every use case needs a sequence diagram
- Use cae realisations – Class function- class holds variables
- Class relationship diagrams should match code exactly, realisations shows how code realises use cases
- Initial way – what is likely to come up Player – name (String), how to implement with use case realisations- try and step throught the turn, take turn function, game needs access to the dice (objects) may run into functions that you don't have – process back and forth
- Find out what you need to do in your functions – test driven development with specif outputs what should you get. N All diagrams may not fully represent thr system that you are making and may need to go back and review.

Notes from Advisor meeting specific (Michael)

- New diagram feedback
- Do we need separate diagrams with set up game?
- Function – set number of players (object): player set up own object?
  - Player Object: Player Factory: creates lots of objects: supply with names: create players from names
  - Include business rules in diagrams: business rules implemented in the code, if its important it should be in the diagram – validate object – enter string validate name (set uo game is small enough to include a validator – indicates it hs been thought about and is part of the setup.
  - Functions will be in class diagrams
- MO to prepare minutes

Name & Role (1)

- *CB – Review of work to date, meeting with advisor*
- *Consider how all game play will interact and combine*

Name & Role (2):

- *LG - Review of work to date, meeting with advisor*
- *Consider how all game play will interact and combine*

Name & Role (3):

- *MO – Review of work to date, meeting with advisor*
- *Consider how all game play will interact and combine*

Name & Role (4):

- *SON – Review of work to date, meeting with advisor*
- *Consider how all game play will interact and combine*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):
- *LG Player Turn Sequence Diagram*
- *LG: Pay resources Sequence Diagram*

Name & Role (2):
- *CB: High Level main Method Sequence Diagram*
- *CB Develop a Square Sequence Diagram*

Name & Role (3):
- *MO Start Game Sequence Diagram*
- *MO: Do Nothing Sequence Diagram*

Name & Role (4):
- *SON created initial sequence diagrams: following meeting with advisor details discussed and broken into sections*
- *SON: invest /do nothing Sequence Diagram*

Minutes for Group 3 Week commencing 08.03.2021 Date of this minute 09.03.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	Michelle Oakes
Conor Bradley	Sancha O'Neill
Laura Gaffey	Conor Bradley
Sancha O'Neill	Laura Gaffey

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 13th group meeting
  - Need to get use case diagram, UML, use case descriptions and class diagram all consistent with iterative changes
  - Start test plan – found template
  - Discuss CB diagram (advisor liked it so use as prototype for others)
  - Sequence diagram: just happy path
  - Look at start game
    Call main method: artemis lite to set up game
  - Every use case needs sequence diagram

- Update sequence diagrams

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):
- *LG: pay money sequence diagram*

Name & Role (2):
- *SON: invest sequence diagram*

Name & Role (3):
- *MO - do nothing option sequence diagram*

Name & Role (4):
- *CB high level overview sequence diagram*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Minutes for Group 3 Week commencing 08.03.2021 Date of this minute 11.03.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*
- 14th group meeting
- Start coding game
- Start with classes and objects
- Discuss invest sequence diagram
  - Change display state for player and block
  - Swap artemis main and artemis player
- Discuss resource manager: use of it
- Discuss take no action: use of it
- Update class diagrams and then descriptions
- Mon 11:30 – 12:00 for updated use case descriptions

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *LG: presentation to group of pay money sequence diagram*

Name & Role (2):

- *SON: presentation to group of invest sequence diagram*

Name & Role (3):

- *MO - presentation to group of do nothing option sequence diagram*

Name & Role (4):

- *CB high presentation to group of high level overview sequence diagram*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Minutes for Group 3 Week commencing 15.03.21 Date of this minute 15.03.21

The following team members were present

Name (printed/typed)	*Signature*
Sancha O'Neill	Michelle Oakes
Laura Gaffey	Sancha O'Neill
Michelle Oakes	Conor Bradley
Conor Bradley	Laura Gaffey

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 15th group meeting
  - Use case descriptions discussed (on shared lucid chart diagram)
  - Resource manager vs initial resources discussed (start game use case)
  - Use case diagram needs updated
  - Group to meet tomorrow 16.03.21 at 11am to write use case descriptions together
  - No action to be taken until then

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *SON - Meeting to collectively agree use case descriptions*

Name & Role (2):

- *CB - Meeting to collectively agree use case descriptions*

Name & Role (3):

- *MO - Meeting to collectively agree use case descriptions*

Name & Role (4):

- *LG- Meeting to collectively agree use case descriptions*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Minutes for Group 3 Week commencing 16.03.21 Date of this minute 16.03.21

The following team members were present

Name (printed/typed)	*Signature*
Sancha O'Neill	Michelle Oakes
Laura Gaffey	Sancha O'Neill
Michelle Oakes	Conor Bradley
Conor Bradley	Laura Gaffey

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 16th group meeting
- Group met to work together on updating use case descriptions.
- Group will meet advisor (Michael) later this afternoon (see separate meeting minutes)
- Team agreed to allow time for individuals to study for upcoming programming exam (25/03) and then commence project **sprint** week beginning 29th of March.

Meeting with Advisor 16.03.21 14:34

- Sequence diagrams all teed up
- Revised use case descriptions to update them
- These revised use case descriptions for MD review
- Way we have done it makes perfect sense
- Can have alternative flow with in description
- Can take out alt flow if really important, just connect dots after

- Invest in square description : allowed to go bankrupt?!
- How would player know resources
- At start of their turn: game resource manager will output all their resources
- In alt flow in take turn use case, there is a validation before that use case is called. E.g. check enough resources before call invest use case
- How do we communicate that some options will not be available to the player e.g. invest not offered if no resources
- Just state in main flow: options not presented
- Highlight the small use cases that they are alternative flows and just a further explanation
- Thought out main things, look at use case descriptions, ascertain main objects, classes
- Whiteboard it
- Base one, start with pseudo code for methods and objects
- Do little experiments
- Use case description: high level or pull of method names etc
- How user flows through process
- Get stuck in with some code

Name & Role (1):
· *Sancha O'Neil (as product owner) ensuring team sticks to project brief.*

Name & Role (2):
· *Conor Bradley scrum member.*

Name & Role (3):
· *Michelle Oakes scrum member.*

Name & Role (4):
· *Laura Gaffey – scrum member and minutes*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned *(Briefly list the actions required of each team member for the next week.)*

Name & Role (1):
· *Michelle – set up trello board for all team members as a visual aid to track progress.*

Name & Role (2):
· *Laura – set up Hartmann Orona spreadsheet for tracking sprint.*

Name & Role (3):
· *Sancha – reorganise documentation on Microsoft teams.*

Name & Role (4):

- *Conor – experiment with classes and code in java.*

Minutes for Group 3 Week commencing 30.03.21 Date of this minute 30.03.21

The following team members were present

Name (printed/typed)	*Signature*
Sancha O'Neill	Michelle Oakes
Laura Gaffey	Sancha O'Neill
Michelle Oakes	Conor Bradley
Conor Bradley	Laura Gaffey

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 17th group meeting
- Group met to work together to plan sprint.
- Group agreed to finalise class diagrams and Hartmann Orana spreadsheet tomorrow (Tuesday) when set up/ initial experiment of code is complete.
- Draft report to be started today.
- All github to be operational for tomorrow 31st March.
- Team agreed to meet again tomorrow 31st March at 11am to finalise sprint plans & class diagrams.

Name & Role (1):

- *Sancha O'Neil as scrum member.*

Name & Role (2):

- *Conor Bradley scrum master.*

Name & Role (3):

- *Michelle Oakes scrum member.*

Name & Role (4):

- *Laura Gaffey – (as product owner) ensuring team sticks to project brief.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (1):

- *Michelle – class diagram set up for team agreement and finalisation.*

Name & Role (2):

- *Laura – further populate Hartmann Orona spreadsheet, update Trello board and update meeting minutes.*

Name & Role (3):

- *Sancha – Initialise report.*

Name & Role (4):

- *Conor – experiment further with classes and code in java.*

Minutes for Group 3 Week commencing 31.03.21 Date of this minute 31.03.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	Michelle Oakes
Sancha O'Neill	Sancha O'Neill
Conor Bradley	Conor Bradley
Laura Gaffey	Laura Gaffey

Task Reporting (Briefly list the progress for each team member in the last week.)*

- *18th group meeting*
- *Group met to work together to update class diagram.*
- *Group agreed to begin coding see allocation of work below.*
- *Draft report underway.*
- *Git almost set up for all members.*
- *Team agreed to meet again tomorrow 1st of April @11am to review sprint progress.*

Name & Role (1):

- *Sancha O'Neil as (as product owner) ensuring team sticks to project brief.*

Name & Role (2):

- *Conor Bradley scrum master.*

Name & Role (3):

- *Michelle Oakes scrum member.*

Name & Role (4):

- *Laura Gaffey – scrum member.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned *(Briefly list the actions required of each team member for the next week.)*

Name & Role (Michelle):

- *Roll dice class and unit test.*
- *Block class & unit test.*

Name & Role (Laura):

- *Laura – Player class & unit test.*
- *Update HartmannOrona spreadsheet, Trello board and update meeting minutes.*

Name & Role (Sancha):

- *Develop Block class & unit test.*
- *Sancha –further develop report.*

Name & Role (Conor):

- *Conor – experiment further with main artemisLite class.*

Minutes for Group 3 Week commencing 01.04.2021 Date of this minute 01.04.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting *(Briefly list the progress for each team member in the last week.*)*

- 19th group meetingGroup me to update on code progress
  - Conor: developing main method and new method calls identified to be distributed for completion – information to uploaded to Trello and team members will select appropriate tasks based on classes completed: once current code is finished.
  - Laura: developing the player class
  - Sancha: developing the develop Block class
  - Michelle: developing the pass go Block

Once these taks have been completed group discussed and agreed to split not two smaller teams to develop code further

- Git lab: group to upload completed code
- Discussion on resources – inclusion of characters to be confirmed but group in agreement this can be added to the code at a later date
- Next meeting: Tuesday 6 April 2021

Name & Role (1):
- *Conor Bradley scrum master.*

Name & Role (2):
- *Laura Gaffey as (as product owner) ensuring team sticks to project brief.*

Name & Role (3):
- *Michelle Oakes scrum member.*

Name & Role (4):
- *Sancha O'Neil scrum member.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next week.)

NA – very early in project lifecycle

Name & Role (Conor):
- *Further development of main method and identification of methods required*
- *Pass go Block and unit test*

Name & Role (Michelle):
- *Roll Dice class developed – unit test required*
- *Pass go Block and unit test*
- *Prepare minutes*

Name & Role (Sancha):
- *Block class developed & unit test completed.*
- *Consider further 3 developments prior to Major development*

Name & Role (Laura):
- *Laura – Player class developed & unit test required*
- *Consider Enum inclusion*
- *Update HartmannOrona spreadsheet, Trello board and update meeting minutes.*

Minutes for Group 3 Week commencing 05.04.2021 Date of this minute 06.04.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*

Appendix II *Meeting minutes*

Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last week.)*

- 20th group meeting
- Group meeting to update on project progress
- All members to now merge their separate parts/ branches to master on git lab
- Discussion on resources – discussed the use of resources instead of money e.g. 8 software engineers and use int as data type. Use time and effort and use hours (int)
- Pass go
    - Discuss how board will know player has gone round again and is to be assigned more resources
    - Keep method in player class?
    - Use flag?
- Discuss who goes first method
- Diff resources and cards e.g. random shuffle to assign a software engineer card which will help with developments etc as stretch requirement
- Implement player score (alongside development of systems to get to moon)
- All sequence diagrams and use case descriptions up to date (everyone go back and update own part)
- Will need separate sequence diagrams for each method in the main
- Next meeting: Wed 7 April 2021

Name & Role (1):

- *Conor Bradley (as product owner) ensuring team sticks to project brief.*

Name & Role (2):

- *Laura Gaffey scrum member.*

Name & Role (3):

- *Michelle Oakes scrum master.*

Name & Role (4):

- *Sancha O'Neil scrum member.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next week.)

Name & Role (Conor):

- *Further development of main method and identification of methods required to be divided up between members*

Name & Role (Michelle):

- *Pair with LG to discuss pass go method*
- *Meeting mins into appendix*

Name & Role (Sancha):

- *Test all classes not in main*
- *Update report body, creating headings to divide up tasks*
- *Mins of this meeting*

Name & Role (Laura):

- *Pair with MO to discuss pass go method*
- *Add player score attribute to player class*
- *Start dice roll for player class*
- *Update resource attribute to hours*

Minutes for Group 3 Week commencing 05.04.2021 Date of this minute 07.04.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last day)*

- *21st group meeting*
  - *MO & LG pair programmed method in player class that assigns additional resources on pass go. To be tested in the main ArtemisLite class.*
  - *First iterations of player, playerTest(LG), block(SON) and dice (MO) classes successfully merged on git lab.*
  - *ArtemisLite class (which holds main method) being developed further (CB) to encompass the above classes.*
  - *Draft report updated by SON with sections so that report wrtiting can be delegated.*

Group meeting to update progress and on next steps:

- *Dice class to be updated to include a method which is used to determine which players go first (CB/MO to update)*
- *Player class boolean bankrupt/ is developer may not need to be "set" in player class. CB to review with main ArtemisLite method.*
- *Implement player score (alongside development of systems to get to moon)*
- *Player turn sequence diagram to be updated (as code evolves).*
- *Will need separate sequence diagrams for each method in the main for example: display game manual, display credits, end game.*
- *SON, MO, LG to start writing up sections of the report to be reviewed by all team members. Sections to be copied into main report in teams so all can review.*
- *Next meeting: Wed 8 April 2021*

Name & Role (1):

- *Conor Bradley (as scrum master) discussing next steps regarding coding.*

Name & Role (2):

- *Laura Gaffey scrum member.*

Name & Role (3):

- *Michelle Oakes product owner.*

Name & Role (4):

- *Sancha O'Neil scrum member.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next few days.)

Name & Role (Conor):

- *Further development of main method and identification of methods required to be divided up between members.*
- *Player turn sequence (once main ArtemisLite method further developed).*

Name & Role (Michelle):

- *Report – start writing up requirement analysis.*
- *Meeting mins into appendix*

Name & Role (Sancha):

- *Display game manual sequence diagram.*
- *Update report body, creating headings to divide up tasks.*

Name & Role (Laura):

- *Display credits sequence diagram.*
- *Report start UML section.*
- *Update Hartmann Orana spreadsheet.*
- *Do today's meeting minutes.*

Minutes for Group 3 Week commencing 05.04.2021 Date of this minute 08.04.21

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*

Appendix II *Meeting minutes*

Conor Bradley	*Sancha O'Neill*
Laura Gaffey	*Conor Bradley*
Sancha O'Neill	*Laura Gaffey*

Task Reporting (Briefly list the progress for each team member in the last day)*

- 22nd group meeting
- All merged code being checked over and amalgamated
- Service charge will be increased depending on how developed the blocks in the system are via main (as per requirements)
- Group will play virtual game and have a debugging session during game play
- How are players with the same name dealt with? Via loop and scanner in main. It will recognise the name and ask the user to enter another
- Throw a double discussed. Decided to enter the logic if a player throws only a double 6 then they get extra points added to their score
- Maintainability discussed
  - OOP principles x 4
  - Usability etc
  - Add more players and blocks easily
  - JCF used e.g. lists etc
- Design pattern discussed
- Factory method design pattern. User will be console based and so code hidden, code also hidden in getters and setters
- Look into design patterns
- Winner discussed
  - If all elements developed, group has won as mission achieved
  - Otherwise: person with highest points is the winner
- How to prevent game ending by accident. "Are you sure you want to do XYZ?" implemented in console/ code
- SON, MO, LG to start writing up sections of the report to be reviewed by all team members. Sections to be copied into main report in teams so all can review
- Next meeting: Mon 12 April 2021

Name & Role (1):

- *Conor Bradley product owner.*

Name & Role (2):

- *Laura Gaffey scrum member.*

Name & Role (3):

- *Michelle Oakes scrum member.*

Name & Role (4):

- *Sancha O'Neil (as scrum master) discussing next step.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next few days.)

Name & Role (Conor):

- *Merging classes with main method and identification of bugs to be fixed between members.*

Name & Role (Michelle):

- *Report – start writing up requirement analysis*
- *Meeting mins into appendix*
- *Report - use case descriptions updated and into report*

Name & Role (Sancha):

- *Display game manual sequence diagram*
- *Mins of this meeting*
- *Case diagram part of report*
- *Change block names in diagram and code*
- *Write game manual and pick up any sequence diagrams*

Name & Role (Laura):

- *Report – continue with sequence diagrams*
- *Update Hartmann Orana spreadsheet*

Minutes for Group 3 Week commencing 01.04.2021 Date of this minute 12.04.21 12 – 3pm

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Conor Bradley*
Laura Gaffey	*Laura Gaffey*
Sancha O'Neill	*Sancha O'Neill*

Task Reporting (Briefly list the progress for each team member in the last week.)*

Task Reporting (Briefly list the progress for each team member in the last day)*

- 23rd group meeting
- Sequence diagrams can now be updated and completed: Invest, Player Turn, Play Game
- Final game layout to be changed to match the final code
- Test cases need to be updated
- Each member of the group will play the game individually and identify any errors / bugs in the system
- A group run through of the game identified the following bugs
  - Please select int 1-31 displayed when player attempts to develop
  - Wait to enter all four players before the game starts
  - Dice, end of board falling over
  - Out of bounds – board only has 12 blocks
- SON, MO, LG, CB to continue writing up sections of the report to be reviewed by all team members. Sections to be copied into main report in teams so all can review / update
- Next meeting: Tues 13 April 2021

Name & Role (1):

- *Conor Bradley (as scrum master) discussing next step.*

Name & Role (2):

- *Laura Gaffey scrum member.*

Name & Role (3):

- *Michelle Oakes scrum member.*

Name & Role (4):

- *Sancha O'Neil product owner*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next few days.)

Name & Role (Conor):

- *Develop sequence diagrams:*
- *Code end game*
- *End game sequence diagram*
- *Design commentary*

Name & Role (Sancha):

- *Display game manual sequence diagram*
- *Continue to update case diagram part of report*
- *Include game manual in game code*
- *Sequence diagrams*

Name & Role (Michelle):

- *Report – continue writing up requirement analysis / use case descriptions*
- *Meeting mins into appendix*
- *Initial use case designs to Appendix*
- *Mins of meeting*

Name & Role (Laura):

- *Report – continue with sequence diagrams section*
- *Update Hartmann Orana spreadsheet*
- *Testing report*
- *Display credits code*

Minutes for Group 3 Week commencing 01.04.2021 Date of this minute 15.04.21 11 – 2pm

The following team members were present

Name (printed/typed)	*Signature*
Michelle Oakes	*Michelle Oakes*
Conor Bradley	*Conor Bradley*
Laura Gaffey	*Laura Gaffey*
Sancha O'Neill	*Sancha O'Neill*

Task Reporting (Briefly list the progress for each team member in the last week.)*

Task Reporting (Briefly list the progress for each team member in the last day)*

- 24th group meeting
- Debugging session took place (approx. 3hours)
- Used combined document detailing main bugs identified in the system
- User had to quit game if geme manual was selected – menu added to end of manual allowing the player to continue to make a selection to play
- When a player landed on a square owned by another player, the wrong player was being allocated to fee – identified the players were added to the player array list at the beginning of the game in order of input – once the dice was rolled to determine the order of play the player sequence was incorrect. Players added again t the player array list following the initial roll of the dice which put them in the correct order of play.
- Next meeting: Mon 19th April 2021

Name & Role (1):

- *Conor Bradley (as scrum master) discussing next step.*

Name & Role (2):

- *Laura Gaffey scrum member.*

Name & Role (3):

- *Michelle Oakes product owner.*

Name & Role (4):

- *Sancha O'Neil scrum member.*

**Printouts giving an overview of interim deliverables may be added as a supplement to these minutes.*

Actions Planned (Briefly list the actions required of each team member for the next few days.)

Name & Role (Conor):

- *Complete end game / game ove r method snd create sequence diagrams*
- *Add code for offer the block to another player if the first player does not want to invest*
- *Game design part of report*
- *Play game and identify any further bugs*
- *Create shared Google document to combine report*

Name & Role (Sancha):

- *Update class diagram*
- *Determine first player – create comparator*
- *Look at sequence diagrams, update invest sequence diagram*
- *Continue to write project report*
- *Play game and identify any further bugs*
- *Look at MO part of report*

Name & Role (Michelle):

- *Roll Dice sequence diagram*
- *Update use case descriptions using the game*
- *Continue to write project report*
- *Mins of meeting*
- *Play game and identify any further bugs*
- *Look at LG part of report*

Name & Role (Laura):

- *Game set up sequence diagram*
- *Continue with testing and test report*
- *Continue to write project report*
- *Play game and identify any further bugs*
- *Look at SON part of report*

All members to look towards completion of all tasks by the beginning of next week.

Appendix III - Git Lab screen dumps

Figure showing the group's cycle analytics

Figure showing the group's commits part 1

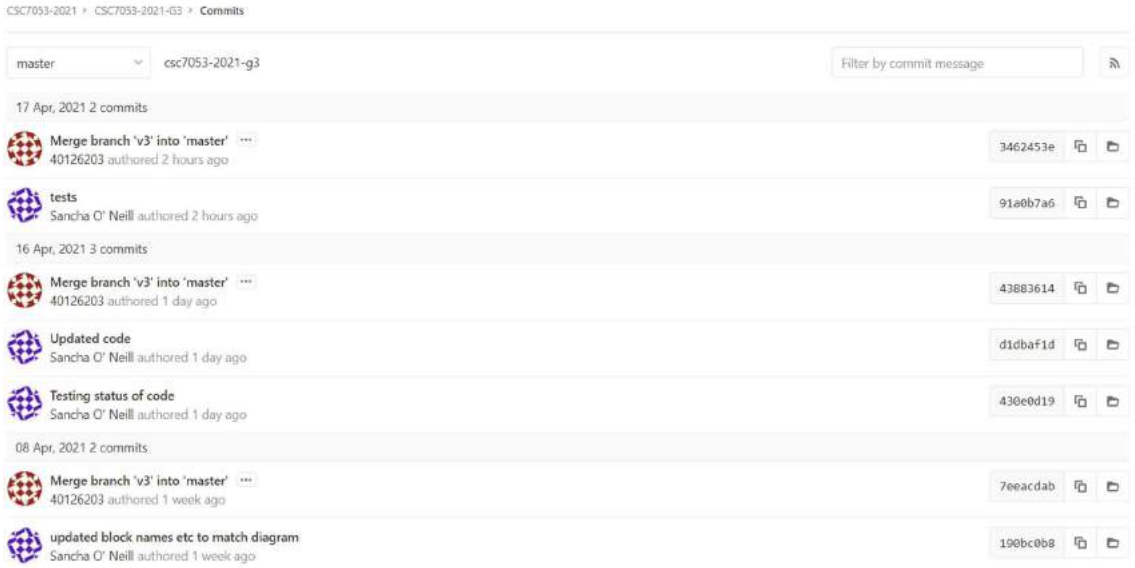


Figure showing the group's commits part 2

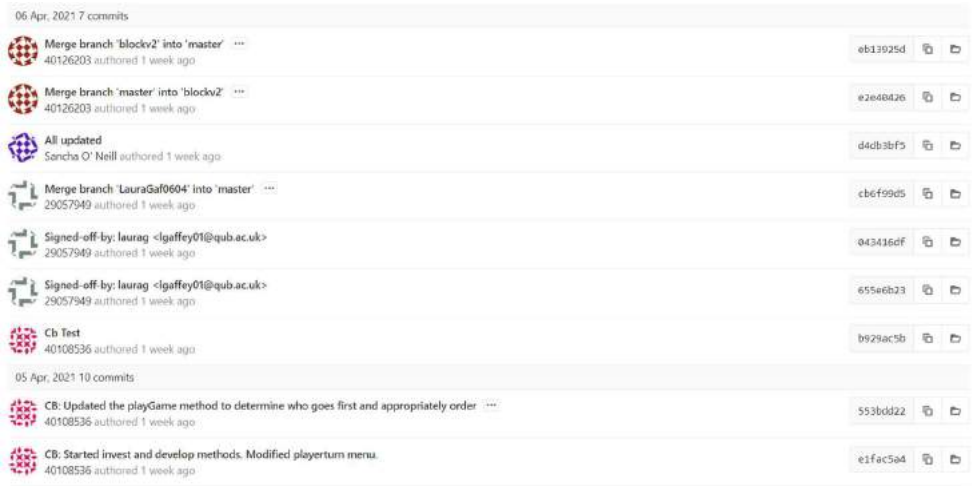


Figure showing the group's commits part 3

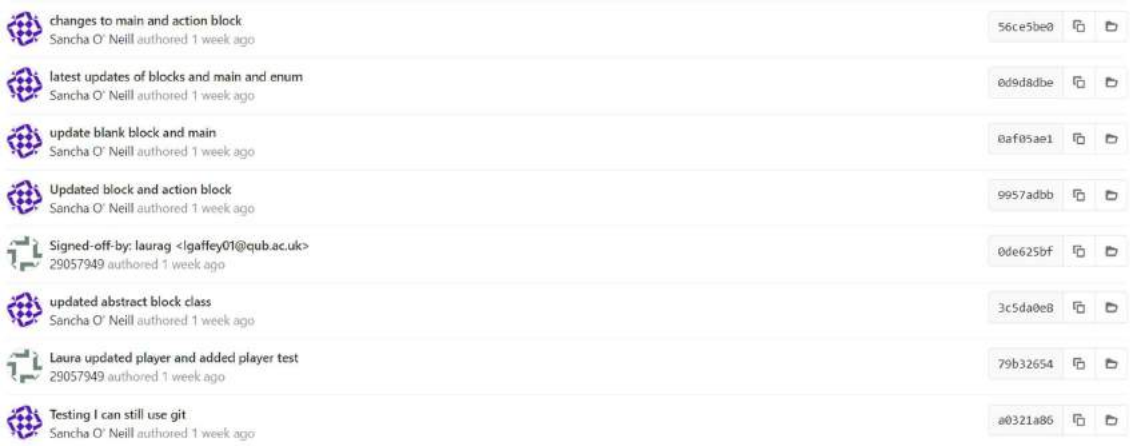


Figure showing the group's commits part 4

Figure showing the group's commits part 5

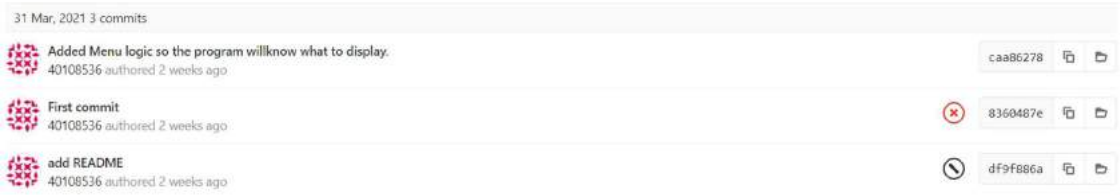


Figure showing group's commits and use of branches

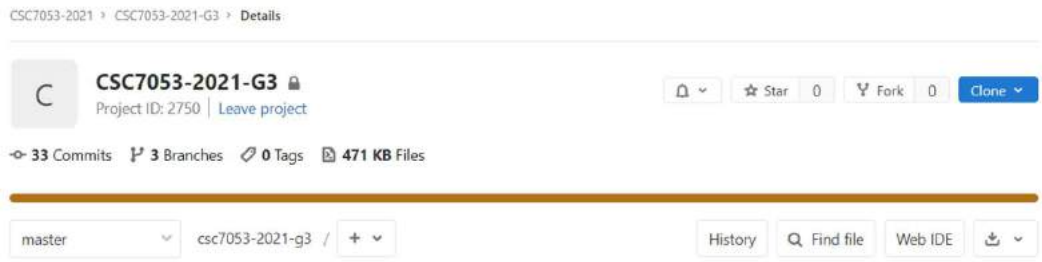


Figure showing merge requests

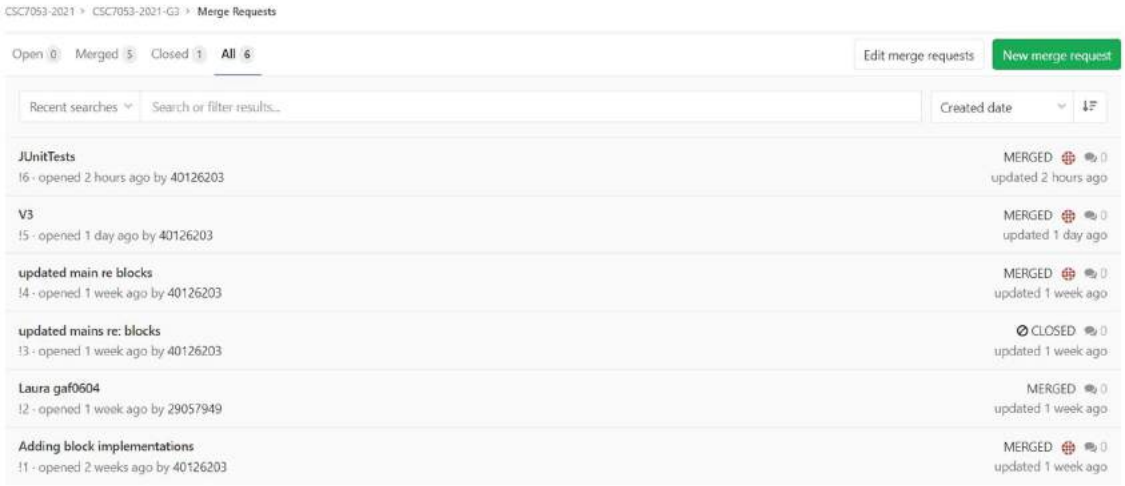


Figure showing merged request part 1

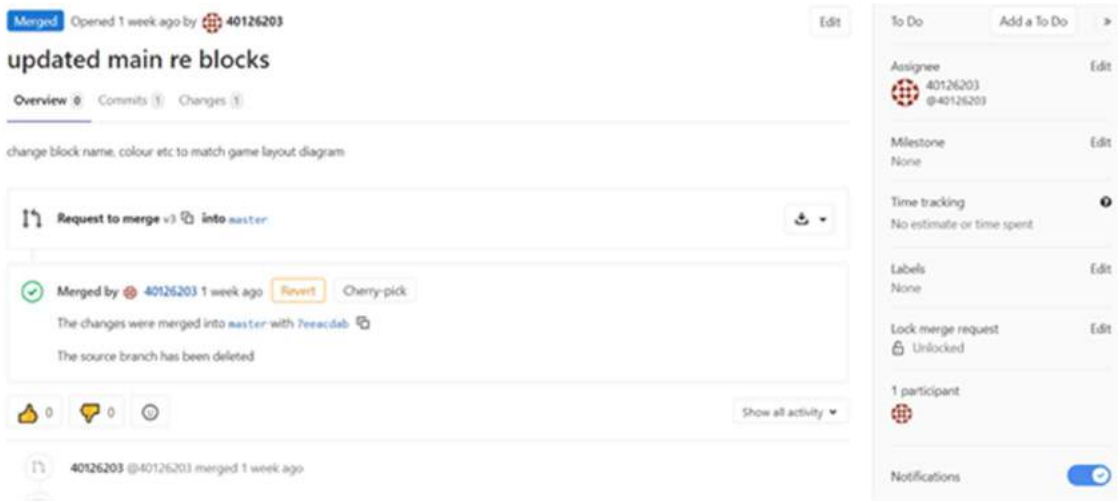


Figure showing merged request part 2

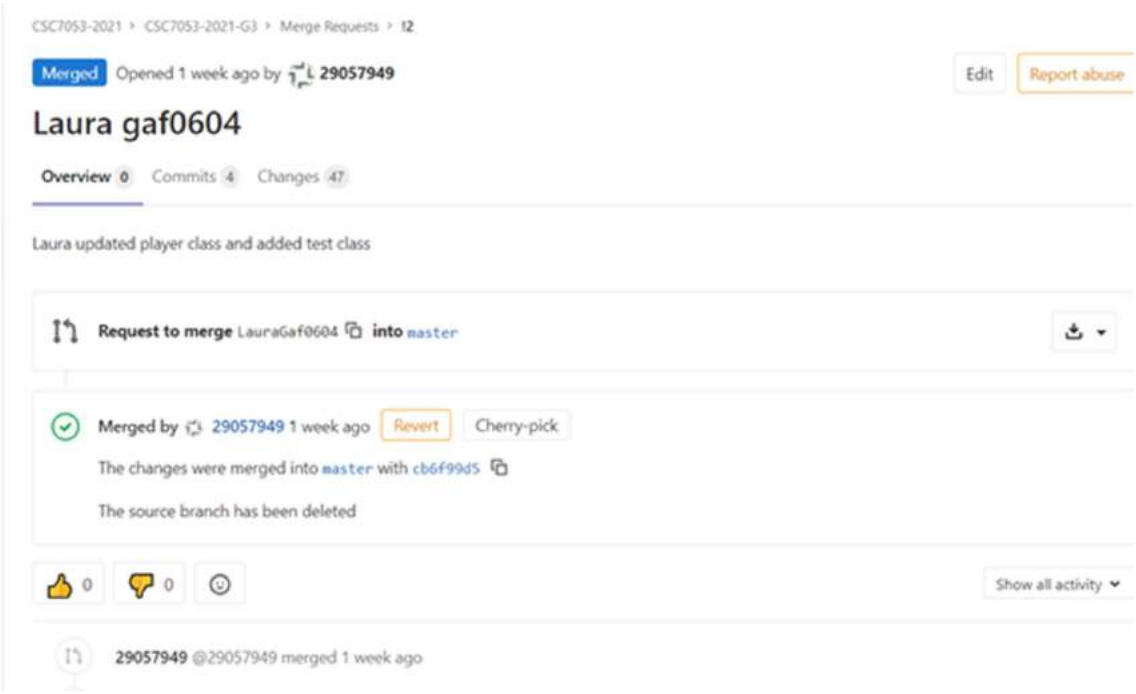


Figure showing merged request part 3

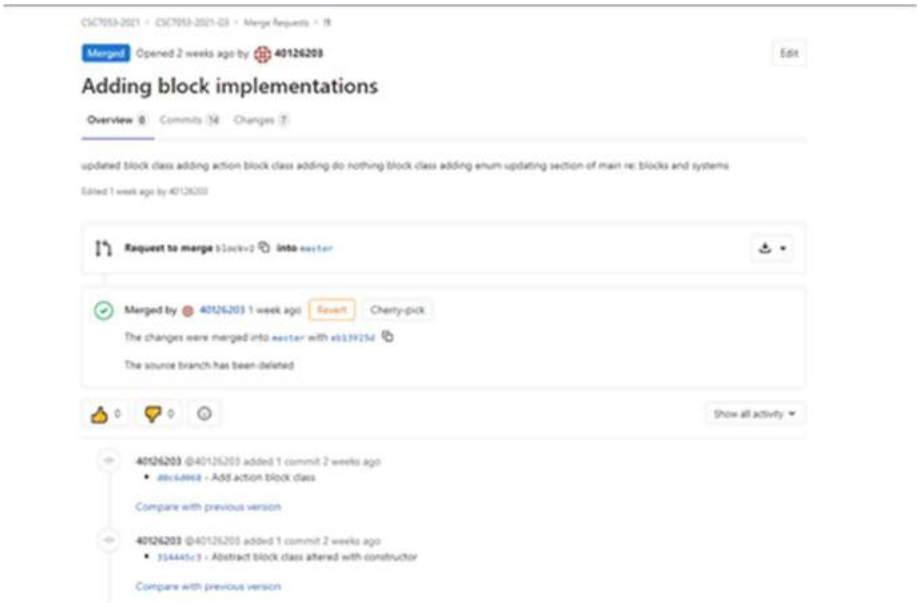


Figure showing project pipeline for month March – April 2021 within GitLab (top)

Figure showing project pipeline for year 2021 within GitLab (bottom)

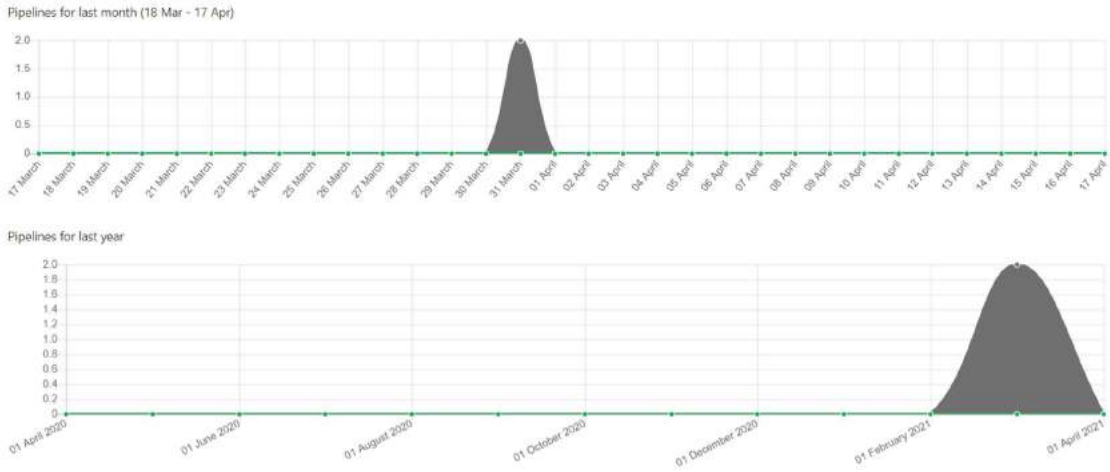


Figure showing commit statics for month March – April 2021 within GitLab

Commit statistics for **master** Mar 31 - Apr 08

- Total: **24 commits**
- Average per day: **2.7 commits**
- Authors: **3**

Figure showing commits per weekday within GitLab

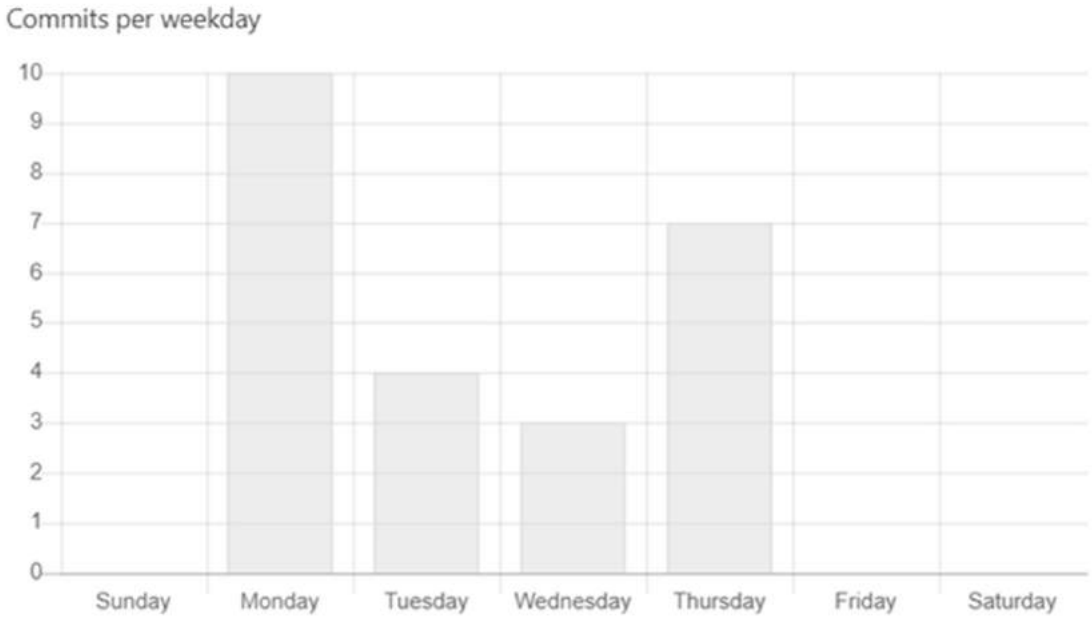


Figure showing commits per hour within GitLab

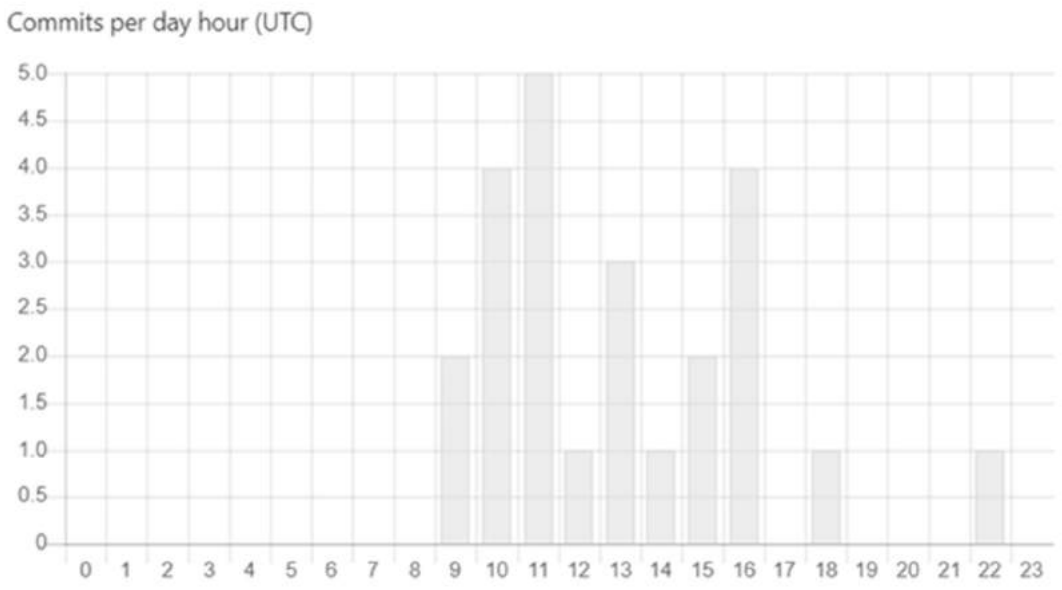
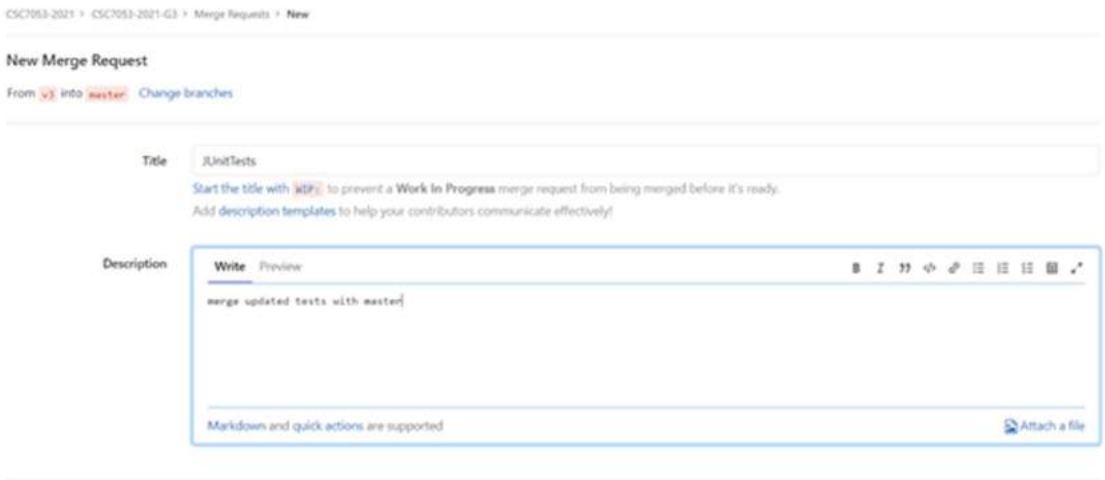


Figure showing the use of branches and merge requests



Appendix III *Git Lab screen dumps*

Graph within the group's repository part 1

Graph within the group's repository part 2

Graph within the group's repository part 3

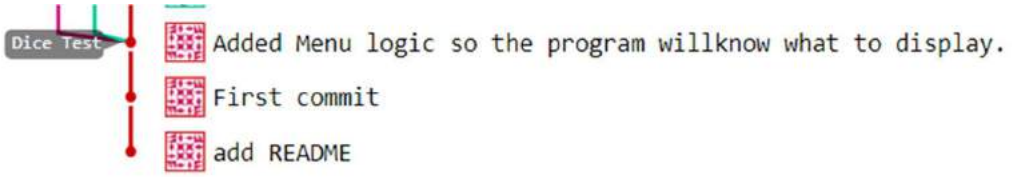


Figure showing the group's activity part 1

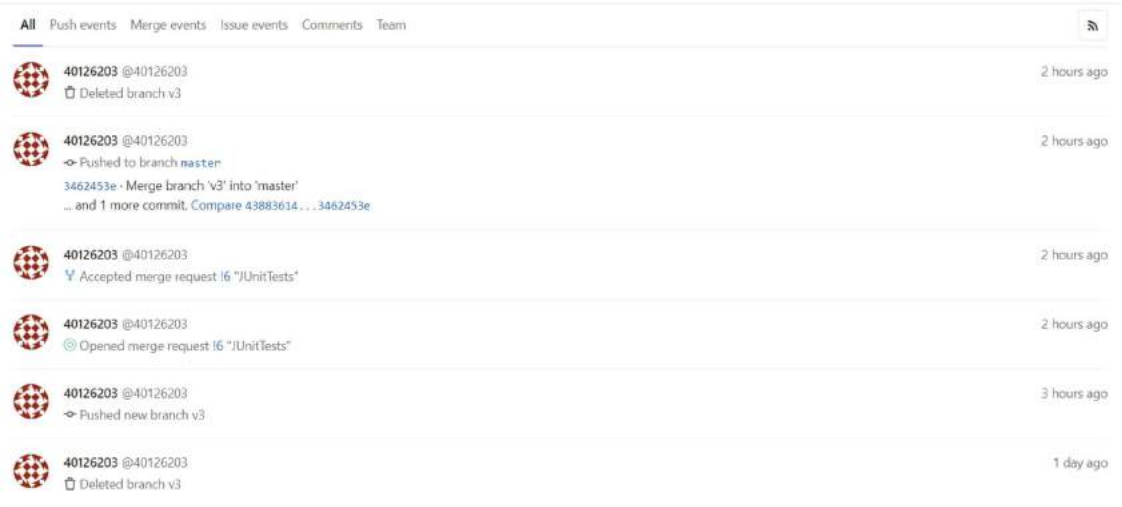


Figure showing the group's activity part 2

Appendix III *Git Lab screen dumps*

Figure showing the group's activity part 3

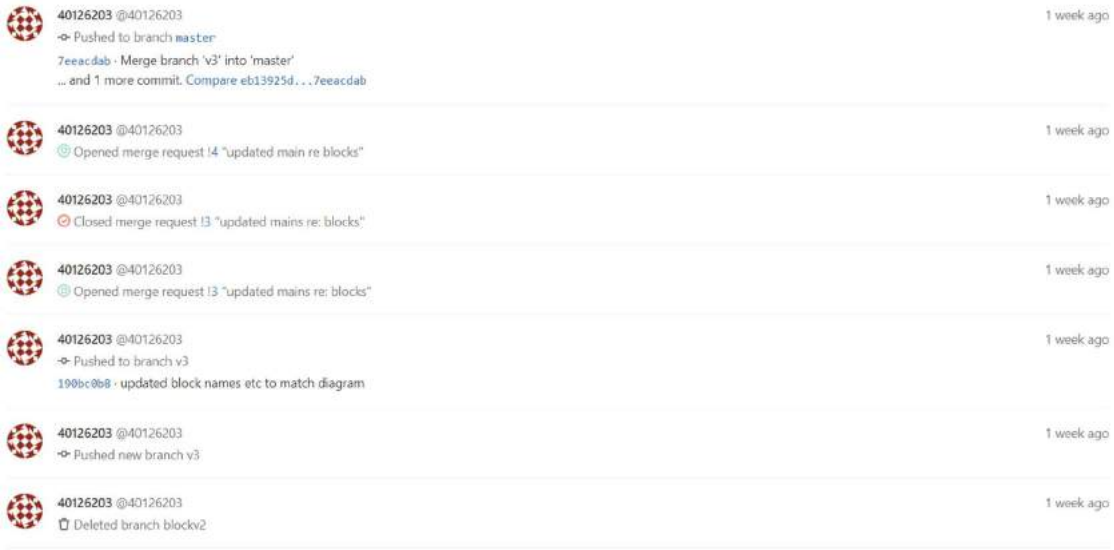


Figure showing the group's activity part 4

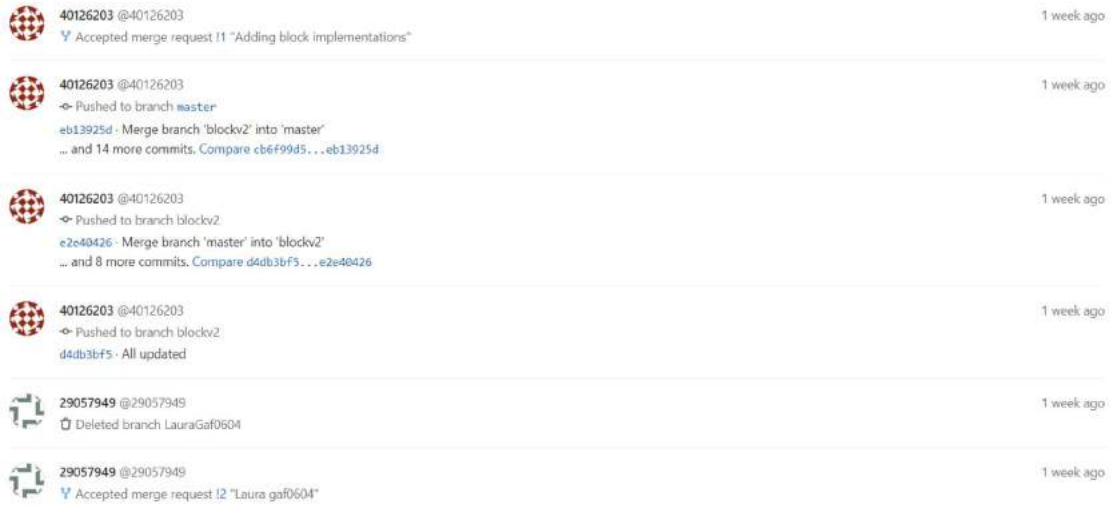


Figure showing the group's activity part 5

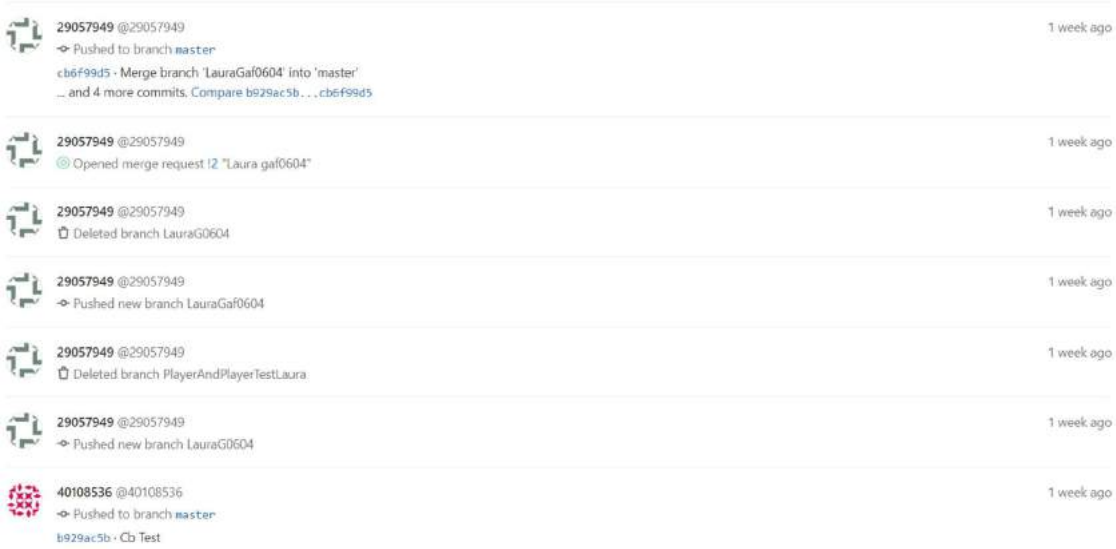


Figure showing the group's activity part 6

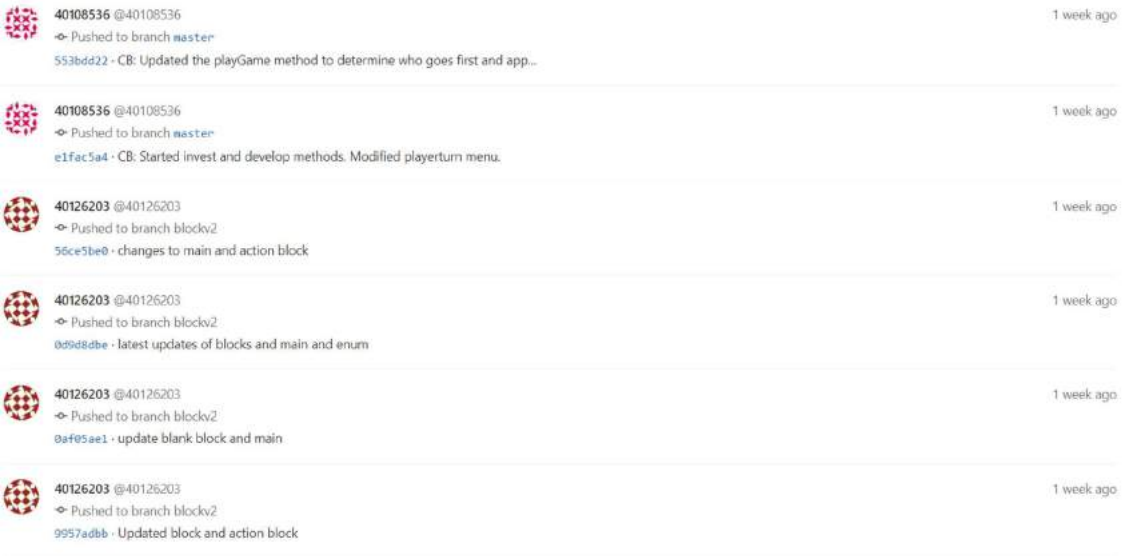


Figure showing the group's activity part 7

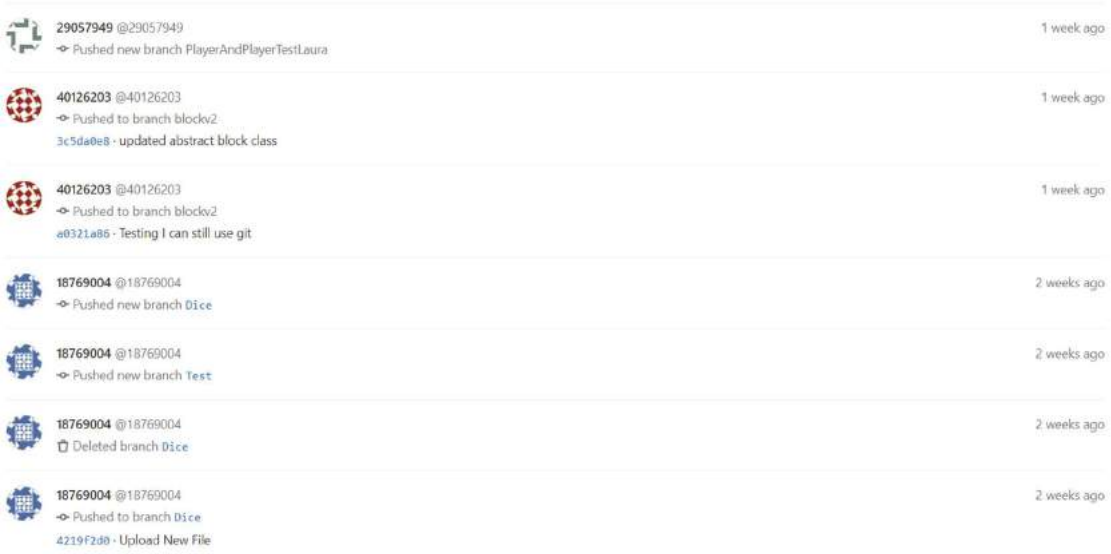


Figure showing the group's activity part 8

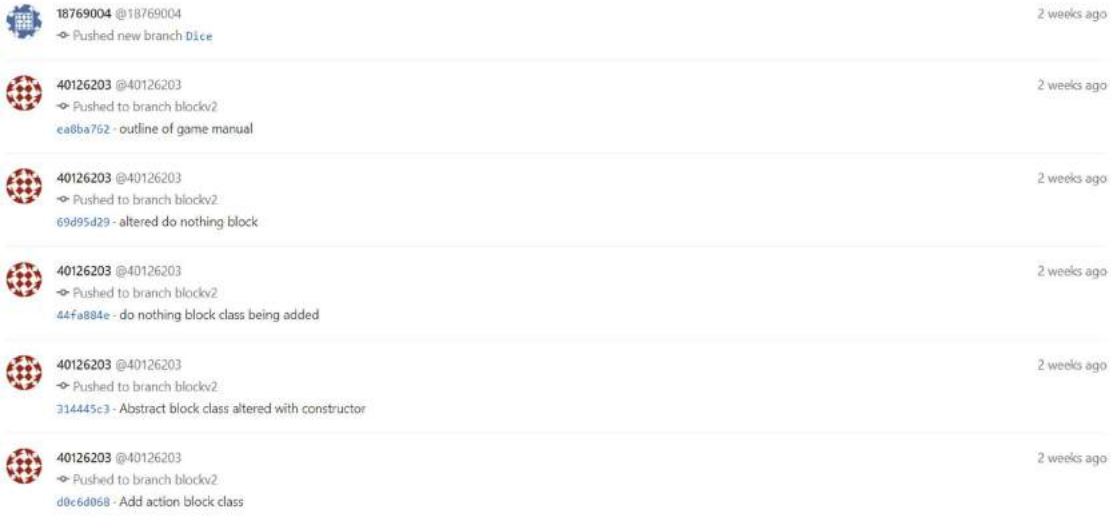
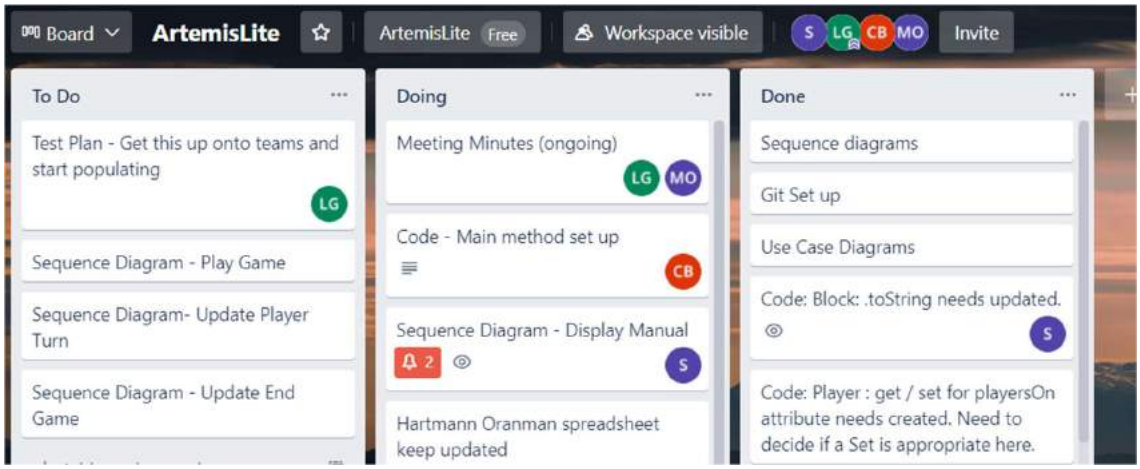


Figure showing the group's activity part 9

Appendix IV - Day to day project management

Figure showing the group's use of Trello (a collaboration tool) for tickets during the sprint



Team 3
Planning Worksheet -- Embrace Reality

Please fill in items (1) through (9)

Grey cells are calculated do not overwrite them

Sprint Team Information

(1) Team Name	(2) Starting Date	(3) # Calendar Days	# Work Days	Ending Date	(4) Work hours in day
Team 3	30/03/2021	22	16	04/20/2021 Tue	8

Sprint Team Member Information

(5) Team Member Full Name	Sancha O'Neil	Michelle Oakes	Laura Gaffey	Conor Bradley						
(6) Team Member Initials	SON	MO	LG	CB						
(7) Working Days This Sprint Exclude personal time off, holidays	12	12	12	12	0	0	0	0	0	0
(8) Overall Drag Factor % of time for ***anything*** other than this Sprint's tasks	20%	20%	20%	20%	0%	0%	0%	0%	0%	0%
Working calendar hours for this Sprint	96	96	96	96	0	0	0	0	0	0
% of calendar hours available for this Sprint	80%	80%	80%	80%	0%	0%	0%	0%	0%	0%
Working hours available for this Sprint	77	77	77	77	0	0	0	0	0	0
Total planned hours from Sprint Backlog page	76	76	76	78	0	0	0	0	0	0
Unplanned hours Red font if planned more than available	1	1	1	(1)	0	0	0	0	0	0

(9) Sprint Team Member Daily Availability

		SON	MO	LG	CB						
1	Tue, Mar-30	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
2	Wed, Mar-31	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
3	Thu, Apr-01	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
4	Fri, Apr-02	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
5	Sat, Apr-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Sun, Apr-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Mon, Apr-05	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
8	Tue, Apr-06	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
9	Wed, Apr-07	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
10	Thu, Apr-08	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
11	Fri, Apr-09	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
12	Sat, Apr-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Sun, Apr-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Mon, Apr-12	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
15	Tue, Apr-13	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
16	Wed, Apr-14	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
17	Thu, Apr-15	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
18	Fri, Apr-16	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
19	Sat, Apr-17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	Sun, Apr-18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Mon, Apr-19	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
22	Tue, Apr-20	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Available Work Hours:	307.2	76.8	76.8	76.8	76.8	0.0	0.0	0.0	0.0	0.0	0.0

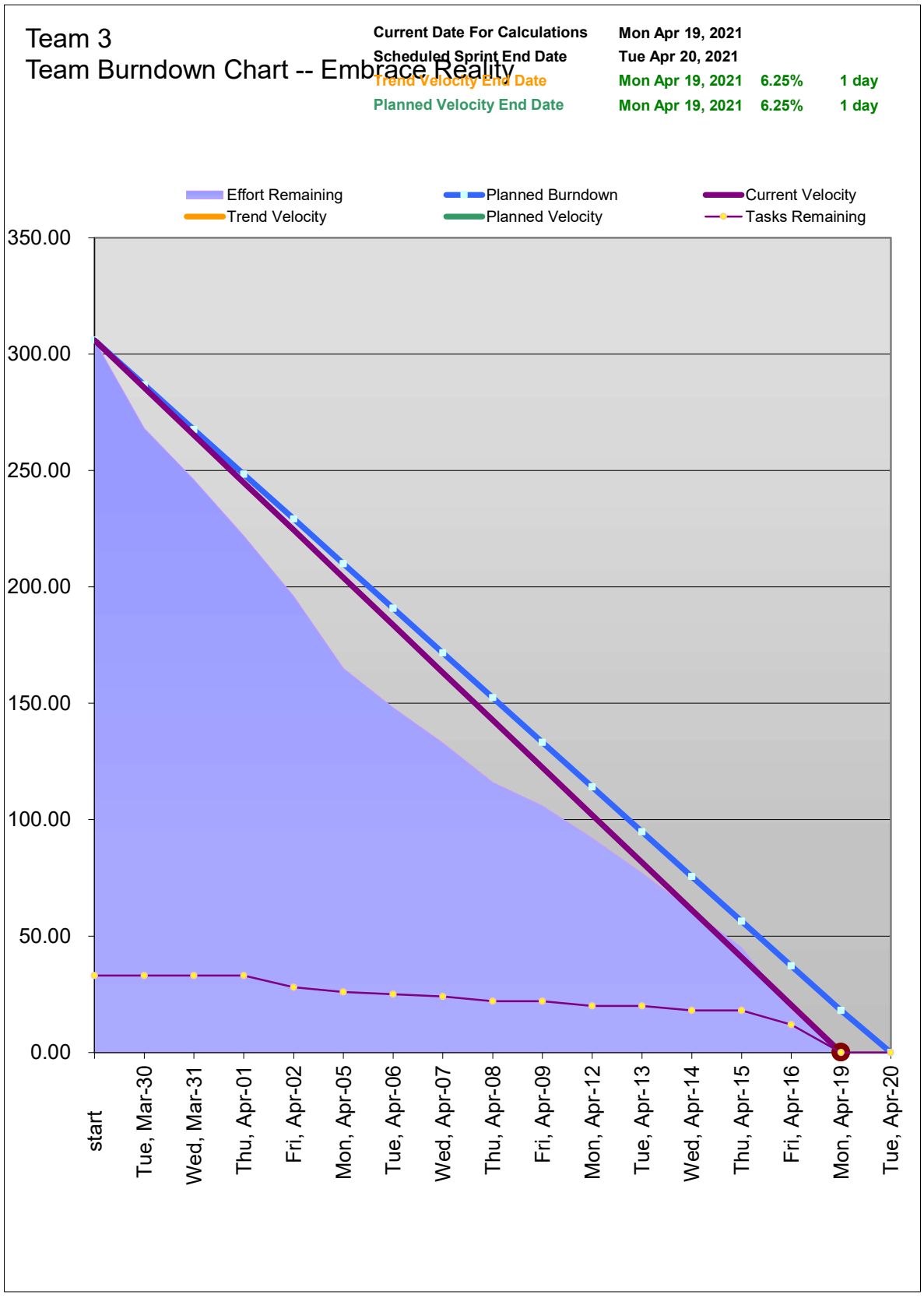
Appendix IV Day to day project management

Team 3
Sprint Backlog -- Embrace Reality

Fill in original task estimates only once at the start of the sprint

Major Task Area	Task	Notes and Trace Links	Owner	Status	your space	Originally Estimated Hours	1 Tue, Mar-30	2 Wed, Mar-31	3 Thu, Apr-01	4 Fri, Apr-02	5 Sat, Apr-03	6 Sun, Apr-04	7 Mon, Apr-05	8 Tue, Apr-06	9 Wed, Apr-07	10 Thu, Apr-08	11 Fri, Apr-09	12 Sat, Apr-10	13 Sun, Apr-11	14 Mon, Apr-12	15 Tue, Apr-13	16 Wed, Apr-14	17 Thu, Apr-15	18 Fri, Apr-16	19 Sat, Apr-17	20 Sun, Apr-18	21 Mon, Apr-19	22 Tue, Apr-20
☑ Use drop-down list for task owners																												
☑ All burndown entered for current day						Total Hours Remaining by Day ==>	306	268	246	222	196	196	196	165	148	133	116	106	106	106	92	77	61	45	18	18	18	0	0
						Total Daily Burndown by Day ==>		38	22	24	26	0	0	31	17	15	17	10	0	0	14	15	16	16	27	0	0	18	0
Game Dev	ArtemisLite	Main class calls all classes below	CB	Completed		58	53	48	43	38	38	38	35	30	25	20	15	15	15	15	10	5	3	0				
	Dice class	Code: Dice class: Must return a single random int 1 - 6. Having as a class means we can make two dice objects.	MO	Completed		14	10	6	4	2	2	2	0															
	Player 1st Itteration	Code Player	LG	Completed		20	16	12	12	12	12	12	8	4	1	0												
	PlayerTest 1st iteration	Code: Player	LG	Completed		8	8	8	3	3	3	3	3	3	3	0												
	Block 1st Itteration	Code: ActionBlock	SON	Completed		16	16	7	7	6	6	6	0															
	Block 1st Itteration	Block - do nothing	SON	Completed		8	8	8	4	0			0															
	BlockTest		SON	Completed		8	8	8	5	5	5	5	5	0														
	Retest Unit test player & block	Coding	SON	Completed		10	10	10	10	10	10	10	10	10	8	10	8	8	8	6	4	4	2	0				
						0																						
						0																						
	GIT updates	Coding	SON	Completed		4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	2	2	1	1	1	0	
Class Diagram			CB	Completed		2	1	1	1	1	1	1	1	1	1	1	1	1	1	0								
			LG	Completed		2	1	1	1	1	1	1	1	1	1	1	1	1	1	0								
			SON	Completed		2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0						
			MO	Completed		20	8	8	6	4	4	4	2	2	2	2	2	2	2	2	2	2	2	0				
Test plan & test cases debug			LG	Completed		14	14	14	14	14	14	14	10	10	10	10	10	10	10	8	8	4	4	2	2	2	0	
as above			MO	Completed		8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	4	4	0			0	
as above			CB	Completed		4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	0			0	
as above			SON	Completed		4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	0				
Git set up			LG	Completed		2	1	1	1	0																		
as above			SON	Completed		2	1	1	1	0																		
as above			MO	Completed		2	1	1	1	0																		
as above			CB	Completed		2	1	1	1	0																		
Report	Set up		SON	Completed		14	12	12	10	8	8	8	6	4	4	4	4	4	4	4	4	4	2	2	2	2	0	
	continue		CB	Completed		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	3	3	3	3	0	
			MO	Completed		20	20	20	20	15	15	15	12	12	12	8	8	8	8	8	4	4	4	1	1	1	0	
			LG	Completed		14	14	14	14	14	14	14	14	14	14	10	10	10	10	10	8	8	4	1	1	1	0	
			SON	Completed		6	6	6	6	6	6	6	6	6	5	4	4	4	4	3	3	2	2	2	2	2	0	
Meeting Minutes			LG	Completed		6	5	5	4	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	0	
			MO	Completed		8	8	8	8	8	8	8	7	6	5	5	5	5	5	4	4	4	4	1	1	1	0	
Demo Video	to be allocated		LG	Completed		0																						
	to be allocated		CB	Completed		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	
	to be allocated		SON	Completed		0																						
	to be allocated		MO	Completed		0																						
Update trello & HO			LG	Completed		10	7	7	7	7	7	7	5	5	4	4	4	4	4	4	3	2	2	1	1	1	0	
			MO	Completed		4	4	4	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	0	
			CB	Completed		2	2	2	2	2	2	2	1	1	0													
			SON	Completed		2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	0						

Appendix IV Day to day project management


Team 3
Team Burndown Chart -- Embrace Reality
Current Date For Calculations Mon Apr 19, 2021
Scheduled Sprint End Date Tue Apr 20, 2021
Trend Velocity End Date Mon Apr 19, 2021 6.25% 1 day
Planned Velocity End Date Mon Apr 19, 2021 6.25% 1 day
Effort Remaining
Planned Burndown
Current Velocity
Trend Velocity
Planned Velocity
Tasks Remaining
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
start
Tue, Mar-30
Wed, Mar-31
Thu, Apr-01
Fri, Apr-02
Mon, Apr-05
Tue, Apr-06
Wed, Apr-07
Thu, Apr-08
Fri, Apr-09
Mon, Apr-12
Tue, Apr-13
Wed, Apr-14
Thu, Apr-15
Fri, Apr-16
Mon, Apr-19
Tue, Apr-20

Team 3
Team Member Burndown Chart -- Embrace Reality

Calendar Hours	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48	40	32	24	16	8	0
Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Date	start	Tue, Mar-30	Wed, Mar-31	Thu, Apr-01	Fri, Apr-02	Sat, Apr-03	Sun, Apr-04	Mon, Apr-05	Tue, Apr-06	Wed, Apr-07	Thu, Apr-08	Fri, Apr-09	Sat, Apr-10	Sun, Apr-11	Mon, Apr-12	Tue, Apr-13	Wed, Apr-14	Thu, Apr-15	Fri, Apr-16	Sat, Apr-17	Sun, Apr-18	Mon, Apr-19	Tue, Apr-20
SON	76	72	63	54	46	46	46	38	31	28	28	25	25	25	20	18	14	10	5	5	5	0	0
MO	76	59	55	51	41	41	41	32	31	30	26	25	25	25	22	17	15	15	3	3	3	0	0
LG	76	66	62	56	54	54	54	44	40	35	27	26	26	26	23	20	15	11	5	5	5	0	0
CB	78	71	66	61	55	55	55	51	46	40	35	30	30	30	27	22	17	9	5	5	5	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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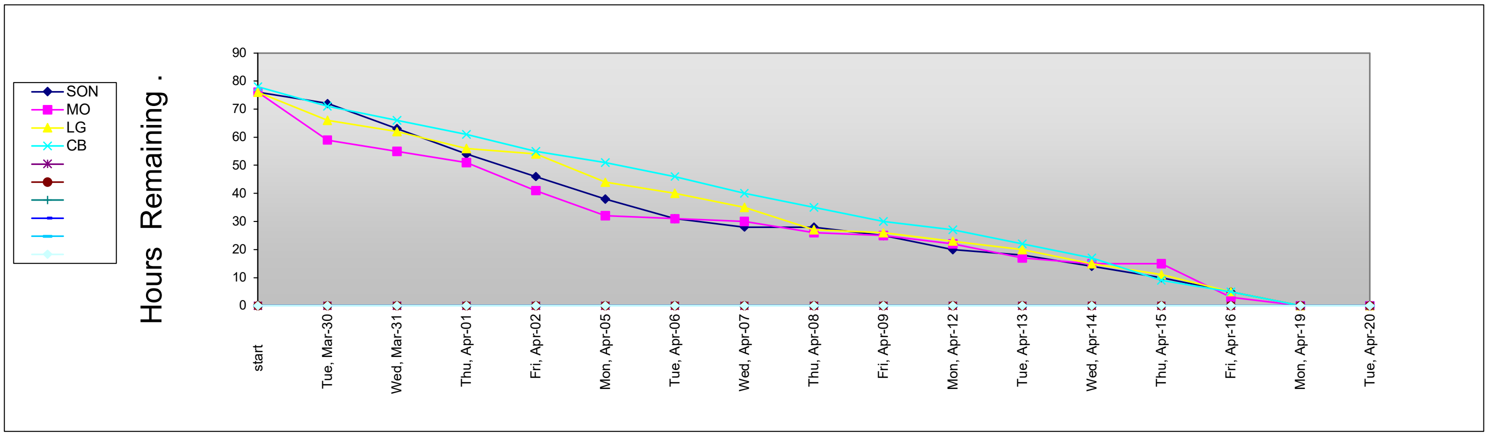
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hours Remaining	306	268	246	222	196	196	196	165	148	133	116	106	106	106	92	77	61	45	18	18	18	0	0
Daily Burndown	0	38	22	24	26	0	0	31	17	15	17	10	0	0	14	15	16	16	27	0	0	18	0
Unfinished Tasks	33	33	33	33	28	28	28	26	25	24	22	22	22	22	20	20	18	18	12	12	12	0	0



Note: The key aspect of this graph is the slope of the lines. A flat line means that someone is stalled, out of work, or stolen.

Appendix IV Day to day project management

Appendix V - Requirements & Check List

ArtemisLite Game requirements

A game based on the board game Monopoly with a distinctive theme based on NASA's mission to land the next woman or man on the moon by 2024. The game will be a simple console-based interface.

1. **Development of a virtual board game – does not have an elaborate graphical interface.**

   The game will be developed in Eclipse using object orientated programming.

2. **The game will have a distinctive theme – NASAs mission to land the first woman or next man in the moon.**

   Research the Artemis Lite project and incorporate key elements associated with the mission into the game – as players move around the board, they will develop systems that will enable them to launch a mission to the moon.

3. **The system uses English to convey the state of game play to interact with players.**

   Commands to the system will use the English language.

4. **The game has up to four players, and their names should be entered.**

   The first requirement stipulates a multi-playe vis the consoler game that requires individual identifiers for each player (can be a choice of organisations) to be entered to allow game play. To avoid two players entering the same name a message will be displayed prompting the player to enter a different name. Each player will begin the game with 100 hours of resources.

5. **The players take turns.**

   The group have determined that the sequence of game play will be decided by a roll of the dice with the player returning the highest number taking the first turn.

6. **Players throw 2 virtual dice.**

   A player moves around the board based on the number displayed on the dice. If a player throws a double play will continue as normal.

7. **Players are told where they have landed and what their obligations or opportunities are.**

   If appropriate a player indicates their choice of action. A player can take charge of a square if they have enough resources to do so. If a player does not want to invest resources in the block that they have laned on it can be offered to another player. If a players resources change during their turn the new balance will be displayed.

8. **There is a start square, where players pick up their 'resources'.**

   This requirement outlines where each player will start the game and also outlines exactly how many resources each player should receive from going around 'the board' each time. During play each player will receive 50 hours of resources for passing go.

9. **There is square where nothing happens**

   In the game of Monopoly this is a resting place where nothing happens, players do not receive or pay any resources if they land on this square.

10. There are four systems: two consist of three adjacent squares and two consist of two adjacent squares

Systems based on the Artemis project:

- v SLS System (3 squares)
- v Orion System (2 squares)
- v Spacesuit System(2 squares)
- v Gateway and Lunar Landers System(3 squares)

SYSTEM	INVEST	DEVELOP	MAJOR DEV.	SERVICE CHARGE
SLS	30 hours	20 hours	50 hours	20 hours
ORION	100 hours	200 hours	300 hours	50 hours
Spacesuit	10 hours	10 hours	20 hours	10 hours
Gateway & Lunar Landers	30 hours	20 hours	50 hours	20 hours

ARTEMIS LITE

11. Before you can develop an area within a system, you must own/manage/'be in charge of' the whole system.

A player can develop and element even if they are not positioned on that system. In Monopoly three houses are required on a property before a hotel can be positioned. In the case of ArtemisLite three developments of a system are required before a major development can take place – costs detailed in point 7.

12. If a player lands on a square owned by another player they will be expected to pay resources to the owner

Cost to be determined, however a player can choose not to take resources from a player – there could be a payment to the owner for an act of charity.

13. If one player runs out of resources or does not want to play, the game ends for all players

There should be a check to avoid the game accidently ending, a message will be displayed - do you really want to quit?

14. The game will be complete when all systems have been developed and the team lands on the moon by making it to the moon.

When a player lands on a square they are given the option to invest, only that player can develop the system following three developments and a major development. Once all systems have been fully developed the team will successfully land on the moon.

15. Additional requirements for consideration

Design features that with some additional effort can make the system more maintainable and extensible – increase number of squares or increase the max number of players. Good software design meets current requirements but can be adapted for future amendments to accommodate change.

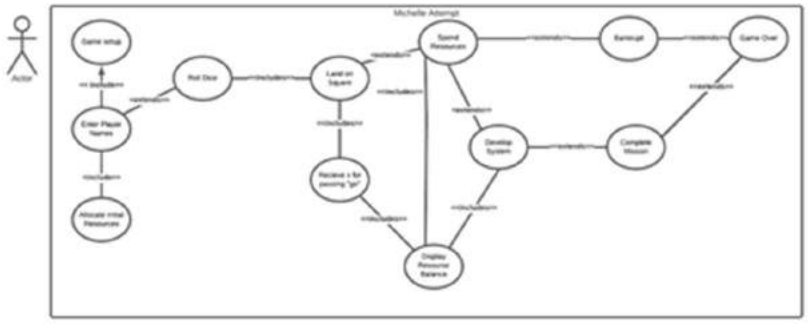
Requirement Check-List

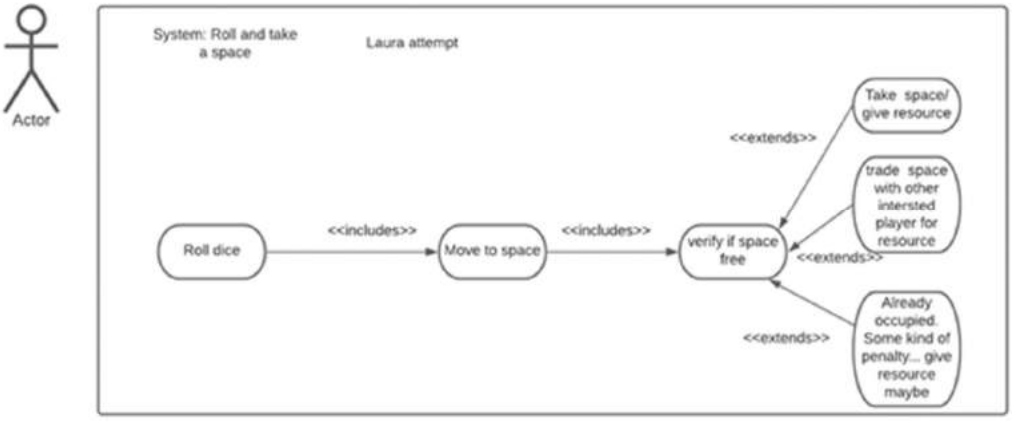
Requirements	Details	System Complies with Req
Req 1	Development of a virtual board game that does not have an elaborate graphical interface.	✓
Req 2	The game will have a distinctive theme – NASAs mission to land the first woman or next man in the moon.	✓
Req 3	The system uses English to convey the state of game play to interact with players.	✓
Req 4	The game has up to four players, and their names should be entered.	✓
Req 5	The players take turns.	✓
Req 6	Players throw 2 virtual dice.	✓
Req 7	Players are told where they have landed and what their obligations or opportunities are.	✓
Req 8	There is a start square, where players pick up their 'resources'.	✓
Req 9	There is square where nothing happens	✓
Req 10	There are four systems: two consist of three adjacent squares and two consist of two adjacent squares	✓
Req 11	Before you can develop an area within a system, you must own/manage/'be in charge of' the whole system.	✓
Req 12	If a player lands on a square owned by another player, they will be expected to pay resources to the owner	✓
Req 13	If one player runs out of resources or does not want to play, the game ends for all players.	✓
Req 14	The game will be complete when all systems have been developed and the team lands on the moon by making it to the moon.	✓
Req 15	Additional requirements for consideration.	✓

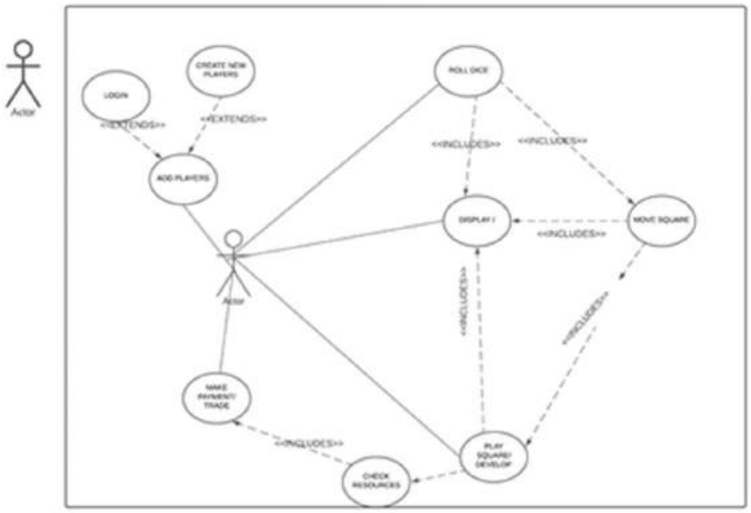
Appendix V Requirements & Checklist

Appendix VI Superseded Use Case diagrams, descriptions & other diagrams

Each member of the group produced a use case diagram which contributed to the final design of the use case that was the starting point for the development of ArtemisLite. The development of the Use Case diagram identified the core elements and processes that will make up the game.







Superseded use case descriptions and further explanations for use case descriptions:

Flow of events for *Land on Square* Use Case	
Objective	A player can invest resources to own a square within a system
Pre-condition	The player lands on a square

Main flow	1: The name of the square and its current condition is displayed to the player, what system it is a part of, is it available to invest in, has another player already invested in the square. 2: The player selects an option 3: If the square is owned Pay Resources use case is called 4: If the player wants to invest, Invest in Square use case is called 5: If the player wants to develop, Develop use case id called 6: If the player does not want to do anything, Do Nothing use case is called
Alternative flows	1. At 3 and 4, if the player's resource balance is 0 they will be warned they do not have enough resources and player turn options displayed: Invest , End Turn, End Game.
Post-condition	The player will remain on the square until their next turn

Flow of events for *Do Nothing Resources*	
Objective	Player takes turn
Pre-condition	Player lands on a square
Main flow	1: Options displayed to player 2: End player turn, Player turn use case called 3: End game, End game use case called
Alternative flows	
Post-condition	Next player turn

Play Game : Flow of events for *Invest in Square* Use Case(child use case)	
Objective	A player can invest resources to start ownership of a system
Pre-condition	It is the players turn, the square is available for investment and the player has enough resources to invest

Main flow	1. The name of the system and square is displayed to the player 2. The player selects to invest in the square (only the owner of a square can develop blocks in the system) 3. The investment amount is deducted from the players total resources 4. The players current and new balance after investment is output to screen 5. Option to develop / end turn / end game
Alternative flows	1. At 3 and 4, if the player's resource balance is 0 they will be warned they do not have enough resources and player turn options displayed: Invest , End Turn, End Game. 2. If player invests, the system's ownership is updated At 5, Player develops the system, Develop use case called. End turn, next player's turn, Player Turn use case called. End Game use case is called
Post-condition	The player will remain on the square until their next turn

Flow of events for *Develop* Use Case	
Objective	A player has chosen to develop a block
Pre-condition	A player has invested in a square and has chosen to develop
Main flow	1: Development options for the player are displayed, Tier 1, Tier 2, Tier 3 2: Player chooses to develop a block, current resources and resources after development displayed, player prompted to choose y or n 3: Option to exit development, and /or not enough resources and avoid bankruptcy
Alternative flows	At 3, exit development and return to player turn options
Post-condition	Development complete, return to player turn menu

Flow of events for Major *Development* Use Case	
Objective	To make a major development in a system
Pre-condition	Player will have completed 3 developments of a system & have a turn

Main flow	1. The option to make a major development is displayed to player 2. The player selects to make a major development 3. The investment amount is deducted from the players resources 4. The players new balance is output to screen
Alternative flows	At 1, if player chooses not to make a major development or does not have required resources the next player takes their turn
Post-condition	The player will remain on the square until their next turn

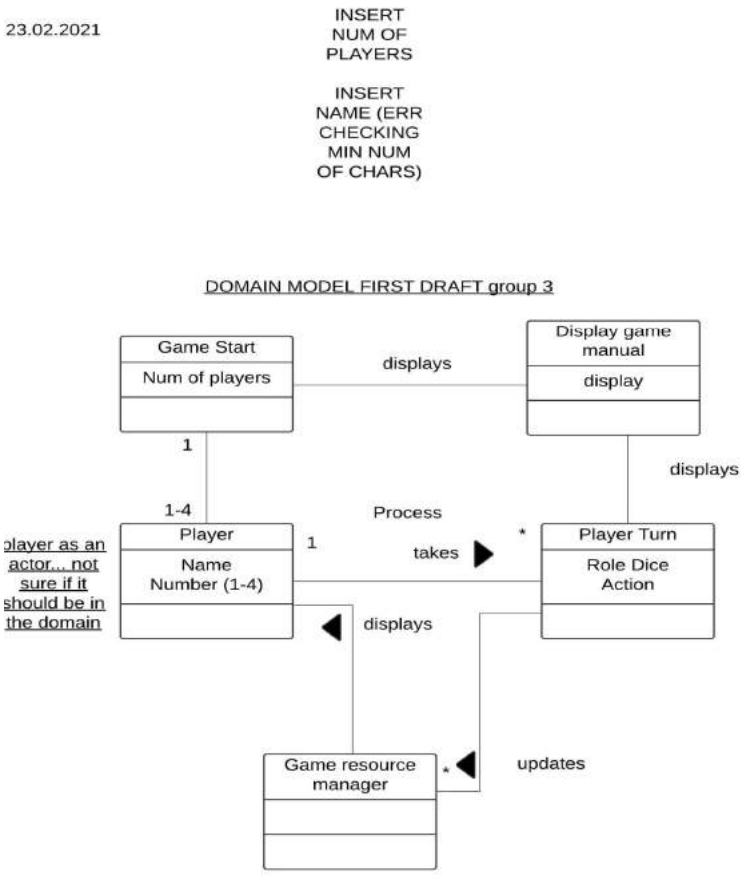


Figure of the group's early attempt of domain model

Appendix VII Expanded Use Case descriptions

Game Set Up: Flow of events for *Allocate Initial Resources* (child use case)	
Objective	Allocate "100 hours" to each player
Pre-condition	Player objects created and names have been entered
Main flow	1: System allocates resources to each player. Resources are displayed on a players turn
Alternative flows	
Post-condition	Players will begin the game with 100 hours of resources

Game Set Up: Flow of events for *Roll Dice* (child use case)	
Objective	Roll 2 dice (numbered 1 to 6), integer output in the range of 2 to 12. The player will then move that number of squares on the board.
Pre-condition	A game has been set up correctly with the desired number of players.
Main flow	1: A player will roll the dice and an integer value will be generated randomly. 2: The value will be output to screen indicating the number of squares to move 3: The PlayerTurn Use Case is called
Alternative flows	

Play Game: Flow of events for *Pass Go* (child use case)	
Objective	To allocate resources to player
Pre-condition	Player passes go
Main flow	1: 50 hours are automatically allocated to the player passing go

Alternative flows	
Post-condition	50 hours added to the players current resource total

Play Game: Flow of events for *Pay Resources* (child use case)	
Objective	If a player lands on a square owned by another player thy may have to pay resources
Pre-condition	A player has landed on a square owned by another player
Main flow	1: Owner is asked if they want to collect the charge 2: Owner collects charge 3: Owner does not collect charge
Alternative flows	At 2, select 8 to collect resources, both players previous and current resources after payment displayed At 3, service charge not collected from player, current hours displayed
Post-condition	Player chooses player turn options

Appendix VIII Further sequence diagrams

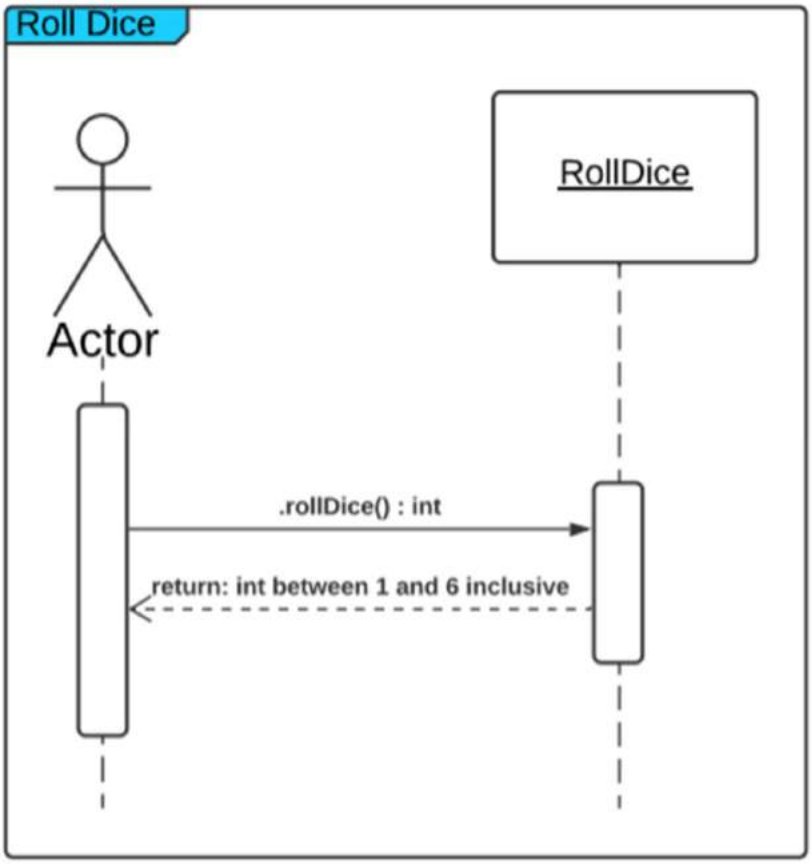
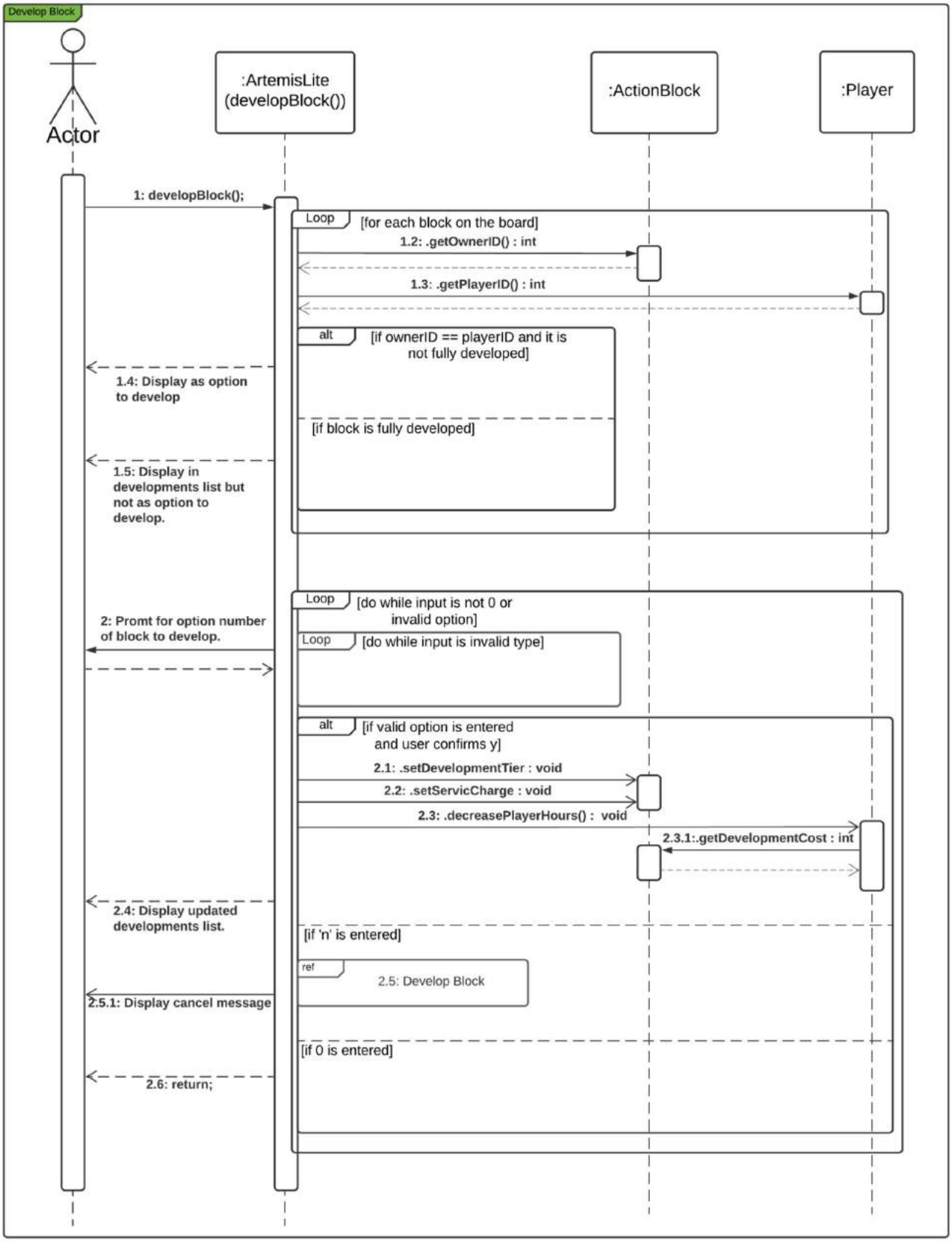


Figure showing the roll dice sequence diagram



Appendix VIII Further sequence diagrams

Figure showing the develop block sequence diagram

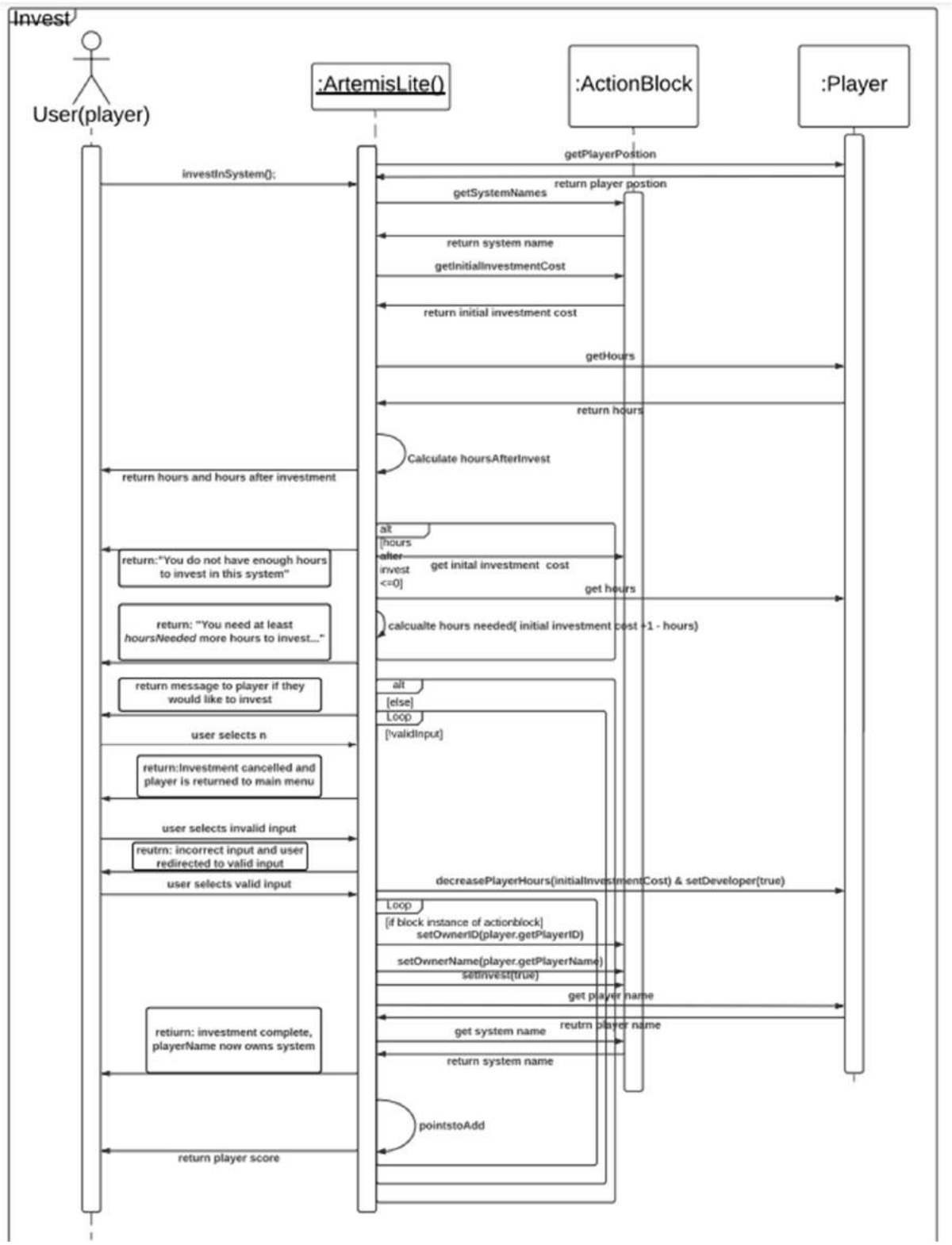


Figure showing the invest sequence diagram

Appendix VIII Further sequence diagrams