CA314 Assignment 1 - Analysis

Group Name: Group 20
Members: Kieran Flynn, Walter Eze, James Toolen, Alaaldin Afana, Ting Lok Chang.
Game: Whist

Refined requirements specification

Functional Requirements

- The game must have a client-server architecture
- The game must facilitate 4 players in each game, in teams of 2
- The game must have a shuffle function which randomises the order of cards
- The game must match together players into teams and opponents
    - Random play: Automatically assigns a player to a game with other random players
    - Username play: Allows a user to create a game with a unique key which other players can then use to join game and select team
- The game must deal out 13 cards to each player, adhering to the order of the deck
- The game must maintain a state of cards already played, cards in play and cards in the deck
- The game must keep score of tricks and points
- The game must terminate when one team has won or when a player leaves mid game
- The game must render a graphical user interface for all players in real time
- The game must manage the order of play, ensuring players to not play out of turn

Infrastructure Requirements

- The game requires each player have a device capable of browser based gameplay with an internet connection
- The game requires a dedicated server connected the internet to host the game

Gameplay Requirements

- Gameplay must follow the format:
    - Cards are shuffled
    - Cards are dealt 1 at a time to each player until each player has 13 cards
    - The final card to be dealt is turned up and this card becomes trumps
    - The dealer has option of leaving this card down in play or picking it up to use later
- The Play :
    - The player to the left of dealer leads the round

- Going clockwise, each player plays a card from the hand dealt to them, the players must play a card of the suit that lead if they have one, otherwise they may play a trump or other suit
- The hand ends when all players have played a card
- The player that played the highest trump card or highest card of leading suit if no trump played wins the trick
- The winner of the trick leads the next trick
- This hand continues until all 13 tricks have been played

The Scoring:

- The team which won most tricks in the hand scores a point for every trick won in excess of 6
- A game is over when a team reaches a score of 6
- Multiple hands are played if necessary until a team reaches this score.

Scenarios

User joins a public game

Mark opens his internet browser and goes to the URL of the whist game. He is presented with a screen which contains three large tile buttons, one says “Join public game”, one says “Join private game with code” and the third says create private game. He selects join random game and is then presented with a waiting icon until he is placed in a game with other public players who are also online.

User creates a private game

Mark opens the Web Browser and goes to the designated url of the Mywhist. He presented with a screen which contains 3 selections: join random game; create private game; join private game. She choose create the private game and is presented with randomized code to use to join the game.

User joins a private game

Mark opens his internet browser and goes to the URL of the whist game. He is presented with a screen which contains three large tile buttons, one says “Join public game”, one says “Join private game with code” and the third says create private game. He selects join private game with code and a text box then appears, he pastes in the code which his friend who created the game sent him and presses join. He is then placed in game with his friend, as he is the first guest to join the game with the code, he is placed on the same team as the games creator, his friends Kelly and James join later using the code and are placed on the opposing team.

The system starts the game

The system shuffles the deck and begins to distribute each card to the players in a clockwise direction until each player has 13 cards, the last card given to the last player will be the suit that is trumps.

User plays a trick

John begins the game by playing a king of hearts as his first card, Jenny, Mark and Steve play a six of hearts, an ace of hearts and four of hearts respectively. Mark wins the trick with the highest card. Following that, mark chooses the ten of clubs as the leading card (trump) for the next trick.

User plays a hand

13 tricks are played and the players have ran out of cards. Mark and John have won a combined total of 7 out of the 13 tricks. Jenny and Laura won the other 6 tricks. Points are awarded for every trick in excess of 6 so Mark and John score 1 point from this hand. Another hand is now played.

Game ends - 4 player

7 hands have been played. Jenny and Laura have a score of 3 points and Mark and John have now got a score of 6 points having just won the last hand. So they have received the required number of points to win the game. All players are presented with a screen offering displaying the winners and offering a replay. If all four players vote to replay then the game is restarted.

Game ends - 2 player

3 hands have been played. Jenny has a score of 1 point and Mark has a score of 3 points having just won the last hand. So mark has received the required number of points to win the game. Both players are presented with a screen offering displaying the winners, as this is two player game meaning team members have dropped out, they are not presented with an opportunity to replay.

One user quits a game

Kevin decides to quit in the middle of a game. Which leaves three players left in the game, Kevins teammate Laurie and their opponents John and Sarah. The game now re-structures to a 3 player game so it can be continued. Each teams score is halved, the amount of points required to win is halved and the lowest scoring player on the two player team which is Sarah, becomes an observer. Now John and Laurie continue the game in a two player format.

Second user from opposing team quits game - observer

Kevin has already quit the game. Now John and Laurie are continuing the game with Sarah as the observer on Johns team. Sarah decides to quit the game. The game remains unchanged and play continues between John and Laurie.

Second user from opposing team quits game - active player

Kevin has already quit the game. Now john and Laurie are continuing the game with Sarah as the observer on Johns team. John decides to quit the game. Johns exact cards are transferred to sarah and she becomes the active player. Play continues on between Sarah and Laurie.

Second user from same team quits game

Kevin has already quit the game. Now John and Laurie are continuing the game with Sarah as the observer on Johns team. Laurie decides to quit the game, she is presented with a screen informing her that if she quits she will have forfeit the game, she decides to quit anyways. John and Sarah win the game.

Third user quits game

Kevin and Sarah have already quit the game. John and Laurie are continuing the game. John decides to quit, he is presented with a screen informing him that if he quits he will have forfeit the game, he decides to quit anyways. Laurie wins the game.

Primary Class List

Game (SERVER SIDE)

Variables
Int Game_id
Player current_dealer
Set <Card> Unused_deck
Set <Card> Deck_in_play
Set <Card> Used_deck
Set <Card> Players

Methods
Update_score()
deal_hand()
shuffle_deck()
end_game()
calculate_hand_points()
calculate_trick_winner()
update_board_state()

Card (SERVER SIDE)

Variables
String Suit
String Type

Game_Manager (SERVER SIDE)

Variables
Set <Players> Online_users
Set <Players> Waiting_users

Set <Game> Active_games

Methods
create_public_game()
create_private_game()
assign_player_to_game()

Player (CLIENT SIDE)

Variables
Int ip_address
String name
Display browser_ui

Methods
connect_to_server()
join_game()
quit_game()
play_card()

Display (CLIENT SIDE)

Methods
render_display()
update_game_view()

CRC’s

<table>
<tr><td>Class Name: Game</td><td colspan="2">ID: 1</td><td>Type:</td></tr>
<tr><td colspan="3">Description: This is the class game it provides the dealer and the player with an Interface</td><td>Associated Use Cases:
Open game</td></tr>
<tr><td colspan="2">Responsibilities</td><td colspan="2">Collaborators</td></tr>
<tr><td colspan="2">It acts as a medium between player and dealer</td><td colspan="2">Player</td></tr>
<tr><td colspan="2">It acts as a medium between player and dealer</td><td colspan="2">Dealer</td></tr>
</table>

Keeps track of game score	

Attributes	
Int Game_id	Set <Card> Players
Player current_dealer	
Set <Card> Unused_deck	
Set <Card> Deck_in_play	
Set <Card> Used_deck	
Relationships	1 to 4 with player. Many to 1 with dealer
Generalisation (a-kind-of)	
Aggregation (has-parts)	
Dealer- a game has a dealer	
Other Associations	

Class Name: Player	ID: 2	Type:
Description: Communicates with game by inputing inputs and responding to outputs		Associated Use Cases:

Responsibilities	Collaborators
It stores Hand	Interface display
It stores player name	Game

Attributes	Operations
Int ip_address	connect_to_server()
String name	join_game()
Display browser_ui	quit_game()
Relationships	4 to 1 with player.
Generalisation (a-kind-of)	
Aggregation (has-parts)	
Interface display-is a part of player	

Other Associations	

Class Name: Dealer	ID: 3	Type:
Description: This class in charge of shuffling and distributing cars		Associated Use Cases:

Responsibilities	Collaborators
Shuffles cards	Deck
Deals cards	Game
Sets trump	
Checks the winner	

Attributes	Operations
List Shuffle	<Set >Deck
List deal	<Set> UsedDeck
List OnTable	

String check winner	
String Set Trump	
Relationships	Many to 1 with Game 1 to 1 with deck
Generalisation (a-kind-of)	
Aggregation (has-parts)	
Dealer –parts of deck	
Other Associations	

Class Name: deck	ID: 4	Type:
Description: Deck class stores information about the card in the deck		Associated Use Cases:

Responsibilities	Collaborators
Keep track of cards in deck	Cards
	Dealer

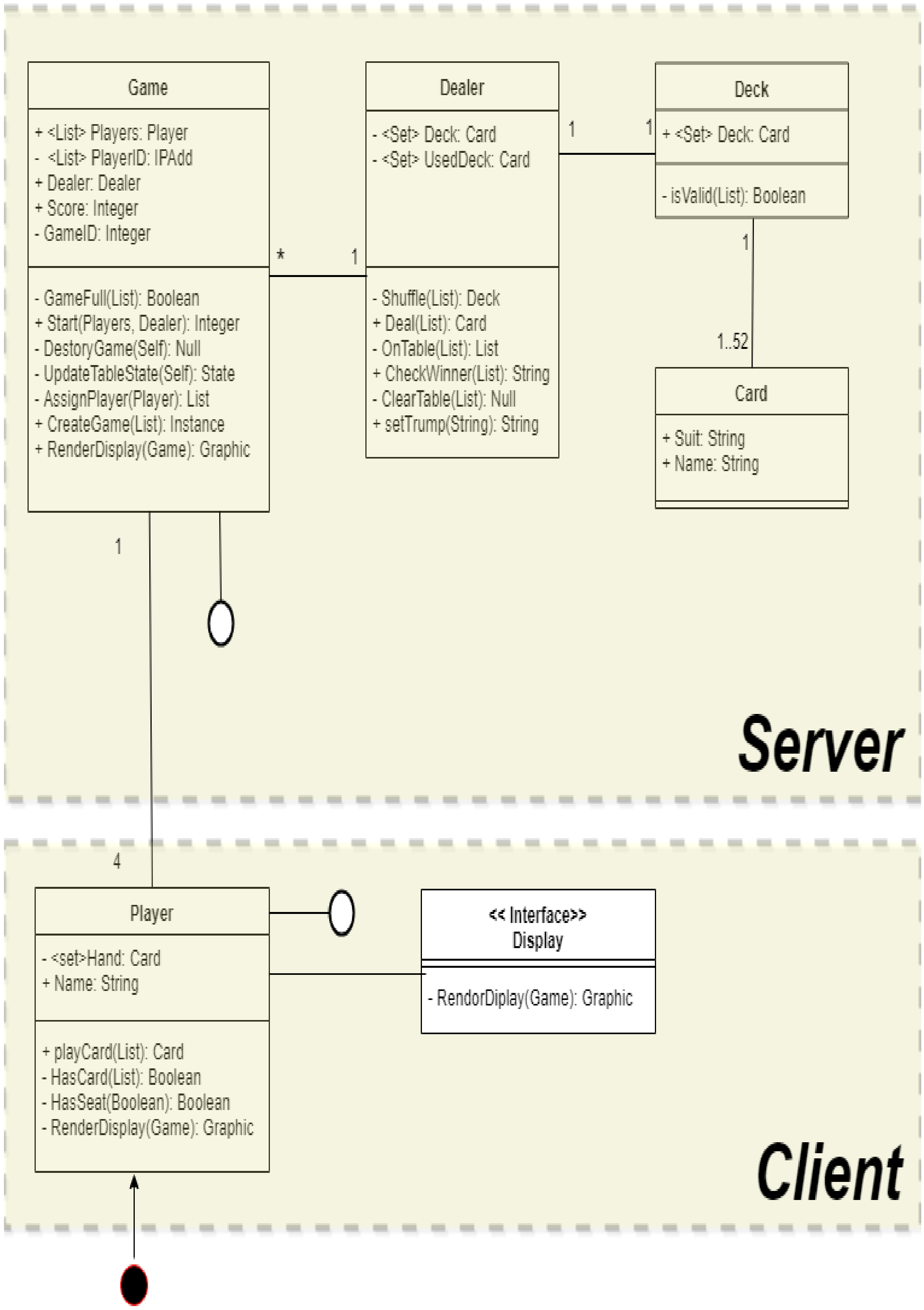
Attributes	Operations
List isValid	<Set> Deck
Relationships	1 to 1 with Dealer 1 to 52 with card
Generalisation (a-kind-of)	
Aggregation (has-parts)	
Card-parts of deck	
Other Associations	

Class Name: Card	ID: 5	Type:
Description: Card class is a list of lists containing an integer and a string		Associated Use Cases:

Responsibilities	Collaborators
Makes up the deck the suites and the hand An essential part of the game	Deck

Attributes	Operations
Sting Suite	
String Name	
Relationships	52 to 1 with deck
Generalisation (a-kind-of)	
deck- a kind of cards	
Aggregation (has-parts)	
Other Associations	

Class Diagrams



Use Case Descriptions & Diagram

USE CASE 1	Play Card	
Goal in Context	Player chooses a card from their deck to play.	
Scope & Level	Gameplay, Core.	
Preconditions	Each player has been dealt thirteen cards	
Success End Condition	A card is taken from the deck of the player and shown to the other players.	
Failed End Condition	No card leaves the players deck.	
Primary, Secondary Actors	Player. Dealer, other players	
Trigger	Website URL, internet access.	
DESCRIPTION	**Step**	**Action**
	1	Four players begin a game of Whist.
	2	A deck of 52 cards is shuffled.
	3	One of the four players is selected to be the dealer.
	4	The dealer gives a single card to each player.
	5	The dealer continues giving cards until all players have 13 cards.
	6	The suit of last card dealt becomes the Trump card.
	7	The player to the left of the dealer can pick a card to play.
	8	Other players can select a card of the same suit as the first card to play.
EXTENSIONS	**Step**	**Branching Action**

	5a	Player leaves the game lobby: Dealing halts
	8a	Player has no cards from opening suit: Player can play cards of other suits
VARIATIONS		**Branching Action**
	1	The starting player can play any suit of card with any number or rank.
	2	The trump card can be one of four suits in a deck: Hearts Diamonds Spades Clubs

USE CASE 2	Create public game	
Goal in Context	Player creates a game on the server that is publicly available.	
Scope & Level	System, Core.	
Preconditions	Player has game open, servers are live.	
Success End Condition	Player can host a game of Whist with 4 random players.	
Failed End Condition	Player cannot host a game of Whist	
Primary, Secondary Actors	Player. Server, other players.	
Trigger	Game lobby creation	
DESCRIPTION	**Step**	**Action**
	1	Player opens the game website
	2	Player selects their name.

	3	Player is presented with different game types to play.
	4	Player chooses to create a public game.
	5	Player selects a name for the lobby.
	6	Player is allocated a slot in the game
	7	Player joins their created game.
	8	Player waits for other players to join the game.
EXTENSIONS	**Step**	**Branching Action**
	7a	Player disconnects from server.
	8a	No players join game: Game cannot begin
VARIATIONS		**Branching Action**
	1	Player can choose any name for their lobby.
	2	Any player who is permitted to use the site may enter a public game lobby.

USE CASE 3	Create Private Game
Goal in Context	Player creates a game on the server that is available to game code owners only.
Scope & Level	System, Core.
Preconditions	Player has game open, servers are live.
Success End Condition	Player can host a game of Whist with 4 hand selected players.
Failed End Condition	Player cannot host a game of Whist
Primary, Secondary Actors	Player. Server, other players.

Trigger	Game lobby creation, private game code.	
DESCRIPTION	**Step**	**Action**
	1	Player opens the game website
	2	Player selects their name.
	3	Player is presented with different game types to play.
	4	Player chooses to create a private game.
	5	Player selects a name for the lobby.
	6	Player is allocated a slot in the game
	7	Player joins their created game.
	8	Player is given a code to distribute to potential players.
	9	Player shares game code with potential players.
	10	Player waits for other players to join the lobby.
EXTENSIONS	**Step**	**Branching Action**
	7a	Player disconnects from server.
	10a	No players join game: Game cannot begin
	10b	Player unknown to host enters game: Player is removed from game lobby
VARIATIONS		**Branching Action**
	1	Player can choose any name for their lobby.
	2	Any player who is aware of the game code to use the site may enter a private game lobby, subject to host’s approval.

USE CASE 4	Join Public game.	
Goal in Context	Player joins a publicly available game on the server.	
Scope & Level	System, Core.	
Preconditions	Player has game open, lobby has slots available, servers are live.	
Success End Condition	Player can successfully a public game.	
Failed End Condition	Player cannot join a public game.	
Primary, Secondary Actors	Player. Server.	
Trigger	Available game lobby slots	
DESCRIPTION	**Step**	**Action**
	1	Player opens the website for the game.
	2	Player selects their name.
	3	Player is presented with different game types to play.
	4	Player chooses to play a public game.
	5	Player is presented with a waiting screen.
	6	Player waits to be entered into a game.
	7	Player is allocated a slot in a game
	8	Player joins their allocated game.
	9	Player joins an available team.
EXTENSIONS	**Step**	**Branching Action**
	3a	No games are available
	6a	Player joins full match: Access denied

	6b	Player disconnects from server.
	9a	Team slot not available: Player joins opposing team
VARIATIONS		**Branching Action**
	1	Players may use different browsers to join the game.
	2	Player may join any game that is accessible to the public.

USE CASE 5	Join Private Game.	
Goal in Context	Player joins a game on the server using a private game code.	
Scope & Level	System, Core.	
Preconditions	Player has game open, game slots are available, servers are live.	
Success End Condition	Player is able to play a game.	
Failed End Condition	Player cannot join a game.	
Primary, Secondary Actors	Player. Host, Server.	
Trigger	Private match code,	
DESCRIPTION	**Step**	**Action**
	1	Player opens the website for the game.
	2	Player selects their name.
	3	Player is presented with different game types to play.
	4	Player chooses to play a private game.
	5	Player enters a private game lobby code.
	6	Player is presented with a waiting screen.
	7	Player waits to be entered into a game.

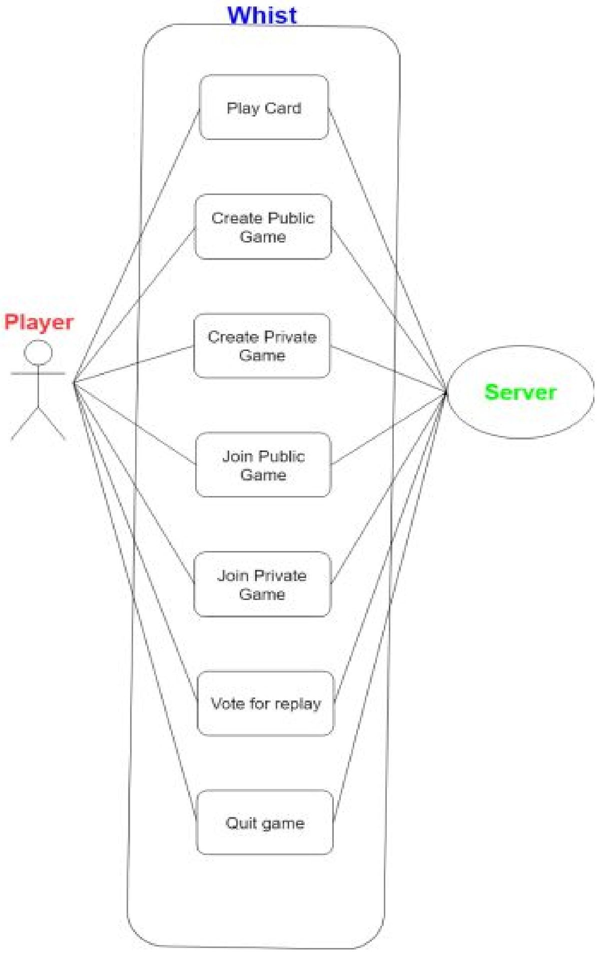
	8	Player is allocated a slot in a game
	9	Player joins their allocated game.
	10	Player joins team of host.
EXTENSIONS	**Step**	**Branching Action**
	3a	No games are available
	5a	Player types wrong access code for private match: Access denied.
	7a	Player joins full match: Access denied
	7b	Player disconnects from server.
	10a	Host team is full: Player joins opposing team
VARIATIONS		**Branching Action**
	1	Player uses different browsers to join the game.

USE CASE 6	Vote for Replay	
Goal in Context	Players vote to decide if both teams should play a rematch.	
Scope & Level	Gameplay, Minor.	
Preconditions	Game is completed, players remain in game lobby.	
Success End Condition	Players decide to continue with a rematch.	
Failed End Condition	The game is concluded.	
Primary, Secondary Actors	Player. Other players.	
Trigger	Game voting poll.	
DESCRIPTION	**Step**	**Action**

	1	Players complete a game of Whist.
	2	A winning team is selected.
	3	Players given a poll to decide if a new match is played.
	4	Player chooses “Yes” or “No” option.
	5	Player waits for other players to enter their vote.
	6	Players votes gathered.
	7	Result of votes calculated.
	8	Result of most popular option is executed.
EXTENSIONS	**Step**	**Branching Action**
	4a	No other votes entered.
	6a	No votes available: Game concludes.
	2a	Match ends in a tie.
	8a	No popular option found: Game concludes.
	8b	Poll ends in a tie: Players return to game lobby.
VARIATIONS		**Branching Action**
	1	Calculated result can range from 0 to 4 in each option.
	2	Vote can produce differing results: “Yes” win “No” win Tie

USE CASE 7	Quit game	
Goal in Context	Player exits from a game lobby on a server	
Scope & Level	System, Core.	
Preconditions	Player is in game lobby.	
Success End Condition	Player is allowed to exit a game lobby	
Failed End Condition	Player remains in the game lobby.	
Primary, Secondary Actors	Player. Server.	
Trigger	Exit request.	
DESCRIPTION	**Step**	**Action**
	1	Player joins an available game.
	2	Player requests to leave the game lobby.
	3	Server asks if the player is sure of their decision.
	4	Player responds to the server question.
	5	Player is removed from the game lobby.
	6	Player is returned to the website homepage.
	7	Server searches for new players to fill available slot in game lobby.
	8	Player joins their allocated game.
EXTENSIONS	**Step**	**Branching Action**
	4a	Player is unsure: Player remains in lobby
	7a	Player is game host: New host is selected from remaining players

	7b	Player was only player in game lobby: Game is terminated.
	6a	Player disconnects from server.
VARIATIONS		**Branching Action**
	1	Players may submit an exit request before, during and/or after a game is in progress.
	2	Players are allowed leave any game lobby type: Public Game Private Game



Team Meeting Minutes:

CA314 Project – Meeting One's Minutes

Date: 4th October 2018

Attendees: James Toolen, Kieran Flynn, Walter Eze, Ting Lok Chang

Meeting Results:

1. We have agreed to hold quick meetings on Monday's & Wednesday's for quick meetings while also holding weekly, hour long meetings on Thursdays.
2. We have elected roles for the group. James is the sceptic, Kieran is the scribe, Walter is the timekeeper & Ting is the facilitator.
3. We have agreed to create a group on Trello for storing the project work before uploading to Loop.
4. We have agreed that the group will work collectively on each element of the project.
5. We have decided that the next topic of discussion will be Use Cases.
6. We have chosen to book a room in the library for the next hour long meeting.

CA314 Meeting Two's Minutes

Date: 11th October 2018

Attendees: James Toolen, Walter Eze, Ting Lok Chang

Results of Meeting:

1. We have agreed that the game developed will be a four-player version of Whist with two teams, one player controlled locally & the others possibly being artificially intelligent players.
2. We have established that the game will be based on a website & the player will be greeted with a "waiting for players" message.
3. We have established that each turn of playing a card will be in a clockwise order and the last card the dealer has will be the trump card.
4. We agreed to use Ting's redbrick server for the website for the game.
5. We have decided to put the rules of the game on the website.

CA314 Team Meeting Three's Minutes

Date: 18th October 2018

Attendees: Kieran Flynn, Ting Lok Chang, James Toolen, Walter Eze, Alaaldin Afana

Results of the Meeting:

1. We decided which parts of the analysis section each person will lead the work on.
2. Walter will work on the refined requirements specification & Scenarios.
3. James & Alaaldin will work on the Primary Class List, CRC's .
4. Ting & Kieran will work on the Use Case Descriptions & Diagram.
5. Walter & James will work on the Structured Walkthrough
6. Kieran will handle the team minutes.