**Arknight Duel**

**1.Arknight Duel: 2 player Turn-based Fantasy Card Game**

1.1 Gameplay

In this game, you and your friend will have a chance to compete in a turn-based card game. The first player who can reach one of the winning conditions first will win the game.

1.2 Game Component

1.2.1 Player Character

- At the beginning of the game, you will be needed to type your name and your friend’s name in the input box.

- The first name will be assigned as Player 1 and another will be Player 2.

- Player 1 will play the game first.

- After each player’s turn ends, another player will start their turn and so on.

1.2.2 Game Board

The game board is where the game will be played on. There are 4 specific boards in the game.

1.2.2.1 Main Board

Main board is where the cards will be put on. There are 3 phases in this game from phase 1 to phase 3. The formation of card on the board will be the same in phase 1 and phase 2, but age 3 will be different from the previous 2 phases.

- In the UI of the game, there will be some card that you can pick, cards you can see, and cards you cannot see which will be black card.

- Card that you can pick means that you can select the card and do one of the 3 commands which are build, sell, or build place.

- Card that you can see means that you can see and read the description of the card, but sometimes you can only see the card but cannot do a command if that card is not pickable.

- Card that you cannot see or black card, this card requires one condition to flip to seeable card. The condition is that you need to already pick the cards under that specific card. Then after the turn ends, that card will be flipped to be seeable. Remember that if that card is black card, you cannot read the description of the card.

- When main board is out of cards, the phase will end, and the next age piles of card will be put on the main board immediately. If the phase 3 ends and the nobody meets the winning condition, the player with most point will win the game.

- At the beginning of the game, the cards on the board will be from age 1.

1.2.2.2 Attack Board

Attack Board is where the attack symbol will be on. Attack board has a length of 19 from -9 to 9. The position of the attack symbol represents how much player 1 and player 2 attack each other.

- At the start of the game, the position of attack symbol is at 0.

- If any player builds a card or builds place a place card that contains attack symbols.

- For player 1, the attack symbol will be moved to the right with that amount of attack symbols appear on the card.

- For player 2, do the same action but to the left.

- If the attack symbol is at position 9, player 1 will win the game.

- If the attack symbol is at position -9, player 2 will win the game.

- At the position 1, 3, 6, -1, -3, or -6, there will be reward or punishment assigned to that position.

- Position 1, player 1 will get 2 points.

- Position 3, player 2 money will be reduced by 2.

- Position 6, player 2 money will be reduced by 5.

- Position -1, player 2 will get 2 points.

- Position -3, player 1 money will be reduced by 2.

- Position -6, player 1 money will be reduced by 5.

\*remember that the reward and punishment at each position will be met only once. After that reward and punishment is already used, there will be no effect if the attack symbol is at that position again.

* + - 1. Player Board

Player Board is where you can see your opponent’s resource counter and yours.

- The player board will show your point, money, resources, cost to buy each resource separately, and the money you will get after selling the card.

- At the beginning of the game, both players will be given 7 LMD, 0 point, 2 LMD for selling a card, and 2 LMD for buying each resource.

- During the game, these amounts of resource can be changed anytime from card, place card, reward and punishment on attack board, and selling rules.

* + - 1. Place Board

Place board is where the place cards will be put on. There are only 8 different cards throughout the game. Each card has a different building requirements and resources.

- To build place card, you can build place card anytime you want if your resources are enough to build place.

- To build place, you need to choose one card on main board, and then select build place option. The chosen normal card will be removed after the build place action completes.

- Place card will have more reward than normal card with high cost of building as well.

1.2.3 Card

Cards determine the flow of the game. There will be 3 piles of card for 3 ages.

- Size of age 1 and age 2 piles of card are 20.

- Size of age 3 pile of card is 16.

1.2.3.1 Type of card

1.2.3.1.1 Military card

This card background is red. If player builds this card, the attack symbol will be moved in the direction according to the attacker with the amount of attack symbols on this card.

1.2.3.1.2 Point card

This card background is orange. If player builds this card, the player point increase with the amount of points on this card.

1.2.3.1.3 Trading card

This card background is yellow. If player builds this card, the money you will get after selling the card will be increased by 1. Then, the cost to buy the resource on this card of the player will be reduced by 1.

1.2.3.1.4 Raw material card

This card background is blue. If player builds this card, the resources will be increased by the amount of resources on this card

1.2.3.1.5 Place card

This card will be on place board. This card can be built anytime if your resources meet with the building conditions.

1.2.3.2 Chain symbols

Some cards contain chain symbol at the top-right edge of the card. The card has either 1 or 2 chain symbols.

1.2.3.2.1 One chain symbol

If player builds a card with one chain symbol, player will get that chain symbol in his inventory.

1.2.3.2.2 Two chain symbols

Cards with 2 symbols can be built by using one of the chain symbols appeared on the card without needing to have enough of resources to meet the building conditions. After that, player will get another symbol to the inventory immediately.

1.3 Game rule

1.3.1) Build and Build Place

To build a card, player needs to have enough materials as appear on the selected card’s requirements. If player do not have enough, player can spend LMD to temporarily buy the resources. However, player will not really get the amount of materials. Player will not lose his resources that were used to build the card except LMD (money).

1.3.2) sell

Player will gain LMD according to the sell card gain displayed on player board.

1.3.3) Winning condition

There are 2 ways to win this game.

1) If any of players can move the attack symbol to the edge of the attack board, the game ends immediately no matter what phase they are in.

- If attack symbol is at position 9, player 1 wins.

- If attack symbol is at position -9, player 2 wins.

If both players cannot move the attack symbol to the edge in 3 phases.

2) Winner will be determined by the player with the most points.

- if both players have the same amount of points, game will end in a tie

1.4 Game Flow

At the beginning of the game, player 1 and player 2 have to fill up the name bar. Player 1 will start the game first. Since the number of cards is even, player 1 will always start the phase.

1. **Player 1 starts the turn**.
2. Player has to choose one of the cards on the board which is pickable. Pickable card is a card that is not overlapped by other cards.
3. After clicking the card’s graphic, there will be 4 buttons for you to choose.
4. In each turn, player can only choose one action to do with selected card.

4.1) **Build**

If player have enough materials to build the card, there will be 2 buttons to choose

which are **Yes Button** and **No Button**.

4.1.1) If player choose **Yes Button**, the card will be built and removed from the main board. Player will not lose his resources that were used to build the card except LMD (money).

4.1.2) If player choose **No Button**, the selected card will be canceled, and player has to choose new card. Return to no 2).

4.2) **Sell**

Player will gain LMD according to the sell card gain displayed on player board.

4.3) **Build Place**

Player has to choose one place card on place board. If player have enough materials to build place card, there will be 2 buttons to choose

which are **Yes Button** and **No Button**.

4.3.1) If player choose **Yes Button**, the place card will be built and removed from the place board. Selected card will also be removed from the main board. Player will not lose his resources that were used to build the card except LMD (money).

4.3.2) If player choose **No Button**, the selected card will be canceled, and player has to choose new card. Return to 2).

4.4) **Cancel**

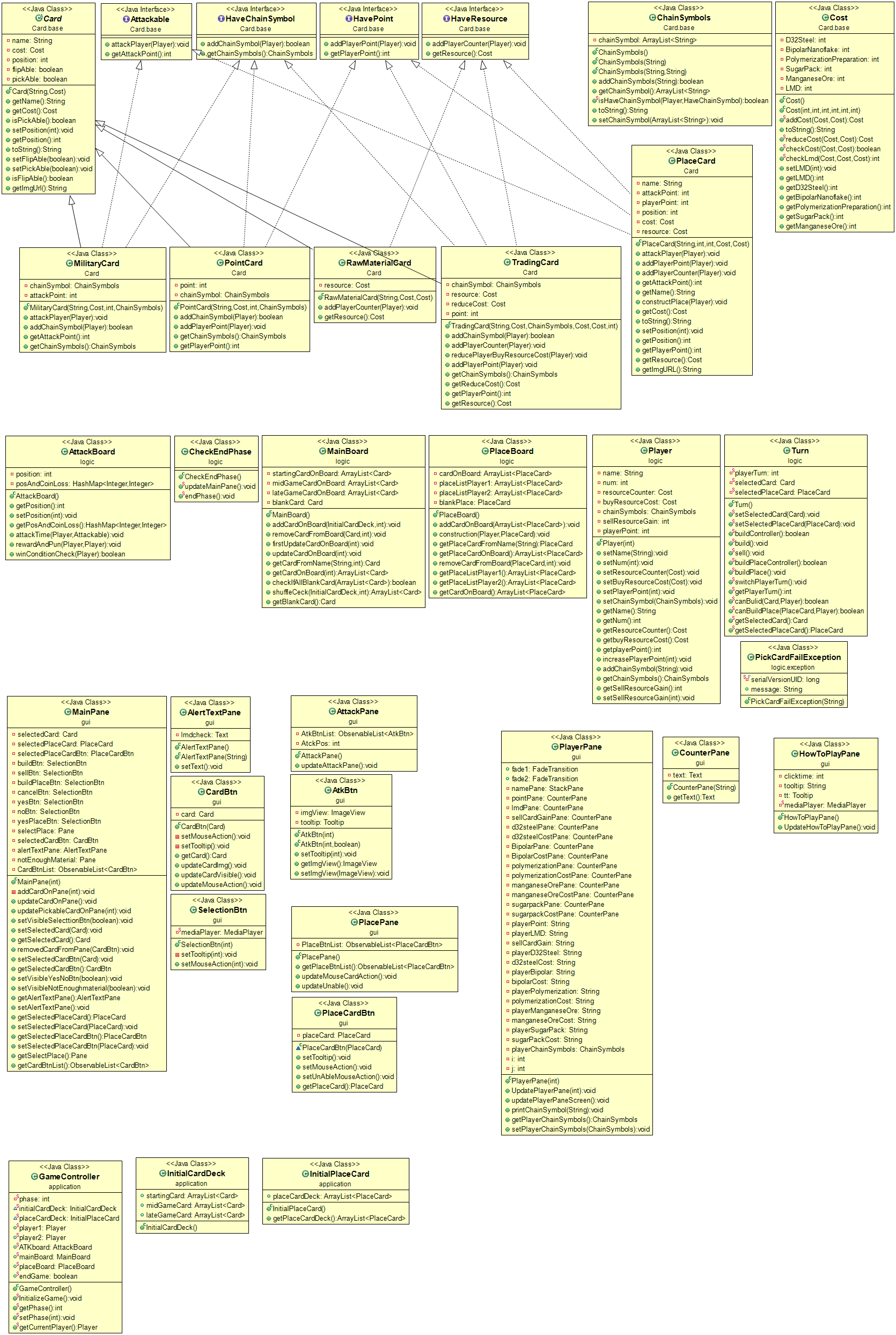
the selected card will be canceled, and player has to choose new card. Return to no 2).

1. If player choose **Yes Button** or **Sell Button** and the process is completed, opponent’s turn will start and repeat the procedure from no 2).
2. If the main board is out of cards, next phase will start and repeat the step from no 1).
3. The procedure will be repeated until one of these conditions met.

7.1) The cards of phase 3 run out, the winner will be determined by the player who meets the winning condition.

7.2) One of the players wins the game by moving the attack symbol to the edge of opponent.

**2. Implementation Details:**



*\* Noted that Access Modifier Notations can be listed below*

***+ (public)***

***# (protected)***

***- (private)***

***static*** *will be underlined.*

***abstract*** *will be italic.*

# 2.1 Package Card.base

2.1.1 Class Card

2.1.1.1 Field

|  |  |
| --- | --- |
| - String itemName | The name of the card. |
| - Cost cost | The cost of the card. |
| - int position | Position of the card on board. |
| - boolean pickAble | To check if the card is pickable. |
| - boolean filpAble | To check if the card is flipable. |

2.1.1.2 Constructor

|  |  |
| --- | --- |
| + Card( String name, Cost cost) | Initializes each field according to the parameter.  Initializes pickAble and filpAble as **False.** |

2.1.1.1 Method

|  |  |
| --- | --- |
| + String toString | Return the card’s name. |
| + String getImageUrl | Return String URL of the card by String concatenation  "/"+this.name+".png" |
| + getter/setter for each field |  |

2.1.2 Class Cost

2.1.2.1 Field

|  |  |
| --- | --- |
| - int D32Steel | Amount of D32Steel. |
| - int BipolarNanoflake | Amount of Bipolar Nanoflake. |
| - int PolymerizationPreparation | Amount of Polymerization Preparation. |
| - int SugarPack | Amount of Sugar Pack. |
| - int ManganeseOre | Amount of Manganese Ore. |
| - int LMD | Amount of LMD. |

2.1.2.2 Constructor

|  |  |
| --- | --- |
| + Cost() | Initializes empty cost. |
| + Cost(int D32Steel, int BipolarNanoflake, int PolymerizationPreparation, int SugarPack, int ManganeseOre, int LMD) | Initializes each field according to the parameter. |

2.1.2.3 Method

|  |  |
| --- | --- |
| + Cost addCost(Cost cost1, Cost cost2) | Return new cost that combine each material of cost1 and cost2 together. |
| + String toString() | Return String of the material name and amount of it. If the amount of it is 0 do not include it in returned String. |
| + Cost reduceCost(Cost cost1, Cost cost2) | Return the difference of each material between cost1 and cost2. If the difference is below 0 set it to 0. |
| + boolean checkCost(Cost playerCost, Cost cardCost) | Return true if all playerCost of each material is more than cardCost. Otherwise return false.  You also have to check each material of player cost or card cost is not 0 |
| + int checkLmd(Cost playerCost, Cost cardCost, Cost buyResourceCost) | Return the number of LMD player have to spend in case of they not have enough material. |
| + void setLMD(int LMD) | Setter method |
| +getter method for each field |  |

2.1.3 Class ChainSymbols

2.1.3.1 Field

|  |  |
| --- | --- |
| - ArrayList<String> chainSymbol | ArrayList of String that contain chain symbols |

2.1.3.2 Constructor

|  |  |
| --- | --- |
| + ChainSymbols() | Initializes new empty ArrayList of String. |
| + ChainSymbols(String chainSymbol) | Initializes new ArrayList of String and add  chainSymbol into ArrayList. |
| + ChainSymbols(String chainSymbol1, String chainSymbol2) | Initializes new ArrayList of String and add  Both chainSymbols into ArrayList. |

2.3.3.3 Method

|  |  |
| --- | --- |
| + boolean addChainSymbols(String chainSymbol1) | Add chainSymbol1 in chainSymbol **if chainSymbol1 is not in chainSymbol.**  And then update playerPane on Screen according to the current player. |
| + boolean isHaveChainSymbol(Player player, HaveChainSymbol card) | Return true if player have at least one chain symbol in the card. Otherwise return false. |
| + String toString() | Return Sting of one chain symbols per line. |
| + getter/setter method |  |

2.1.4 Interface Attackable

|  |  |
| --- | --- |
| *+ void attackPlayer()* |  |
| *+ int getAttackPoint()* |  |

2.1.5 Interface HavePoint

|  |  |
| --- | --- |
| *+ void addplayerPoint(Player player)* |  |
| *+ int getPlayerPoint()* |  |

2.1.6 Interface HaveChainSymbol

|  |  |
| --- | --- |
| *+ boolean addChainSymbol(Player player)* |  |
| *+ ChainSymbols getChainSymbols()* |  |

2.1.7 Interface HaveResource

|  |  |
| --- | --- |
| *+ boolean void addPlayerCounter(Player player)* |  |
| *+ Cost getResource()* |  |

# 2.2 Package Card

2.2.1 Class MilitaryCard **extends** Card **Implements** HaveChainSymbol, Attackable

2.2.1.1 Field

|  |  |
| --- | --- |
| - ChainSymbols chainSymbol | ChainSymbol(s) of the card. |
| - int attackPoint | The cost of the card. |

2.2.1.2 Constructor

|  |  |
| --- | --- |
| + MilitaryCard( String name, Cost cost, int attackPoint, ChainSymbols chainSymbol) | Initializes each field according to the parameter.  If attackPoint below 0 set it to 0. |

2.2.1.3 Method

|  |  |
| --- | --- |
| + void attackPlayer(Player ATKplayer) | Call method attackTime from ATKBoard |
| + boolean addChainSymbol(Player player) | Add each chain symbol in the card to player chainSymbol and return false. |
| + int getAttackPoint() | Return attackPoint of this card. |
| + ChainSymbols getChainSymbols() | Return chainSymbol of this card. |

2.2.2 Class PointCard **extends** Card **Implements** HaveChainSymbol, HavePoint

2.2.2.1 Field

|  |  |
| --- | --- |
| - ChainSymbols chainSymbol | ChainSymbol(s) of the card. |
| - int point | The cost of the card. |

2.2.2.2 Constructor

|  |  |
| --- | --- |
| + PointCard( String name, Cost cost, int point, ChainSymbols chainSymbol) | Initializes each field according to the parameter.  If point below 0 set it to 0. |

2.2.2.3 Method

|  |  |
| --- | --- |
| + void addPlayerPoint(Player player) | Call method increasePlayerPoint from Player |
| + boolean addChainSymbol(Player player) | Add each chain symbol in the card to player chainSymbol and return false. |
| + int getPlayerPoint() | Return point of this card. |
| + ChainSymbols getChainSymbols() | Return chainSymbol of this card. |

2.2.3 Class RawMaterialCard **extends** Card **Implements** HaveResource

2.2.3.1 Field

|  |  |
| --- | --- |
| - Cost resource | resource of the card. |

2.2.3.2 Constructor

|  |  |
| --- | --- |
| + RawMaterialCard (String name, Cost cost, Cost resource) | Initializes each field according to the parameter. |

2.2.3.3 Method

|  |  |
| --- | --- |
| + void addPlayerCounter(Player player) | Set player counter with sum of the resource of this card and old player counter |
| + Cost getResource() | Return resource of this card. |

2.2.4 Class TradingCard **extends** Card **Implements** HaveResource**,** HaveChainSymbol, HavePoint

2.2.4.1 Field

|  |  |
| --- | --- |
| - ChainSymbols chainSymbol | ChainSymbol(s) of the card. |
| - int point | The cost of the card. |
| - Cost resource | Resource of the card. |
| - Cost reduceCost | Show how much this card reduce player buy resource cost |

2.2.4.2 Constructor

|  |  |
| --- | --- |
| + TradingCard(String name, Cost cost, ChainSymbols chainsymbol, Cost resource, Cost reduceCost, int point) | Initializes each field according to the parameter.  If point below 0 set it to 0. |

2.2.4.3 Method

|  |  |
| --- | --- |
| + void addPlayerPoint(Player player) | Call method increasePlayerPoint from Player |
| + void addPlayerCounter(Player player) | Set player counter with sum of the resource of this card and old player counter |
| + boolean addChainSymbol(Player player) | Add each chain symbol in the card to player chainSymbol and return false. |
| + void reducePlayerBuyResourceCost(Player player) | Set player buy resource cost with the different between player’s old buy resource cost and reduce cost of this card. |
| + int getPlayerPoint() | Return point of this card. |
| + ChainSymbols getChainSymbols() | Return chainSymbol of this card. |

2.2.5 Class PlaceCard **Implements** HaveResource, HavePoint, Attackable

2.2.5.1 Field

|  |  |
| --- | --- |
| - String name | Name of the card. |
| - int attackPoint | AttackPoint of the card. |
| - int PlayerPoint | Point of the card. |
| - Cost cost | Cost of the card. |
| - Cost resource | Resource of the card. |

2.2.5.2 Constructor

|  |  |
| --- | --- |
| + PlaceCard(String name, int attackPoint, int playerPoint, Cost cost, Cost resource) | Initializes each field according to the parameter.  If point or attackPoint is below 0 set it to 0. |

2.2.5.3 Method

|  |  |
| --- | --- |
| + void attackPlayer(Player ATKplayer) | Call method attackTime from ATKBoard |
| + void addPlayerPoint(Player player) | Call method increasePlayerPoint from Player |
| + void addPlayerCounter(Player player) | Set player counter with sum of the resource of this card and old player counter |
| + int getAttackPoint() | Return attackPoint of this card. |
| + void constructPlace(Player player) | Call method construction from place board |
| + String toString() | Return name of this card |
| + String getName() | Return name of this card |
| + Cost getCost() | Return cost of this card |
| + getter/setter for position |  |
| +int get PlayerPoint() | Return point of this card |
| +Cost getResource() | Return resource of this card |
| + String getImgURL() | Return String URL of the card by String concatenation  "/"+this.name+".png" |

# 2.3 Package logic

2.3.1 Class Player

2.3.1.1 Field

|  |  |
| --- | --- |
| - String name | Player’s name. |
| - int num | Player’s number. |
| - Cost resourceCounter | Show how much of each material each player have. |
| - Cost buyResourceCost | Show how much LMD to spend on each material when buying it. |
| - ChainSymbols chainSymbols | Player’s chain symbols. |
| - int sellResourceGain | LMD gain from selling a card. |
| - int playerPoint | Player’s point |

2.3.1.2 Constructor

|  |  |
| --- | --- |
| + Player(int num) | Initializes each field according to the parameter.  **Player starts with no materials and 7 LMD and buy resource cost of each material is 2 LMD except LMD which is 1 LMD.**  **Player have no chain symbol when start.**  **Player can sell card and gain 2 LMD when start.**  **Player have no point when start.** |

2.3.1.3 Method

|  |  |
| --- | --- |
| + getter/setter method for each field |  |
| + void increasePlayerPoint(int point) | Add point to player’s point. |
| + void addChainSymbol(String chainSymbol) | Call method addChainSymbols of player’s chainSymbols. |

2.3.2 Class Turn

2.3.2.1 Field

|  |  |
| --- | --- |
| - int playerTurn | Start with player 1 turn (playerTurn = 1). |
| - Card selectedCard | Currently selected card in each turn. |
| - PlaceCard selectedPlaceCard | Currently selected place card in each turn. |

2.3.2.2 Method

|  |  |
| --- | --- |
| + getter method for each field |  |
| + void setSelectedCard(Card card) throws PickCardFailException(int point) | If the card is pickable set the card as selected card. Else throws pickCardFailException. |
| + void setSelectedPlaceCard(PlaceCard placeCard) | Set placeCard as selectedPlaceCard. |
| + boolean canBulid(Card card, Player player) | Return true if player can build a card. Otherwise return false.  Player can build the card if  Player have chain symbols on the card  **Or** player’s material is more than card’s cost  **Or** player have enough LMD to buy material. |
| + boolean canBuildPlace(PlaceCard placeCard, Player player) | Return true if player can build a place card. Otherwise return false.  Player can build place card if  Player’s material is more than card’s cost  **Or** player have enough LMD to buy material. |
| + boolean buildController() | Return result of canBuild method of selected card and current player. |
| + boolean buildPlaceController() | Return result of canBuildPlace method of selected place card and current player. |
| + void switchPlayerTurn() | Switch current player |
| + void build() | If player’s have chain symbols on the card do not reduce LMD of player. Otherwise reduce player LMD base on missing material.  If card is **attackable** call method attackplayer when build.  If card **have resource** call method addplayerCounter when build.  If card **have point** call method addPlayerPoint when build.  If card **have chain symbols** call method addChainSymbols when build  If card is **trading card** (1) increase player sell card gain by 1 when build (2) reduce player build resource cost according to the card when build.  **Remove selected card from main board after build**  **Switch player turn after build**  --- Do not add this part in the code ---  (If player have enough material player will not have to spend LMD to build it)  (Player’s material will not reduce after build) |
| + void sell() | Increase Player LMD base on player’s sell card gain.  **Remove selected card from main board after sell**  **Switch player turn after sell** |
| + void buildPlace() | Reduce player LMD base on missing material.  **Add player counter, add player point and attack player when build**  **Remove selected card from main board after build**  **Remove selected place card from place board after build**  **Switch player turn after build**  --- Do not add this part in the code ---  (If player have enough material player will not have to spend LMD to build it)  (Player’s material will not reduce after build)  (Player have to select one card and discard it to build place card) |

2.3.3 Class MainBoard

2.3.3.1 Field

|  |  |
| --- | --- |
| - ArrayList<Card> startingCardOnBoard | Collect card list on main board first phase |
| - ArrayList<Card> midGameCardOnBoard | Collect card list on main board second phase |
| - ArrayList<Card> lateGameCardOnBoard | Collect card list on main board last phase |
| - Card blankCard | Blank card is used to compare if the card is removed from the board. |

2.3.3.2 Constructor

|  |  |
| --- | --- |
| + MainBoard() | Set startingCardOnBoard, midGameCardOnBoard, lateGameCardOnBoard as new ArrayList of card  BlankCard is trading card that have blank name, cost, chain symbols, resource, reduce cost.  Blank card is pickable and flipable. |

2.3.3.3 Method

|  |  |
| --- | --- |
| + ArrayList<Card> shuffleCeck(InitialCardDeck initialCardDeck, int phase) | If phase is 1, return shuffled starting card deck of initial card deck.  If phase is 2, return shuffled mid game card deck of initial card deck.  If phase is 3, return shuffled late game card deck of initial card deck. |
| + void addCardOnBoard(InitialCardDeck initialCardDeck, int phase) | If phase is 1, Shuffle starting card of initial card deck. Set position of each card start with 1 and add each card to startingCardOnBoard.  If phase is 2, Shuffle mid game card of initial card deck. Set position of each card start with 1 and add each card to midGameCardOnBoard.  If phase is 3, Shuffle late game card of initial card deck. Set position of each card start with 1 and add each card to lateGameCardOnBoard. |
| + void removeCardFromBoard(Card card, int phase) | If phase is 1, set card in startingCardOnBoard as a blank card.  If phase is 2, set card in midGameCardOnBoard as a blank card.  If phase is 3, set card in lateGameCardOnBoard as a blank card. |
| + void firstUpdateCardOnBoard(int phase) | Update filpable of some card in board.  If phase is 1 or 2, set card flipAble = true according to the following position : 1,2,6,7,8,9,15,16,17,18,19,20  If phase is 3, set card flipAble = true according to the following position : 1,2,6,7,8,9,14,15,16 |
| + void updateCardOnBoard(int phase) | Check if the card is overlapped by another card. If the card is not overlapped by another card set pickAble and flipAble true.    Card phase 1 and 2 will be displayed on screen in the order like this    Card phase 3 will be displayed on screen in the order like this |
| + Card getCardFromName(String name, int phase) | Return card that have same name in parameter |
| + ArrayList<Card> getCardOnBoard(int i) | If i is 1 return startingCardOnBoard.  If i is 2 return midGameCardOnBoard.  If i is 3 return lateGameCardOnBoard. |
| + boolean checkIfAllBlankCard(ArrayList<Card> cardOnBoard) | Return true if all card if blankCard. Otherwise return false. |
| + getter method for blankCard |  |

2.3.4 Class AttackBoard

2.3.4.1 Field

|  |  |
| --- | --- |
| - int position | Position of attacker start with 0 |
| - HashMap<Integer, Integer> posAndCoinLoss | If attacker move to some position player will receive point or loss LMD. |

2.3.4.2 Constructor

|  |  |
| --- | --- |
| + AttackBoard() | Set posAndCoinLoss as new HashMap<Integer, Integer>  First Integer is position. Second is point gain or LMD loss.  Add following to posAndCoinLoss.  (1,2),(3,2),(6,5),(-1,2),(-3,2),(-6,5) |

2.3.4.3 Method

|  |  |
| --- | --- |
| + getter/setter method for position  + getter method for posAndCoinLoss |  |
| + void attackTime(Player player, Attackable card) | Move position of attacker toward opponent and call rewardAndPun(Player player1, Player player2) to check if new position player will gain point or opponent will loss LMD or not. |
| + void rewardAndPun(Player player1, Player player2) | If position is 1 or higher player1 will gain 2 point.  If position is 3 or higher player2 will loss 2 LMD.  If position is 6 or higher player2 will gain 5 LMD.  If position is 9 or higher player1 will win the game.  If position is -1 or lower player2 will gain 2 point.  If position is -3 or lower player1 will loss 2 LMD.  If position is -6 or lower player1 will gain 5 LMD.  If position is -9 or lower player2 will win the game.  **Point gain and coin loss will active only once. If attacker already pass through position point gain and coin loss will not active** |
| + boolean winConditionCheck(Player player) | Return true if it is player1’s turn and attacker position is 9 or player2’s turn and attacker position is -9. Otherwise return false. |

2.3.5 Class CheckEndPhase

2.3.5.1 Method

|  |  |
| --- | --- |
| + void updateMainPane() | Check if card in current phase is all blank card.  If card in current phase is all blank card set new phase and call method newMainPane(int i) from Main. If attacker’s position is 9 or -9 or card phase 3 is all blank card call endPhase() |
| + static void endPhase() | Set visible of all card on screen false.  Set disable of all place card on screen true.  String text will be displayed who is the winner or tie. Set text on stack pane with imageView of background and set position on screen.  Set quitBtnImgView size and position on screen. If click on this ImgView will exit the program. Also set tooltip with text “Close the game” show when mouse enter quitBtnImgView hide when mouse exit.    End phase part |

# 2.4 Package logic.exception

2.4.1 Class PickCardFailException extends Exception

2.4.1.1 Field

|  |  |
| --- | --- |
| - final long serialVersionUID | Auto generate |
| - String message | Message of Error |

2.4.1.2 Constructor

|  |  |
| --- | --- |
| + PickCardFailException(String message) | Set message of error as message. |

# 2.5 Package application

2.5.1 Class GameController

2.5.1.1 Field

|  |  |
| --- | --- |
| - int phase | Phase of the game |
| + InitialCardDeck initialCardDeck | Initialize cards in each phase of the game |
| + InitialPlaceCard placeCardDeck | Initialize place cards of the game |
| + Player player1 | Player 1 |
| + Player player2 | Player 2 |
| + AttackBoard ATKboard | Attack board of the game |
| + MainBoard mainBoard | Main board of the game |
| + PlaceBoard placeBoard | Place board of the game |
| + boolean endGame | Check whether the game ends |

2.5.1.2 Method

|  |  |
| --- | --- |
| + void InitializeGame() | Call method addCardOnBoard() to mainBoard of all 3 phases.  Call method firstUpdateCardOnBoard(int i) of all 3 phases.  Call method updateCardOnBoard(int I) of all 3 phases.  Call method addCardOnBoard() to placeBoard.  Set phase to 1. |
| + getter/setter method for phase |  |
| + Player getCurrentPlayer() | Return current player. |

2.5.2 Class InitialCardDeck

2.5.2.1 Field

|  |  |
| --- | --- |
| + ArrayList<Card> startingCard | ArrayList that contains cards used in phase 1 |
| + ArrayList<Card> midGameCard | ArrayList that contains cards used in phase 2 |
| + ArrayList<Card> lateGameCard | ArrayList that contains cards used in phase 3 |

2.5.2.2 Constructor

|  |  |
| --- | --- |
| + initailCardDeck() | Initialize every cards of each phase and add it according to their phase. |

2.5.2 Class InitialPlaceCard

2.5.2.1 Field

|  |  |
| --- | --- |
| + ArrayList<PlaceCard> placeCardDeck | ArrayList that contains place cards used in the game |

2.5.2.2 Constructor

|  |  |
| --- | --- |
| + initailPlaceCard () | Initialize every place card, then add it to placeCardDeck. |

# 2.6 Package gui

2.6.1 Class AlertTextPane extends StackPane

2.6.1.1 Field

|  |  |
| --- | --- |
| - Text lmdcheck | Text showing the available ways to do command. |

2.6.1.2 Constructor

|  |  |
| --- | --- |
| + AlertTextPane() | Set background of StackPane.  Set size of stackPane to (500,130)  Set lmdcheck text color to white.  Set lmdcheck text size to 40.  Set lmdcheck text by call setText method.  Set lmdcheck lay out X and Y to 0 then add lmdcheck to stackPane. |
| + AlertTextPane(String text) | Generate new text set color to white and size to 40 then set position X and Y to 75.set textProperty with value in parameter.  Add new generated text to stackPane.  Set size of stackPane to (500,100)  Set background of StackPane.  Set visible of stackPane to false.  Set tooltip with size 14 showing “Click to close” when mouse move on stackPane.  Set on mouse click action when click on stackPane do the following. 1) set visible of selectPlace in MainPane to false. 2) set visible of not enough material in MainPane to false. 3) set visible of selection button in MainPane to false. |

2.6.1.3 Method

|  |  |
| --- | --- |
| + void setText() | If player has chain symbols to build the selected card, set lmdcheck to “Build by Chain Symbol?”  Else, set lmdcheck to "Spend "+ (lmd to build) +" LMD to build?" |

2.6.2 Class AtkBtn extends StackPane

2.6.2.1 Field

|  |  |
| --- | --- |
| - ImageView imgView | ImageView for each of odd and even AtkBtn.. |
| - Tooltip tooltip | Set tooltip for each of AtkBtn. |

2.6.2.2 Constructor

|  |  |
| --- | --- |
| + AtkBtn (int position) | Set background for odd and even positions from  -9 to 9 of each AtkBtn.  Set tooltip of each AtkBtn by call method setTooltip(int position) |
| + AtkBtn(int position, boolean atkpos) | Set background for AtkBtn when the attack symbol is on the same position with AtkBtn. Separate them by odd and even as well.  Set tooltip of each AtkBtn by call method setTooltip(int position) |

2.6.2.3 Method

|  |  |
| --- | --- |
| + void setTooltip(int position) | Set tooltip to AtkBtn that has the position 1, 3, 6, -1, -1, and -6 by the rules of reward and punishment. Show Tootip when mouse move on stackPane. |
| + getter/setter method for imgView |  |

2.6.3 Class AttackPane extends HBox

2.6.3.1 Field

|  |  |
| --- | --- |
| - ObservableList<AtkBtn> AtkBtnList | List of AtkBtn. |
| - int AtckPos | Storing position of attack symbol from the attack board. |

2.6.3.2 Constructor

|  |  |
| --- | --- |
| + AttackPane() | Initialize AtkBtn from position -9 to 9 then add to AtkBtnList. |

2.6.3.3 Method

|  |  |
| --- | --- |
| + void updateAttackPane() | Update the position of attack symbol to this AttackPane.  If AtckPos > 9, set it to 9.  If AtckPos <-9, set it to -9.  Set image to the AtkBtn in AtkBtnList.  Set tooltip for each of AtkBtn in AtkBtnList. |

2.6.4 Class CardBtn extends Pane

2.6.4.1 Field

|  |  |
| --- | --- |
| - Card card | Card to assign to CardBtn. |

2.6.4.2 Constructor

|  |  |
| --- | --- |
| + CardBtn(Card card) | Assign card to the field.  Update image of the card by updateCardImg().  Set tooltip.  Set MouseAction. |

2.6.4.3 Method

|  |  |
| --- | --- |
| - void setMouseAction() | If card is pickable, set setOnMouseClicked with following action,  1)Set visible to SelectionBtn to true.  2)Set SelectedCard and 3) SelectedCardBtn in mainPane with this card. |
| - void setTooltip() | Set graphic of card image to tooltip.  Set font size of toolTip to 20.  Set description of building cost, reward.  Show toolTip when mouse move on cardBtn. |
| + void updateCardImg() | If this card is flappable, set the CardBtn with its image, else set it to back card. |
| + void updateCardVisible() | If card equals to the last used-selected card, set visible to this CardBtn false. |
| + void updateMouseAction() | Method to update the MouseAction.  If card is pickable, set setOnMouseClicked with following action,  1)Set visible to SelectionBtn to true.  2)Set SelectedCard and 3) SelectedCardBtn in mainPane with this card. |
| + getter method for card |  |

2.6.5 Class CounterPane extends StackPane

2.6.5.1 Field

|  |  |
| --- | --- |
| - Text text | Text of the CounterPane |

2.6.5.2 Constructor

|  |  |
| --- | --- |
| + CounterPane(String counter) | Set property to text and add in CounterPane.  Set image to the CounterPane. |

2.6.5.3 Method

|  |  |
| --- | --- |
| + getter method for text |  |

2.6.6 Class HowToPlayPane extends Pane

2.6.6.1 Field

|  |  |
| --- | --- |
| - int clicktime | Set to 1. |
| - String tooltip | Set to empty string. |
| - Tooltip tt | New toolTip |
| - MediaPlayer mediaPlayer |  |

2.6.6.2 Constructor

|  |  |
| --- | --- |
| + HowToPlayPane() | Set size of this pane to (1358, 744)  Set background of the pane.  Set font size of tt to 20  Set String tooltip to "1/12\nClick to view next"  Set text of tt using tooltip String  Show tt when mouse move to this Pane  setOnMouseClicked do the following.   1. Hide tt 2. Set and play mediaPlayer with button click sound 3. Call method UpdateHowToPlayPane() |

2.6.6.3 Method

|  |  |
| --- | --- |
| + void UpdateHowToPlayPane() | If clicktime not equal 11 set String tooltip to clicktime+1+ “/12\nClick to view next”  Else set String tooltip to "12/12\nClick to close"  Set text of tt with String tooltip  Show tt when mouse move to this pane  If clicktime not equal 12, increase click time by 1 and set new background of HowToPlayPane.  Else set visible of howtoPlayImgView in main to false, set disable of startBtnImageView in main to false, set visible of this pane to false. |

2.6.7 Class MainPane extends Pane

2.6.7.1 Field

|  |  |
| --- | --- |
| - Card selectedCard | Selected Card from mouse click. |
| - PlaceCard selectedPlaceCard | Selected PlaceCard from mouse click. |
| - PlaceCardBtn selectedPlaceCardBtn | Selected PlaceCardBtn from mouse click. |
| - SelectionBtn buildBtn | Button for doing command “Build”. |
| - SelectionBtn sellBtn | Button for doing command “Sell”. |
| - SelectionBtn buildPlaceBtn | Button for doing command “Build Place”. |
| - SelectionBtn cancelBtn | Button for doing command “Cancel”. |
| - SelectionBtn yesBtn | Button for doing command “Yes”. |
| - SelectionBtn noBtn | Button for doing command “No”. |
| - SelectionBtn yesPlaceBtn | Button for doing command “Yes” to build place. |
| - Pane selectPlace | Pane to fill with SelectionBtn |
| - CardBtn selectedCardBtn | Selected CardBtn from mouse click. |
| - AlertTextPane alertTextPane | Alert pane with a text. |
| - Pane notEnoughMaterial | Pane to fill the with text “Not enough material”. |
| - ObservableList<CardBtn> CardBtnList | List of CardBtn |

2.6.7.2 Constructor

|  |  |
| --- | --- |
| + MainPane(int phase) | Set background of MainPane.  Set prefer size to (1357, 743)  Set padding with new insets(8)  Initialize and set position of the selection button(buildBtn, sellBtn, buildPlaceBtn, cancelBtn, yesBtn, yesPlaceBtn, noBtn).  Set card on board according to the phase of the game.  Set notEnoughMaterial with new AlertTextPane("Not Enough Material!") and set its position.  Set selectPlace with new AlertTextPane("Select Place to build") and set its position.  Then add all on Pane. |

2.6.7.3 Method

|  |  |
| --- | --- |
| - void addCardOnPane(int phase) | Adding a card to the pane according to its index with different coordinate on screen. |
| + void updateCardOnPane() | Update card after doing commands. Call updateCardImg() ,updateCardVisible() from cardBtn and call updatePickableCardOnPane(int phase) with current phase for each cardbtn in CardBtnList.  Then call updateMouseAction()for each cardbtn in CardBtnList in another loop. |
| + void updatePickableCardOnPane(int phase) | Update pickable of the card after doing commands. According to the game rules. |
| + void setVisibleSelecttionBtn(boolean bool) | Set visible of the selection button(buildBtn, buildPlaceBtn, sellBtn, cancelBtn) with boolean form parameter. |
| + void removedCardFromPane(CardBtn card) | Remove the card form pane after doing commands. Set that card in cardBtnList to blankcard. |
| + void setSelectedCardBtn(Card card) | Set selectedCardBtn to selected cardBtn if the selected cardBtn is in cardBtnList. |
| + void setVisibleYesNoBtn(boolean b) | Set the visible of YesBtn and NoBtn by Boolean in parameter. |
| + void setVisibleNotEnoughmaterial(boolean bool) | Set visible of notEnougMaterial pane with boolean in parameter.  Set visible of selectionBtn to false. |
| + void setAlertTextPane() | Initialize alertTextpane.  Set LayoutX to 450.  Set LayoutY to 650.  Add alertTextPane to pane’s children. |
| + void setSelectedPlaceCardBtn(PlaceCard selectedPlaceCard) | Set selectedPlaceCardBtn to selected placeCardBtn if the selected placeCardBtn is in placeCardBtnList. |
| + getter/setter method for SelectedCard |  |
| + getter method for selectedCardBtn |  |
| + getter method for alertTextPane |  |
| + getter/setter method for selectedPlaceCard |  |
| + getter method for selectedPlaceCardBtn |  |
| + getter method for selectPlace |  |
| + getter method for CardBtnList |  |

2.6.8 Class PlaceCardBtn extends Pane

2.6.8.1 Field

|  |  |
| --- | --- |
| - int PlaceCard placeCard | PlaceCard to assign to placeCardBtn |

2.6.8.2 Constructor

|  |  |
| --- | --- |
| + PlaceCardBtn(PlaceCard placeCard) | Set placeCard with the parameter.  Set size to (175, 117)  Set tooltip by setTooltip() method.  Set background of the placeCardBtn by placeCard’s url. |

2.6.8.3 Method

|  |  |
| --- | --- |
| + void setTooltip() | Set graphic image to the tooltip  Set description of building requirements, reward.  Show tooltip when mouse move on PlaceCardBtn in position (500,200) |
| + void setMouseAction() | Set selectedPlaceCard and selectedPlaceCardBtn with this placeCard.  If this placeCard can be built, set visible of YesBtn and NoBtn to true.  Else, setSelectedPlaceCard to null and set visible of notEnoughMaterial pane to true. |
| + void setUnAbleMouseAction() | Set mouseAction of the placeCardBtn to nothing. |
| + getter method for PlaceCard |  |

2.6.9 Class PlacePane extends HBox

2.6.9.1 Field

|  |  |
| --- | --- |
| - int ObservableList<PlaceCardBtn> PlaceBtnList | List of PlaceBtn. |

2.6.9.2 Constructor

|  |  |
| --- | --- |
| + PlacePane() | Set prefSize to 1450,145.  Set padding by Inset size 8.  Set alignment to center.  Set background of the placePane.  Initialize all of placeCardBtn by getPlaceCardOnBoard() in GameController then add to PlaceBtnList.  Add placeBtnList to PlacePane’s children. |

2.6.9.3 Method

|  |  |
| --- | --- |
| + void updateMouseCardAction() | Set MouseAction to all of placeCardBtn in placeBtnList. |
| + void updateUnable() | Set unable MouseAction to all of placeCardBtn. |
| + getter method for PlaceBtnList |  |

2.6.10 Class PlayerPane extends GridPane

2.6.10.1 Field

|  |  |
| --- | --- |
| - FadeTransition fade1 | new FadeTransition() |
| - FadeTransition fade2 | new FadeTransition() |
| - StackPane namePane | Show player’s name |
| - CounterPane pointPane | Show player’s point |
| - CounterPane lmdPane | Show player’s LMD |
| - CounterPane sellCardGainPane | Show player’s sell card gain |
| - CounterPane d32steelPane | Show player’s D32 steel |
| - CounterPane d32steelCostPane | Show player’s D32 steel cost |
| - CounterPane BipolarPane | Show player’s Bipolar Nanoflake |
| - CounterPane BipolarCostPane | Show player’s Bipolar Nanoflake cost |
| - CounterPane polymerizationPane | Show player’s polymerization preparation |
| - CounterPane polymerizationCostPane | Show player’s polymerization preparation cost |
| - CounterPane manganeseOrePane | Show player’s manganese ore |
| - CounterPane manganeseOreCostPane | Show player’s manganese ore cost |
| - CounterPane sugarpackPane | Show player’s sugar pack |
| - CounterPane sugarpackCostPane | Show player’s sugar pack cost |
| - String playerPoint | String that show amount of point that player have |
| - String playerLMD | String that show amount of LMD that player have |
| - String sellCardGain | String that show amount LMD gain from sell the card |
| - String playerD32Steel | String that show amount of D32 steel that player have |
| - String d32steelCost | String that show amount of LMD need to buy D32 steel |
| - String playerBipolar | String that show amount of Bipolar Nanoflake that player have |
| - String bipolarCost | String that show amount of LMD need to buy Bipolar Nanoflake |
| - String playerPolymerization | String that show amount of polymerization preparation that player have |
| - String polymerizationCost | String that show amount of LMD need to buy polymerization preparation |
| - String playerManganeseOre | String that show amount of manganese ore that player have |
| - String manganeseOreCost | String that show amount of LMD need to buy manganese ore |
| - String playerSugarPack | String that show amount of sugar pack that player have |
| - String sugarPackCost | String that show amount of LMD need to buy sugar pack |
| - ChainSymbols playerChainSymbols | Show player’s chain symbols |
| - int i | i = 0 |
| - int j | J = 9 |

2.6.10.2 Constructor

|  |  |
| --- | --- |
| + PlayerPane(int player) | Set Vgap and Hgap to 8  Set padding with new insets(8)  Set alignment to center  Set PrefWidth to275  Set background of PlayerPane  Set up namePane by add namePane background image then and text that display player name (text color white and size 40)  Add namePane to PlayerPane’s children  Call updatePlayerPane(player)  Set [material]pane and [material]CostPane for each material([material] are BipolarPane, BipolarCostPane, d32steelCostPane, d32steelPane, manganeseOreCostPane, manganeseOrePane, polymerizationCostPane, polymerizationPane, sugarpackCostPane, sugarpackPane, pointPane, lmdPane, sellCardGainPane)  Set imageView of each [material] and set tooltip to show material’s name when move mouse on the image ([material] are Bipolar Nanoflake, D32 steel, Manganese Ore, Polymerization Preparation, Sugar Pack, Point, LMD, Sell card gain)  Add pointImgView, pointPane to row 1  Add lmdImgView, lmdPane to row 2  Add sellCardGainImgView, sellCardGainPane to row 3  Add d32steelImgView, d32steelPane, d32steelCostPane to row 4  Add bipolarImgView, BipolarPane, BipolarCostPane to row 5  Add polymerizationImgView, polymerizationPane, polymerizationCostPane to row 6  Add manganeseOreImgView, manganeseOrePane, manganeseOreCostPane to row 7  Add sugarPacImgView, sugarpackPane, sugarpackCostPane to row 8 |

2.6.10.3 Method

|  |  |
| --- | --- |
| + void UpdatePlayerPane(int player) | If player = 1 set String of all material, point, LMD, cost and chain symbols according to player 1  If player = 2 set String of all material, point, LMD, cost and chain symbols according to player 2 |
| + void updatePlayerPaneScreen() | Make current player’s namePane fade brighter and darker during player’ turn and make is stop when it’s not current player’s turn  Set text property using String of each material to set value of the text of each material and cost |
| + void printChainSymbol(String chainSymbol) | Add imageView of chainSymbol player have below row 8, each row can have maximum 3 chain symbols and have to add to new row  Add tooltip to show Chain symbol’s name when move mouse on imageView of chainSymbol |
| + getter/setter for playerChainSymbols |  |

2.6.11 Class SelectionBtn extends Pane

2.6.11.1 Field

|  |  |
| --- | --- |
| - MediaPlayer mediaPlayer | Clicking sound |

2.6.11.2 Constructor

|  |  |
| --- | --- |
| + SelectionBtn(int btn) | Initialize selectionBtn by its number.  - 1 is build button  - 2 is sell button  - 3 is build place button  - 4 is cancel button  - 5 and 7 are yes button (5 is for confirm build card and 7 is for confirm build place)  Set background to the button.  Call method setTooltip(int btn).  Call method setMouseAction(int btn). |

2.6.11.3 Method

|  |  |
| --- | --- |
| - void setTooltip(int btn) | Set tooltip to each of selectionBtn.  If btn = 1, set text of tooltip with "Build this card by resource or chain symbol"  If btn = 2, set text of tooltip with "Sell this card"  If btn = 3, set text of tooltip with "Use this card to build place"  If btn = 4, set text of tooltip with "cancel and pick new card"  If btn = 5 or 7 set text of tooltip with “confirm build"  If btn = 6 set text of tooltip with “cancel and pick new card"  Show tooltip when mouse move on selectionBtn. |
| + void setMouseAction(int btn) | Set a command to each of selectionBtn.  If btn =1, do the following when click  1)set and play mediaPlayer of button click sound  2)call setSelectedCard of Turn with current selectedCard from mainPane  3)If can build selected card setVisibleYesNoBtn and setVisibleSelecttionBtn of mainPane to false. Else, setVisibleNotEnoughmaterial of mainPane to true.  If btn = 2, do the following when click  1)set and play mediaPlayer of button click sound  2)call setSelectedCard of Turn with current selectedCard from mainPane  3)call sell from turn  4)call updateCardOnBoard from mainBoard  5)call updateCardOnPane() and updatePickableCardOnPane() from mainPane  6)updatePlayerPane of player 1 and 2  7)setVisibleSelecttionBtn from mainPane to false  8)setSelectedPlaceCard from mainPane to null  9)call updateMainPane() from CheckEndPhase  If btn = 3, do the following when click  1)set and play mediaPlayer of button click sound  2)set visible of selectPlace of mainPane to true  3)set visible of SelecttionBtn of mainPane to false  4)call updateMouseCardAction() from placePane  5)set selectedPlaceCard of mainPane to null  6)call updateMouseCardAction() form placePane  If btn = 4, do the following when click  1)set and play mediaPlayer of button click sound  2)updatePlayerPane of player 1 and 2  3)updatePlayerPaneScreen of player 1 and 2  4)setVisibleSelecttionBtn from mainPane to false  5)set selectedPlaceCard of mainPane to null  6)call updateUnable() form placePane  If btn = 5, do the following when click  1)set and play mediaPlayer of button click sound  2)call setSelectedCard of Turn with current selectedCard from mainPane  3)call build from Turn  4)call updateCardOnBoard from mainBoard  5)call updateCardOnPane() and updatePickableCardOnPane() from mainPane  6)call updateAttackPane() from atkPane from main  7)updatePlayerPane of player 1 and 2  8)updatePlayerPaneScreen of player 1 and 2  9)set visible of Yes and No Btn of mainPane to false  10)setVisibleSelecttionBtn from mainPane to false  12)set selectedPlaceCard of mainPane to null  13)call updateMainPane() from CheckEndPhase  If btn = 6, do the following when click  1)set and play mediaPlayer of button click sound  2)updatePlayerPane of player 1 and 2  3)updatePlayerPaneScreen of player 1 and 2  4)set visible of Yes and No Btn of mainPane to false  5)setVisibleSelecttionBtn from mainPane to false  6)set selectedPlaceCard of mainPane to null  7)call updateUnable() form placePane  If btn = 7, do the following when click  1)set and play mediaPlayer of button click sound  2)call setSelectedCard of Turn with current selectedCard from mainPane  3)call setSelectedPlaceCard of Turn with current selectedPlaceCard from mainPane  4)call buildPlace from Turn  5)call updateCardOnBoard from mainBoard  6)call updateCardOnPane() and updatePickableCardOnPane() from mainPane  7)call updateAttackPane() from atkPane from main.  8)updatePlayerPane of player 1 and 2  9)updatePlayerPaneScreen of player 1 and 2  10)set visible of AlertTextPane from mainPane to false  11)set visible of selectedCardBtn from mainPane to false  12)set visible of Yes and No Btn of mainPane to false  13)setVisibleSelecttionBtn from mainPane to false  14)call updateUnable() form placePane |