Blackjack! Presentation

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What we did: *(made Blackjack!)*

Demo

2 Use Cases:

1) Play and win a round against a dealer—win a bet

2) Bet everything—lose to the dealer, results in a game over

Demo video

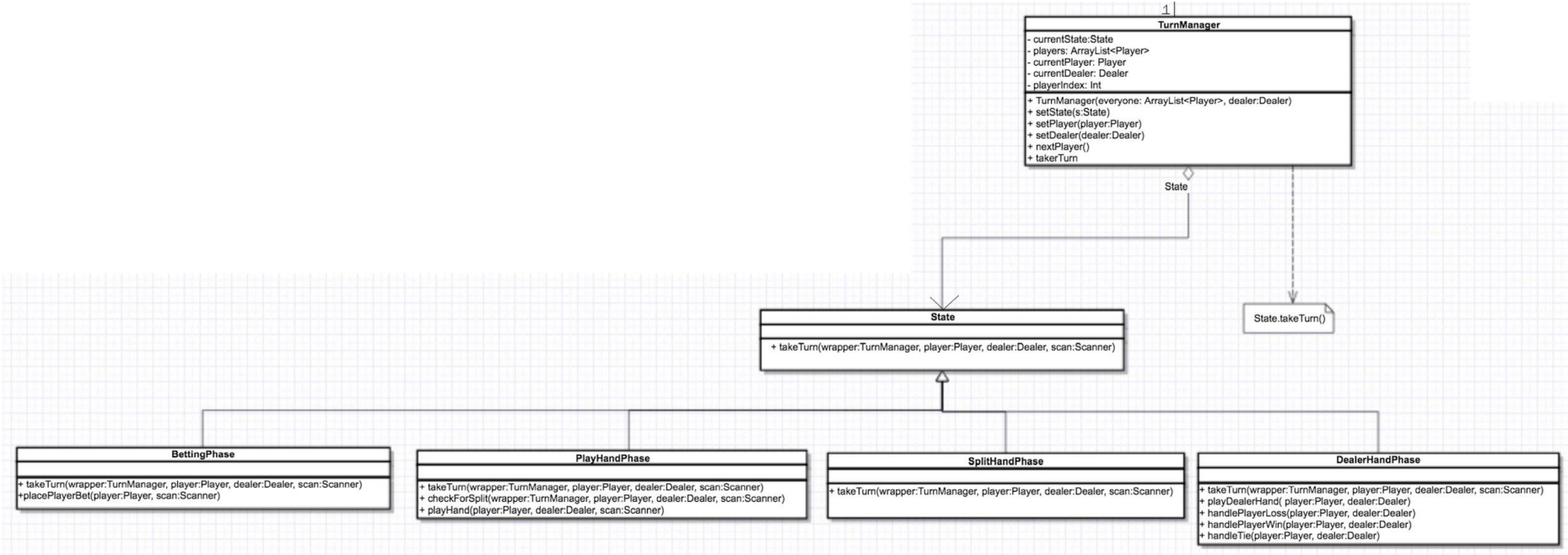
Design Patterns

Design Patterns:

- State
  - Handle turns and phases (betting, play hand, etc.)

- Memento
  - Save/load game state

- **STATE**


1
TurnManager
- currentState:State
- players: ArrayList<Player>
- currentPlayer: Player
- currentDealer: Dealer
- playerIndex: Int
+ TurnManager(everyone: ArrayList<Player>, dealer:Dealer)
+ setState(s:State)
+ setPlayer(player:Player)
+ setDealer(dealer:Dealer)
+ nextPlayer()
+ takerTurn
State
State
+ takeTurn(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
State.takeTurn()
BettingPhase
+ takeTurn(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
+placePlayerBet(player:Player, scan:Scanner)
PlayHandPhase
+ takeTurn(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
+ checkForSplit(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
+ playHand(player:Player, dealer:Dealer, scan:Scanner)
SplitHandPhase
+ takeTurn(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
DealerHandPhase
+ takeTurn(wrapper:TurnManager, player:Player, dealer:Dealer, scan:Scanner)
+ playDealerHand(player:Player, dealer:Dealer)
+ handlePlayerLoss(player:Player, dealer:Dealer)
+ handlePlayerWin(player:Player, dealer:Dealer)
+ handleTie(player:Player, dealer:Dealer)

- **MEMENTO**

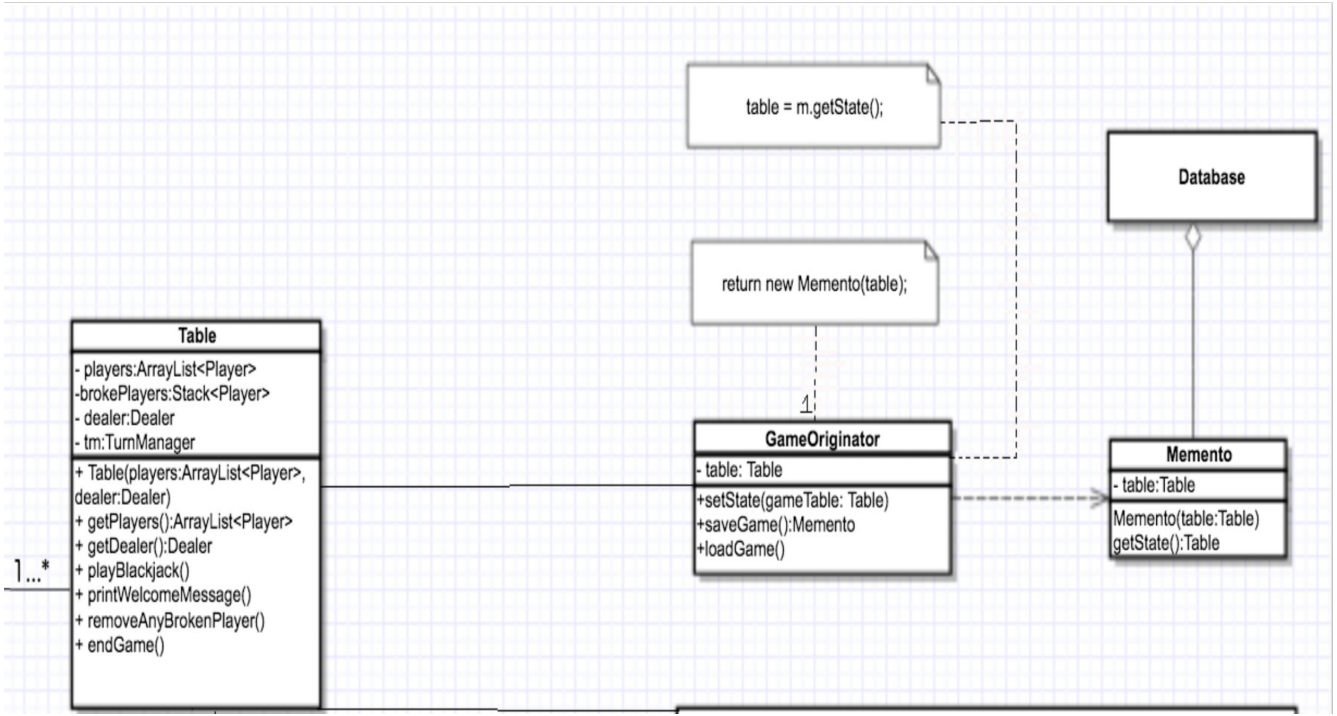


table = m.getState();
Database
return new Memento(table);
Table
- players:ArrayList<Player>
-brokePlayers:Stack<Player>
- dealer:Dealer
- tm:TurnManager
+ Table(players:ArrayList<Player>, dealer:Dealer)
+ getPlayers():ArrayList<Player>
+ getDealer():Dealer
+ playBlackjack()
+ printWelcomeMessage()
+ removeAnyBrokenPlayer()
+ endGame()
1...*
1
GameOriginator
- table: Table
+setState(gameTable: Table)
+saveGame():Memento
+loadGame()
Memento
- table:Table
Memento(table:Table)
getState():Table

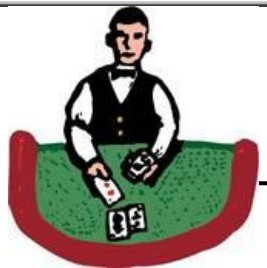
Interesting Stuff

Interesting stuff people might learn from:

- Modeling the real word
- Readable code
- High-level simplicity

- **Modeling the real word**

Dealer
-deck:Deck
+ Dealer() + deal():Card + shuffleDeck() + dealStartingHands(player:Player) + processDealRequest(player:Player) + mustHit():Boolean + printHand()



```
public void shuffleDeck() {
    deck.shuffle();
}
```

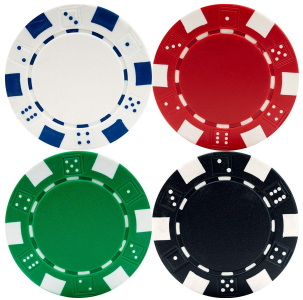
```
public void dealStartingHands(Player player) {
    player.acceptDealtCard(deal());
    player.acceptDealtCard(deal());

    this.acceptDealtCard(deal());
    this.acceptDealtCard(deal());
}
```

```
 */
public void processDealRequest(Player player) {
    player.acceptDealtCard(deal());
}
```

- **Modeling the real word**

Chips
- chips:Map<Integer,Integer>
+ Chips(amount:Int) + getChips():Map<Integer,Integer> + addChip(chipVal:Int) + getTotalValueOfChips():Int + combineChips(chips:Chips) + takeChip(chipVal:Int):Int + isEmpty():Boolean + printChips() - divyUpChips(amount:Int)::Map<Integer,Integer>



```java
private static Map<Integer, Integer> divyUpChips(int amount) {
    Map<Integer, Integer> chips = new LinkedHashMap<Integer, Integer>();
    int[] chipValues = new int[]{50000, 20000, 5000, 500, 100, 50, 25, 10, 5, 1};

    for (int chipVal: chipValues) {
        int numChips = amount/chipVal;
        chips.put(chipVal, numChips);
        amount = amount - numChips*chipVal;
    }

    chips.values().removeIf(v -> v==0);
    return chips;
}
```

- **Readable code**

```
    private Card[] createStandardDeck() {
        Card[] newCards = new Card[52];
        int i = 0;

        try {
            for(String suit: new String[]{Card.DIAMONDS, Card.CLUBS, Card.HEARTS, Card.SPADES}) {
                for (int j = Card.ACE; j <= Card.KING; j++) {
                    newCards[i] = new Card(j, suit);
                    i++;
                }
            }
        }
        catch (Exception e) {
```

```
public class BettingPhase implements State {
    @Override
    public void takeTurn(TurnManager wrapper, Player player, Dealer dealer, Scanner scan) {
        wrapper.setState(new PlayHandPhase());
        player.startPlaying();

        placePlayerBet(player, scan);
    }
```

```
public class PlayHandPhase implements State {
    @Override
    public void takeTurn(TurnManager wrapper, Player player, Dealer dealer, Scanner scan) {
        wrapper.setState(new DealerHandPhase());

        dealer.shuffleDeck();
        dealer.dealStartingHands(player);
        checkForSplitHand(wrapper, player, dealer, scan);

        playHand(player, dealer, scan);
    }
```

- **High-level simplicity**

TABLE

```
    /*
     * The central method of this game.
     * Players take turns playing Blackjack
     * against a single dealer until they
     * successively run out of chips and get
     * removed from play. Game ends when all
     * players have gone broke.
     */
    public void playBlackjack() {
        while (!players.isEmpty()) {
            tm.takeTurn();
            removeAnyBrokePlayer();
        }
        endGame();
    }
```

DEALER

```
public class Dealer extends Player {
    private Deck deck;

    public Dealer() {

    public Card deal() {
        return deck.deal();
    }

    public void shuffleDeck() {
        deck.shuffle();
    }

    /*
     * Used to start the playHandPhase of a turn by dealing
     * a hand to the Player first, then to this Dealer itself.
     */
    public void dealStartingHands(Player player) {
        player.acceptDealtCard(deal());
        player.acceptDealtCard(deal());

        this.acceptDealtCard(deal());
        this.acceptDealtCard(deal());
    }
```

—

FIN. *(...and the crowd goes wild…)*