ESOF 322 - Programming Assignment 2

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Use Case:	The Play
Actors:	Current Player
Goals:	For player to roll both dice to receive n from the sum of the dice, move icon n spaces on the board, according to space, player may buy property, pay rent, or pay taxes. If doubles are rolled, they move n spaces, then repeat. If doubles are thrown 3 times in a turn, player icon goes to jail.
Steps:	

The player rolls dice	
	The system returns the dice as an length 2 array
The player moves that many spaces forward on the board	
	If the player passed the GO space, they are credited $200.00
	The system takes actions based on the space the player landed on
If the dice roll was doubles, add one to that players double counter, and take another turn	

Use Case:	Buying Property
Actors:	Current Player
Goals:	When player lands on property, they may purchase said property. Player receives the title deed. If player does not want property, property is put up for auction in which they can also bid, highest bidder wins property.
Preconditions:	Property must not already be owned by another player.
Steps:	

The player lands on an unclaimed space	
The player chooses to buy the property at its current price or not	
	If not, pass the deed to auction
	If the player chooses to buy the property, the player is debited the current price, and given the property

Use Case:	Property Auction
Actors:	All players
Goals:	All players must be able to bid on property that was passed on by the current player whos turn it is.
Preconditions:	Property must have no been bought by player who landed on property
Steps:	

Any player places a bid	
	If that bid was higher than the previous bid, that player is placed in the lead
If 30 seconds pass without a bid, the player in the lead is debited the current bid and given the deed	

Use Case: Selling Property
Actors: Current Player, Player Who's Buying
Goals: Allow the current player to sell one of their already owned properties to another player. If property being sold is mortgaged, the purchasing player must either lift the mortgage at once by paying the mortgage plus 10% interest; or pay for the property as well as pay the bank 10% interest at the time of purchase, and then pay to lift the mortgage plus 10% interest at a later time.
Preconditions: Current player must own said property.
Steps:

The player chooses a property of theirs to sell	
	If the property is mortgaged the player is given the option to pay it off and then sell it
The seller chooses a price to sell it for	
	Each player is given the option to buy it
If a player chooses to buy it, the properties' ownership is transferred to the new owner and they pay the price to the seller	

Use Case: Paying Rent
Actors: Current Player, Property Owning Player
Goals: When current player lands on property owned by another player, the property owner receives x amount of $ from current player specified on title deed for how developed the property may be. If property is mortgaged, no rent can be collected. Rent doubles if property owner owns all of that group of properties, and is increased based on how improved property is.
Preconditions: Property landed on must be already owned by a player
Steps:

The player lands on the property of another player	
	The server checks if the property is mortgaged
If it is not then the rent is calculated and the player that landed on pays it to the owner of the property	

Use Case: Income Tax
Actors: Current Player
Goals: If current player lands on income tax spot, they must either pay $200 or pay 10% of net worth (cash on hand, printed prices of mortgaged and unmortgaged property, and cost price of all buildings owned)
Steps:

The player lands on income tax	
The player may choose to pay $200 or 10%	
if their net worth	
	If the player chooses 10% then the server sums their net worth and the player pays 10% of it

Use Case: Jail
Actors: Current Player
Goals: Current player goes to jail under 2 conditions: land on space "Go to Jail" or throws doubles three times. Player can get out of jail if: they throw doubles on any of next three turns, paying $50 before rolling dice on any of 3 turns. Must pay $50 if it is third turn in jail. On turn that player gets out of jail (by rolling doubles, or paying) player moves forward the number rolled on the doubles, or rolls dice after paying. Player may buy and sell property, sell houses and hotels, and receive rent while in jail.
Steps:

The player lands on the "Go to Jail" space or throws a third double in a row	
	The player is moved to jail and their turn is ended
The player may pay $50 dollars or attempt to roll doubles to get out of jail. If it is their third turn in jail they are fined $50 dollars	
	If the player payed or was fined $50 they roll and move. If they rolled doubles they move by the number rolled.

Use Case: Free Parking
Actors: Current Player
Goals: If player lands on "Free Parking" spot, they receive no money, property, or reward of any kind (they do nothing).
Steps:

Use Case: Buying Houses
Actors: Current Player
Goals: Player may build houses on any property of color group, but must build on unimproved properties of this or any other fully owned color group (must build evenly on properties). Price of house is shown on deed of property. May build up to four houses on each property.
Preconditions: Player must own all property in group
Steps:

The user attempts to build a house	
	The server checks if all properties of the color are owned
	If they are, the system checks if the other properties in the color group have greater than or equal to number of houses
If they do, the system debits the house cost from the player, The system places a house	

Use Case: Buying Hotels
Actors: Current Player
Goals: Player may buy a hotel (price specified on title deed) that replaces houses on property. Only one hotel may be on each property.
Preconditions: Player must have four houses on specified property
Steps:

Player begins buying a hotel on a street	
	The system checks if there are four houses on the street
	If there are, the system checks if the number of hotels is maxed,
If it isn't, The system debits the hotel cost from the user, removes the houses, and places a hotel	

Use Case: Mortgages
Actors: Current Player
Goals: No rent can be collected on mortgaged properties or utilities, but rent can be collected on unmortgaged properties in the same group. In order to lift the mortgage, the owner must pay the Bank the amount of the mortgage plus 10% interest. When all the properties of a color-group are no longer mortgaged, the owner may begin to buy back houses at full price.
Preconditions: Player must own said property
Steps:

The user begins mortgaging an unimproved deed	
	The system changes the deeds mortgage status to true and gives the player the deeds mortgage price

Board

+ num_hotels_remaining : int
+ num_houses_remaining : int
+ players : Player []
+ board : Deed []

+ take_turn() : null
+ hold_auction(Deed) : null

2 - 4

Player

+ deeds : int []
+ money : int
+ token : String
+ name : String
+ position : int

+ roll_dice() : []
+ take_turn() : null
+ trade_deed(Deed, recipient)
+ mortgage_Deed(Deed) : int
+ pay_rent(Deed) : int
+ calculate_net_worth() : int

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Deed

+ purchase_price : int
+ mortgage_value : int
+ rent : int
+ name : String
+ owner : String
+ mortgage : Boolean

+ calculate_rent() : int

Extends

Extends

Extends

Extends

Street

+ house_cost : type
+ hotel_cost : type
+ num_houses : int
+ hotel : Boolean
+ color : String

+ calculate_rent(num_houses, num_hotels) : int

Railroad

+ calculate_rent(int) : int

Utility

+ calculate_rent(int []) : int

Other

Property Auction

All players

- Any player places bid
- If next bid is higher than previous bid player's bid is updated
- If 30 seconds pass without bid, highest bid receives deed.
- Deducts deed price from player's wallet

System

Buying houses

Current Player

- Player wants to build house
- Checks if all properties of that color are owned
- Checks if the other properties have greater than or equal to number of houses
- System deducts house cost from the player's wallet
- Player rolls dice to move after getting out of jail

System

Buying hotels

Current Player

Player wants to buy a hotel on a street

System checks if there are four houses on the street

Checks if number of hotels is maxed out

System deducts the hotel cost from user and removes houses from property and places a hotel

System

Buying Property

Current Player

Player lands on location

System Checks if location is unclaimedf

Player's choice on buying property or not. If not the deed is passed to auction

Property bought by player and is debited from players wallet

System

Free Parking

Current Player

Player lands on "free parking"

Nothing happens

System

Income Tax

Current Player

Player lands on income tax

Player chooses between paying $200 or 10% net worth

If player chooses 10% of wealth, calculate tax to pay

Pay tax

Deducts tax from current players wallet

System

Jail

Current Player

- Player lands on "Go to jail" space or rolls doubles 3 times in a row
- Player is moved to jail and turn is ended
- Player must pay $50 or attempt to roll doubles to get out
- If player can't roll doubles in three turns $50 is deducted from their wallet
- Player rolls dice to move after getting out of jail

System

Mortgages

Current Player

- Player wants to mortgage their deed
- Changes deed status to mortgaged
- Bank pays player mortgaged price for property and credits player's wallet.

System

Paying rent

Current Player

- Player lands on property of another player
- Checks if property is mortgaged
- If property is not mortgaged calculate rent
- If property is mortgaged do nothing
- Player pays rent

System

The Play

Current Player

- Roll Dice, If dice roll was doubles current player gets to roll again
- Return dice rolled
- player moves to new location and system updates location
- If player passes GO, credit $200

System

Selling Property

Player chooses a property to sell

Property is mortgaged the player is given to pay it off and sell it

Seller's choice of price

Each player is given an option to buy deed

Buyer gets the deed transferred into their name

Current Player

System