De La Salle University
College of Computer Studies

CCPROG3 Machine Project
MyEmpire

MyEmpire is a multi-player property-trading game. It has 32 spaces that includes: 18 properties (grouped into seven colors), 3 railroads, 2 utilities, 3 chance spaces, 1 Luxury Tax space, 1 Income Tax space, and 4 corners (Start, Free Parking, Community Service, and Jail).

This game may be played by 2 to 4 players.

Setup
At the start of the game, the players will fill in the 28 spaces of an empty playing board, with properties, railroads, utilities, etc. The four corner spaces are fixed.

Each player starts with an initial amount of $1500.

The bank starts with number of players times $2500.

The Game
This is a turn-based game. All players will begin at the **START**.
On each turn, the player rolls a dice, and advances clockwise on the board, based on the value of the dice.

Players will pay the bank when they land on tax spaces; collects money when on or passing through **START**; pays fine on his next turn when landing in Jail.

When a player lands on a property, he can

- PURCHASE unowned property;
- DEVELOP owned property;
- PAY RENT to the owner of the property;
- INITIATE TRADE when landing on an owned by another player; or
- DO NOTHING.

Owned properties may be developed, when

- the owner lands on his property, and
- the owner has enough cash, and
- one of the following conditions is met:
  - when total amount collected for this property is enough to develop; or
  - when the number of times this property is landed reaches the foot traffic limit.

Each time a property is developed, a house is built. When the number of houses for this property reaches the house limit, this property is fully developed.

Hotels for a property may only be built, when all properties of this color owned by the player are fully developed.

Each property belongs to one of the seven colors. Below is a description of the different properties.

Property	Price	Price per 🏠	Rent						Multiplier
			un-improved	🏠	🏠🏠	🏠🏠🏠	🏠🏠🏠🏠	Hotel	
Almond Drive	60	50	2	10	30	90	160	250	2.5
Kasoy Street	60	50	4	20	60	180	320	450	3.0
Rodeo Drive	100	50	6	30	90	270	400	550	3.5
Orange Street	100	50	6	30	90	270	400	550	4.0
Ventura Street	120	50	6	40	100	300	450	600	4.0
Juan Luna	140	100	10	50	150	450	625	750	4.5
Ylaya	140	100	10	50	150	450	625	750	4.5
J. Abad Santos	160	100	12	60	180	500	700	900	5.0
Madison	180	100	14	70	200	550	750	950	5.0
Annapolis	180	100	14	70	200	550	750	950	5.5
Connecticut	200	100	16	80	220	600	800	1000	5.5
Bougainvilla	220	150	18	90	250	700	875	1050	6.0
Dama de Noche	220	150	18	90	250	700	875	1050	6.0
Acacia	240	150	20	100	300	750	925	1100	6.5
Solar Street	260	150	22	110	330	800	975	1150	6.5
Galaxy Street	260	150	22	110	330	800	975	1150	7.0
9th Street	300	200	26	130	390	900	1100	1275	7.0
5th Avenue	320	200	28	150	450	1000	1200	1400	8.0

Foot traffic for each property is computed as $[no\_of\_players \times multiplier]$.

Property value increases when owner owns more properties of the same color.

Number of properties owned of the same color	Additional amount on rent
2	$ 10
3	$ 20

The three railroads (North, South, Metro) are each worth $200. Rent is based on the number of railroads that player owns: $25 for one, $50 for two, and $150 for all three.

The two utilities (Electric and Water) are each worth $150. If a player owns either, rent is equal to the amount shown on the dice times 4. If a player owns both, rent is equal to the amount shown on the dice times 10.

Trade

When trade is initiated, and the other player agrees to the trade, properties (including the developments for these properties) will change owners. Trading properties does not involve money.

Tax

Tax is collected when a player lands on either the Luxury Tax space or on the Income Tax space. The player pays tax to the bank. Luxury tax is $75, while Income tax is $200 or 10% of cash on hand, whichever is higher.

Chance

When a player lands on a Chance space, one out of the 28 Chance cards is given to the player. The Chance Card may be either be kept by the player until it is applicable, or used immediately. The card is discarded after use.

A set of 28 Chance cards is generated at the start of the game. When cards in the set have all been used, the same set is shuffled and used.

Chance Card	Total Card Count per Group
• Get out of jail free.	2
• Proceed to *property*, do not collect money when passed **START**. You may buy the property if unowned, pay rent, or propose trade. • Go to nearest utility. If unowned, you may buy from the bank; otherwise throw dice and pay owner 10 times the value of the dice. • Go to nearest railroad. If unowned, you may buy from the bank; otherwise pay rent.	6
• Congratulations! Bank pays dividend of $50 • Tax refund. Collect $100 from the bank. • Advance to **START**, collect $200. • It's your birthday! Collect $300 gift money. • You won the *competition*, collect $150 prize money.	6
• Go to jail. When passing **START**, do not collect $200 • Take a trip to *property*, collect money when passing **START**	4
• Double rent. Apply this card to a property you own, and you can collect double rent from the next player who lands on it. If you do not own any property, discard this card. • Apply this card to a property you own. Renovation costs $25 per house, or $50 per hotel. From now on, rent is increased by 50%. If you do not own any property, discard this card. • Apply this card to a property you own. Dilapidated houses. From now on, rent is decreased by 10%. If you do not own any property, discard this card. • Apply this card to a utility or railroad you own. Increase charge by 10%. If you do not own any utility or railroad, discard this card. • Apply this card to a utility or railroad you own. Decrease charge by 10%. If you do not own any utility or railroad, discard this card.	7
• Donate money for community development (*random amount*) • Pay taxes (*random amount*)	3

Four Corners

The four corners on the board is fixed. These are:

START	All players begin here. The next time a player passes through or lands on this space, the player collects $200 from the bank.
Community Service	When a player lands here, he donates $50 to the bank.
Free Parking	When a player lands here, he waits for his next turn.
JAIL	When a player lands here, he pays $50 at the start of his next turn.

End of Game

Game ends when

- a player does not have enough money to pay for rent, tax or fine; or
- a player owns 2 full sets of properties with the same color; or
- the bank is out of cash.

Players are ranked by their total worth (cash on hand + value of properties). Bankrupt player/s are at the bottom of the ranking.

Due Dates

Phase 1

Due: **July 1, 2019 (M)**

1. Draw the UML class diagram with the relationships for each of the entities that is described above. Note that attempt to use object-orientation is acceptable. At the least, object-based modeling is expected.
2. Create a Java program to show that a player purchase, develop a property, pays rent on a property where the Double Rent Chance Card is applied to it.
3. GUI is highly encouraged.

Phase 2

Due: **August 10, 2019 (Sa)**

1. Draw the UML class diagrams with the relationships, following MVC design pattern and exhibiting object-oriented paradigm.
2. Implement your modeled solution using Java programming language based on the whole specifications provided. Implementation of optional features stated above will incur bonus points. When applicable, use abstract class, interface, and inheritance to maximize use of polymorphism.
3. GUI is required. Following Model-View-Controller in the implementation is expected.

Deliverables

For each phase, deliverables are:

1. UML class diagram
2. source code with internal documentation
3. API documentation of user-defined classes via `Javadoc`
4. at least 3 unique test cases per method (except setters and getters) per class. Setters still need to have test cases, especially those that performs error checking.