

[20th March, 2021]

CENG 3430 Course Project

Project Design Document

[Catch the Thief Game]

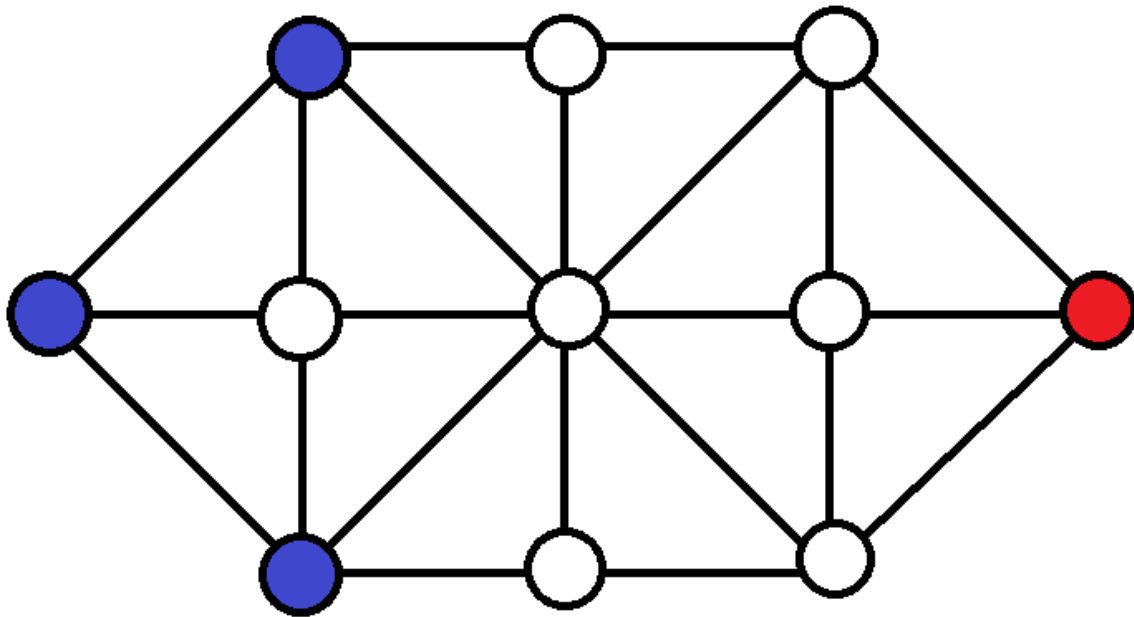
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II: Project Design

In this project, I am going to develop a chess game called “Catch the Thief Game”.

In the game, one Player becomes the cops, which is the Blue side, and for the another player will become the thief, which is the red side.

At the start of the game, there will be three blue nodes and one red node on the screen.



As the picture shows, in the initial state of the game, the blue player will take the leftest three nodes and the red player will take the rightest node.

After calculation, blue team should always move first as if red team moves first, blue team is impossible to win the game.

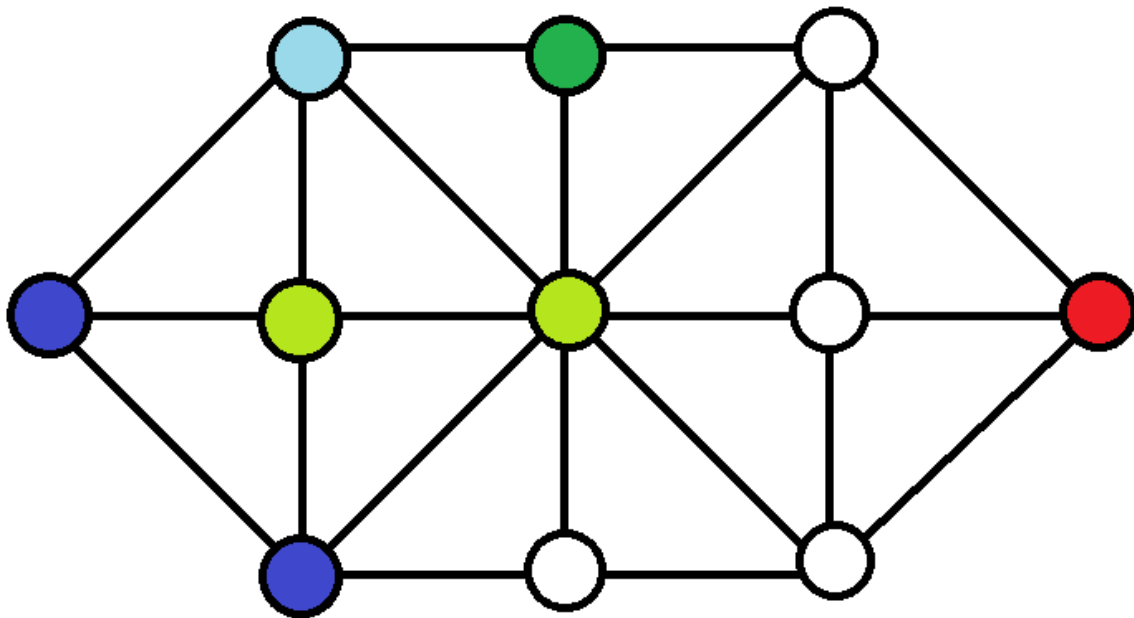
As normally, there is always a prosecution period in the law, there is also a turn limitation for the blue side, which the blue teams should catch the thief before the 30th move (count with both players). If they can't, the blue team loses the game.

III: Movement

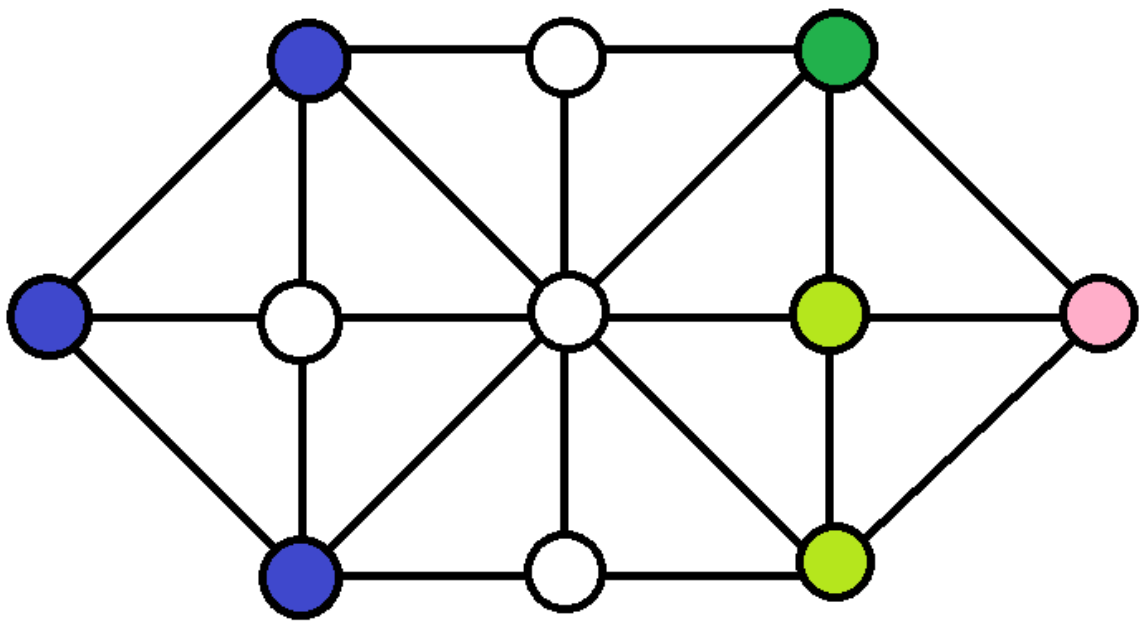
When the player moves, the board will show the movable node for each player in their turn. For the player who controls the blue team, the player needs to first choose which chess he will move. For the player who controls the red team, the player has only one node, so he will go in the moving_state at the first of their turn. The chosen node will become a light color of the original color.

During the Moving_state, The screen will show the movable by turning the color of the nodes to green, When the player chooses one of the nodes of the movable nodes, the color of that node will become deep green.

For the Blue team:

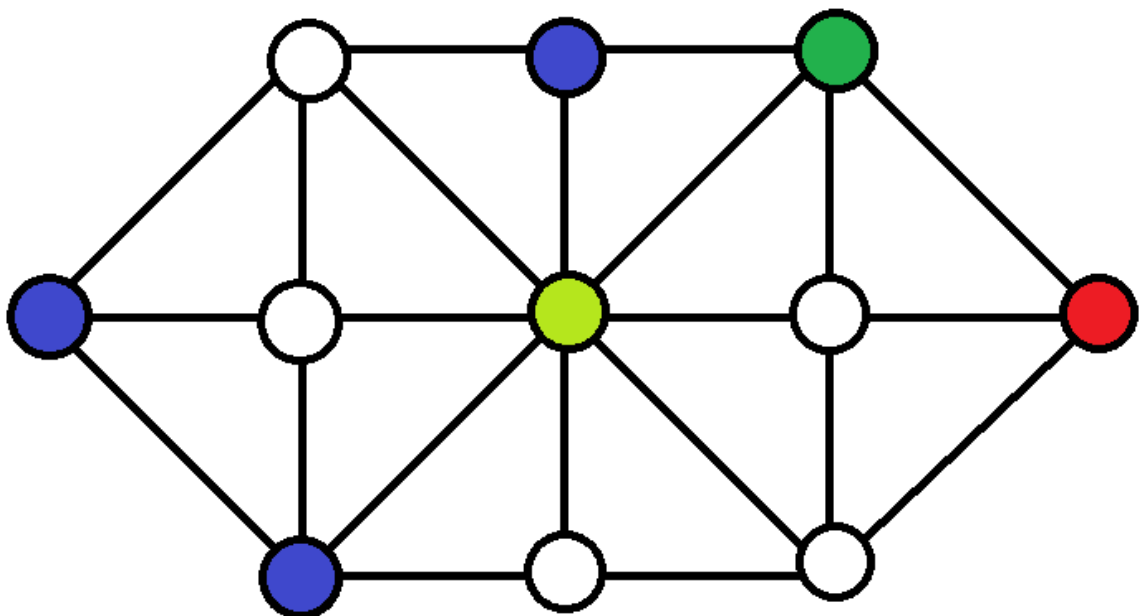


For the red team:



As the nodes of the blue team are triple than the red team. There would be one limitation for the blue nodes → the blues nodes can only go forward.

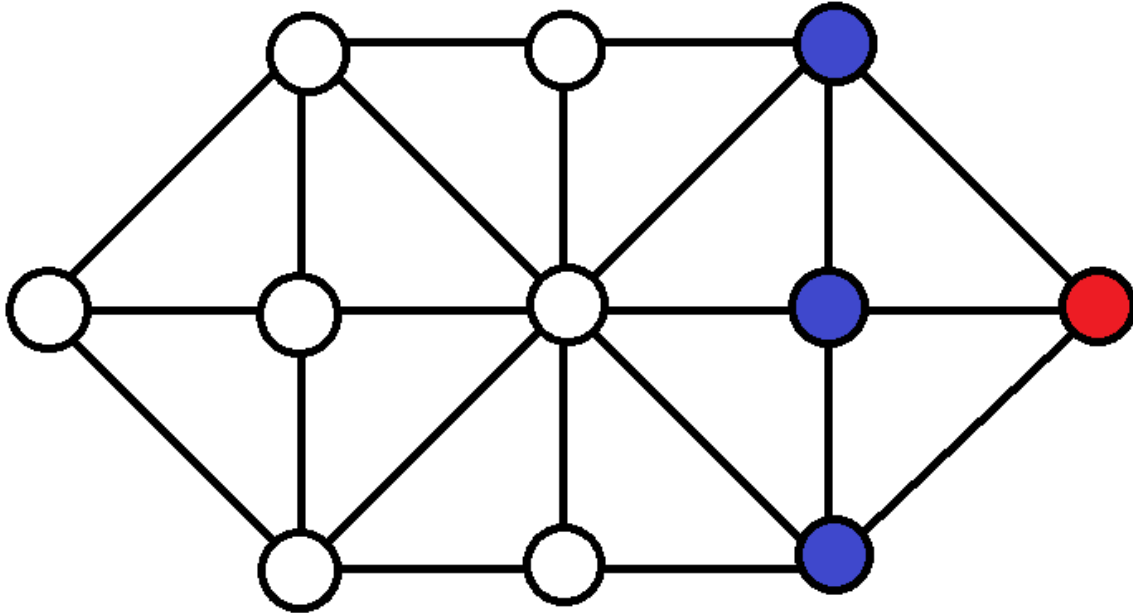
The arch design is as follow:



IV: Win State

In order to win the game, the Blue team needs to push forward and the red team can't move to the red nodes to any nodes then The Blue team wins the game.

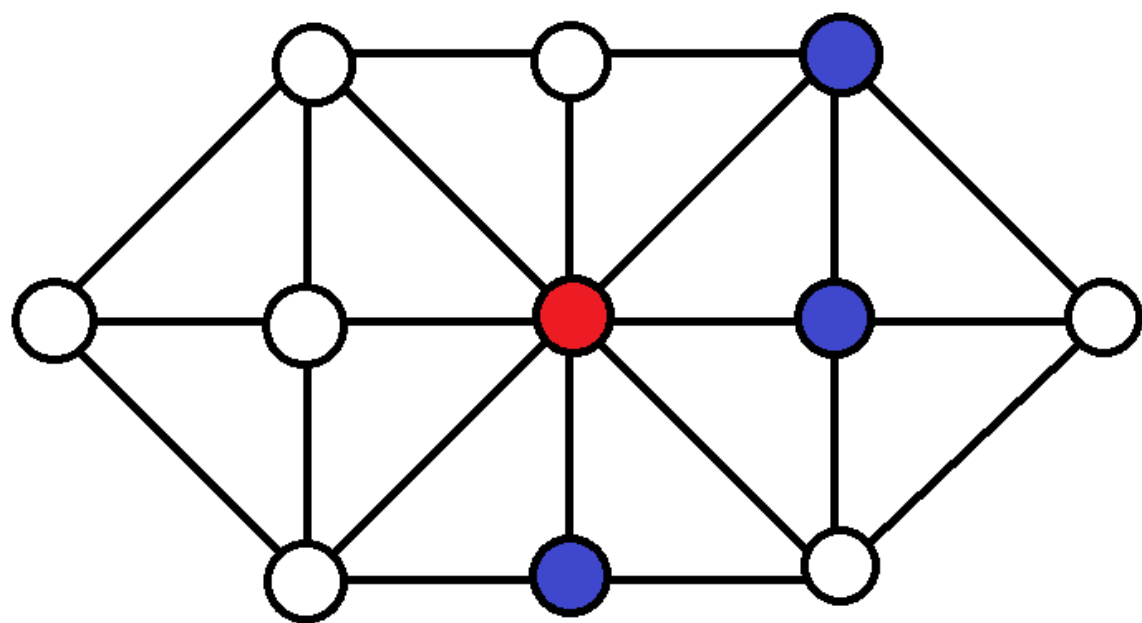
The following picture is one of the win situation of Blue team:



For the red team, as a thief, the player just needs to cross over the encircle of the blue nodes, then the Red team wins the game.

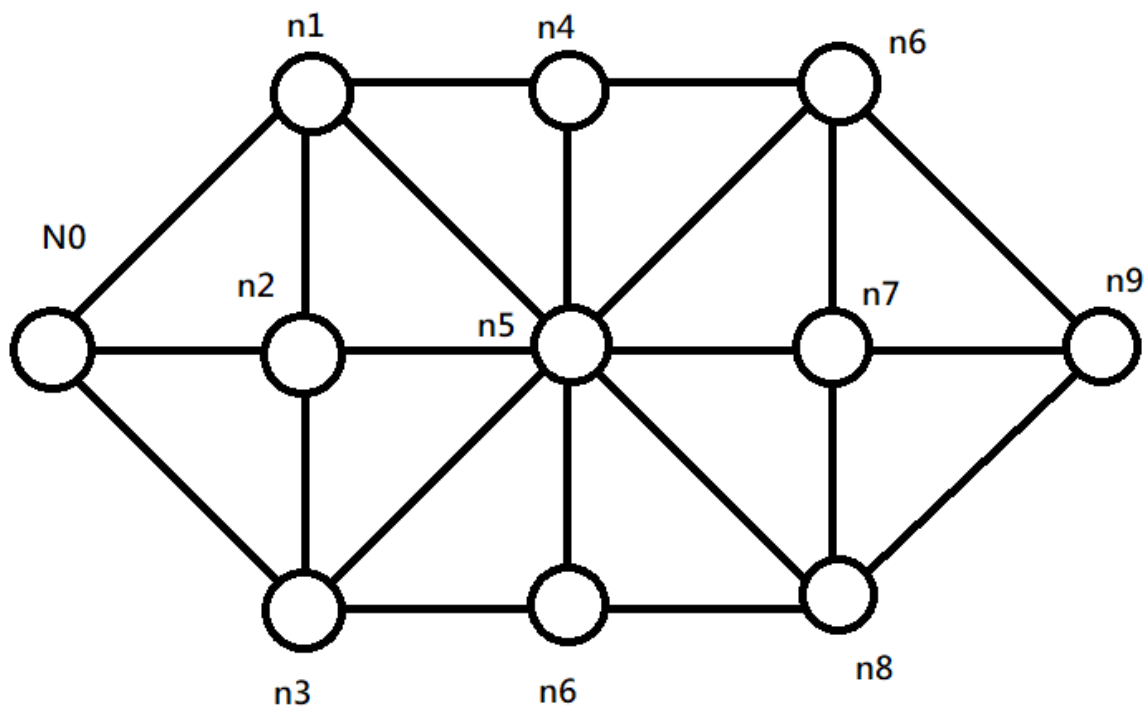
→ If the red node is behind a blue node, which means that it has already crossed the encircle of the cops.

The Following picture is one of the win situation of Red Team:



V: Nodes Design

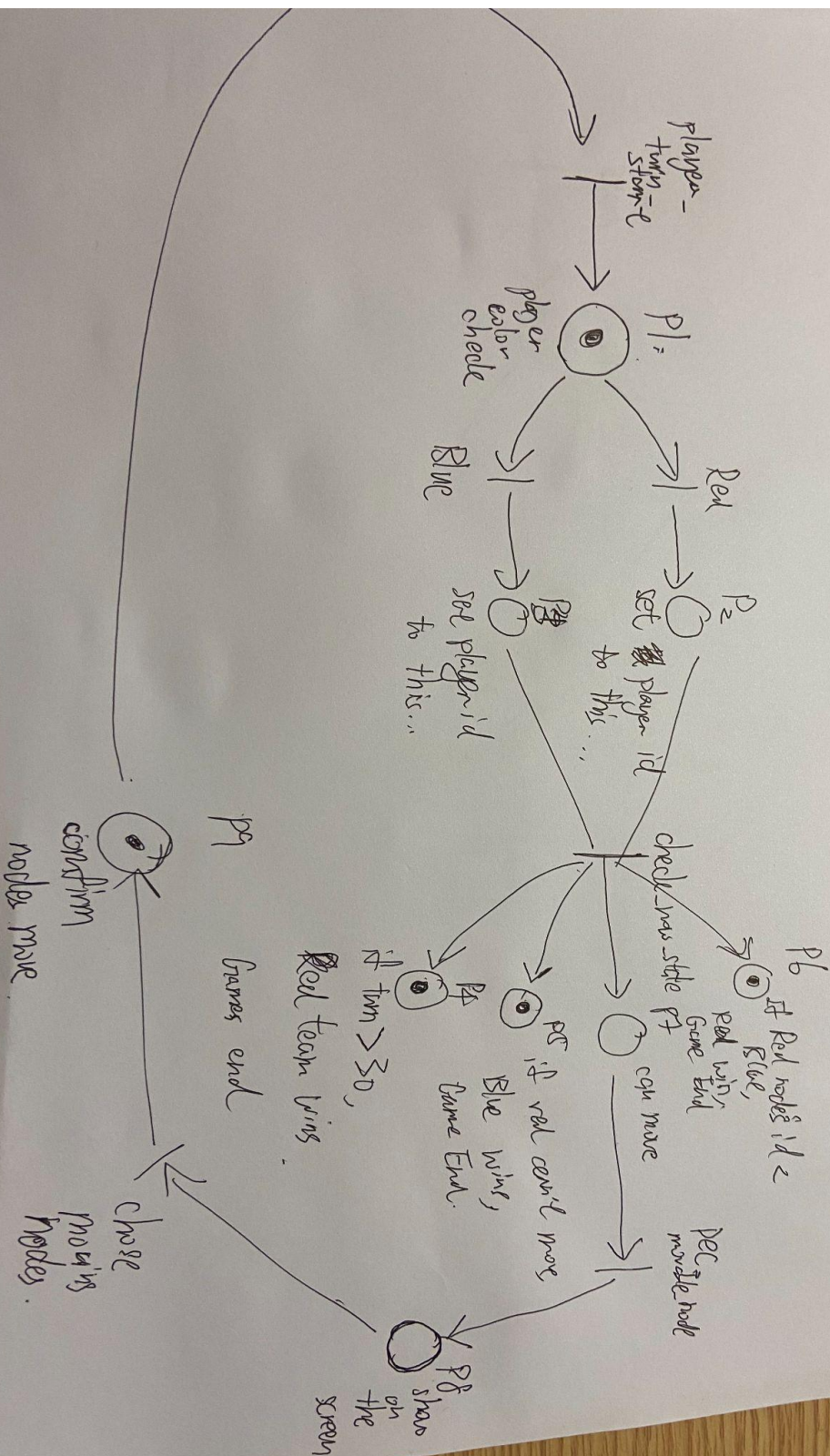
The Following picture is the designed ID for the nodes in the board:



I design in this way as I think it is easier for the system to check / trigger the win state of red team.

VI: Petri Net

CENG 3430 Project Design Petri Net



VII: Hardware Required

LCD display screen: to display the chess board of the game. provided by the course.

→ implement: Draw diagram, display different colors in the nodes zone, print the state like "Player X's turn, Please Move"/ "Player X wins!"

PMODSSD: display the turn counter of the game. provided by the course.

→ implement: A count up counter in decimal.

Extra hardware (advanced/ option):

Controller for the player:

Can be a joystick or a direction controller as the picture shown



→ implement: 4 direction decided the next_node in the moveing_state
1 confirm button to confirm the player's move