Today's content

1. class diagram
2. Finding winner in O(1)

Class diagram

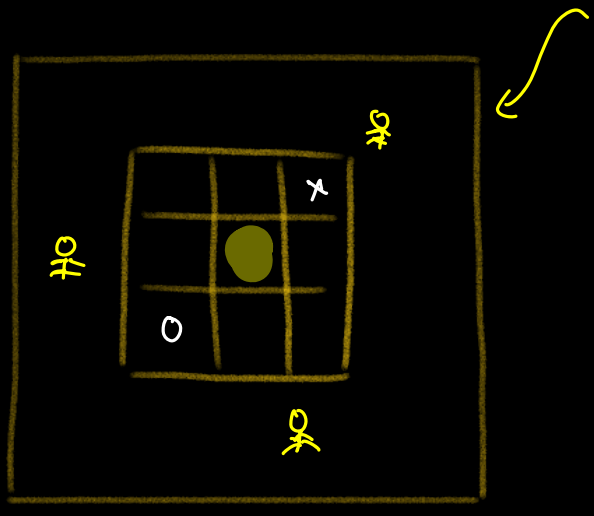
1. From nouns
2. By visualizing systems
   ↓ for games

} ways to create class dia.

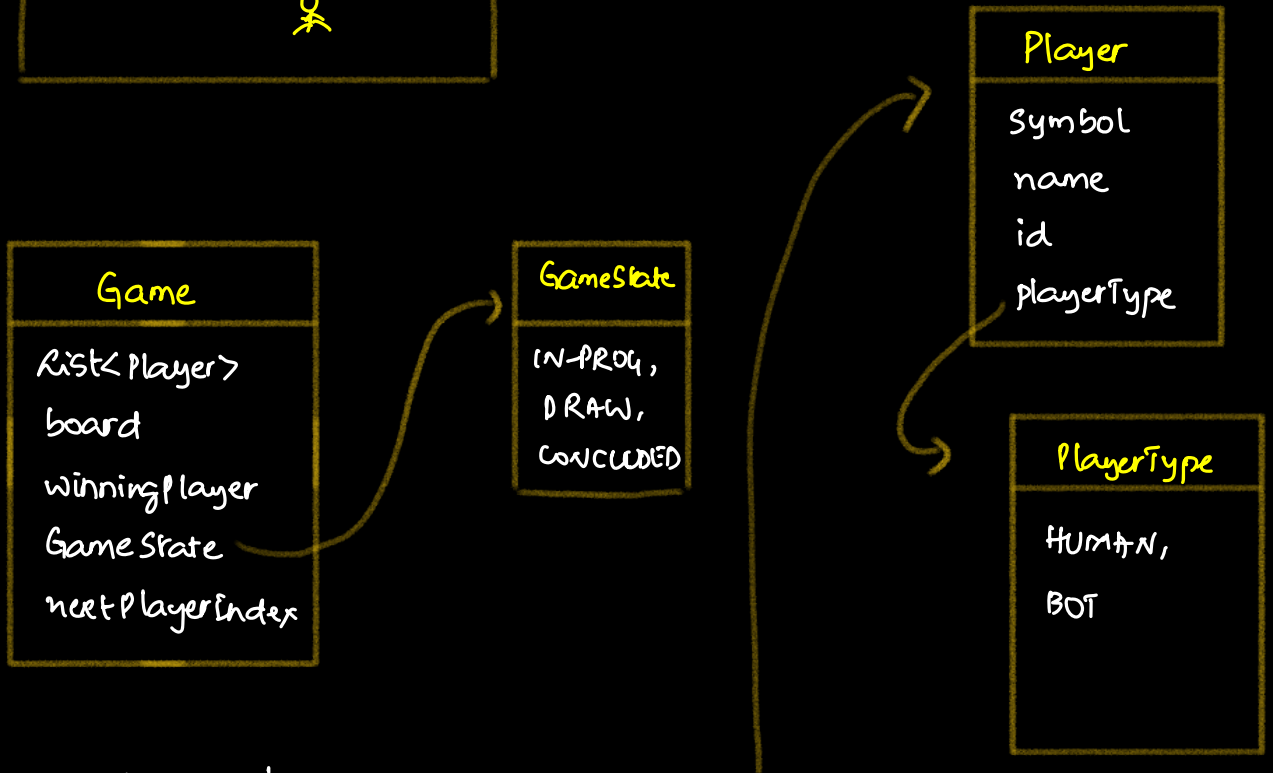
What's expected for a class diagram? -

1. entities
2. Design Patterns.

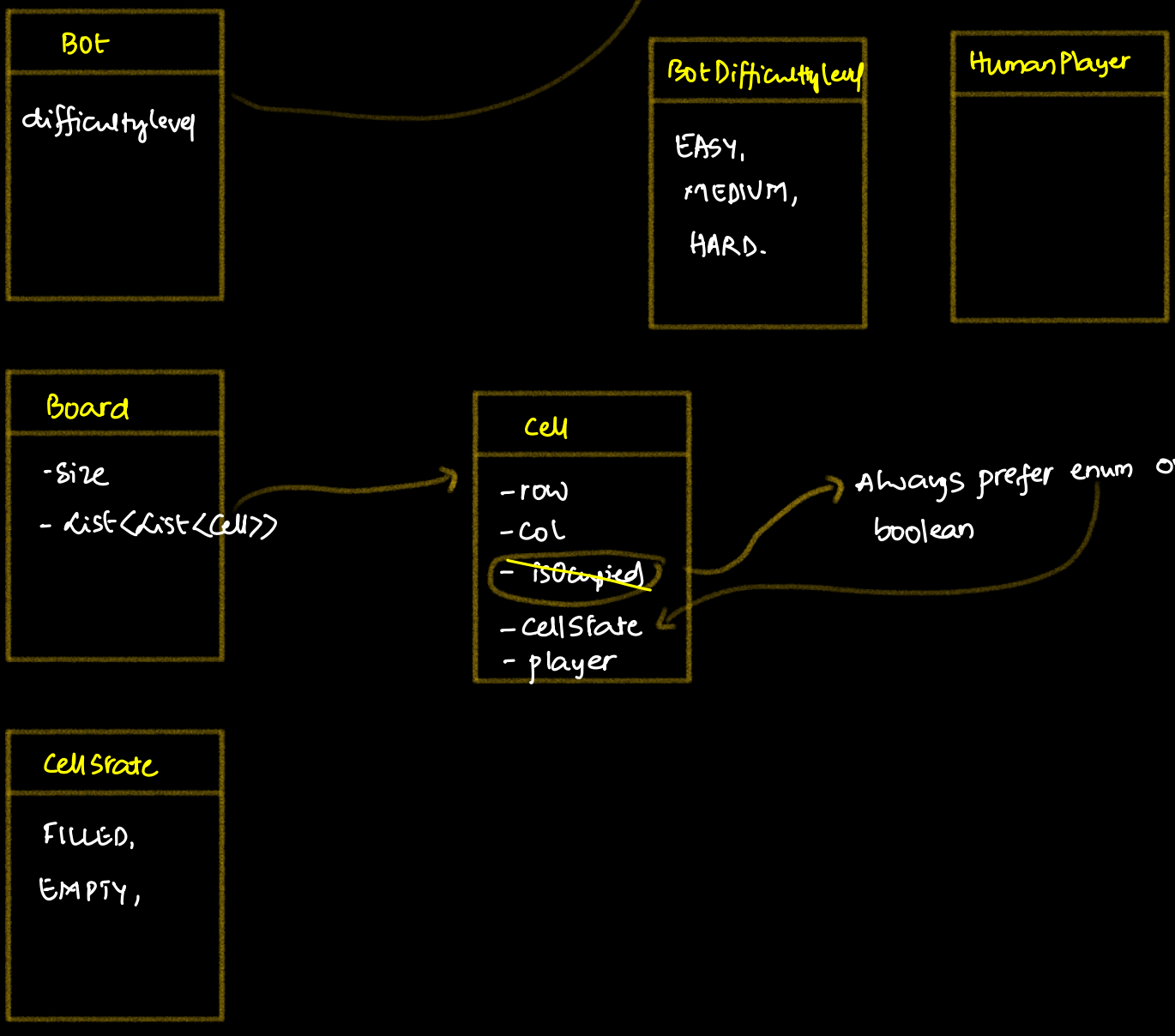
Visualise



1. Players
2. Board
3. Game.



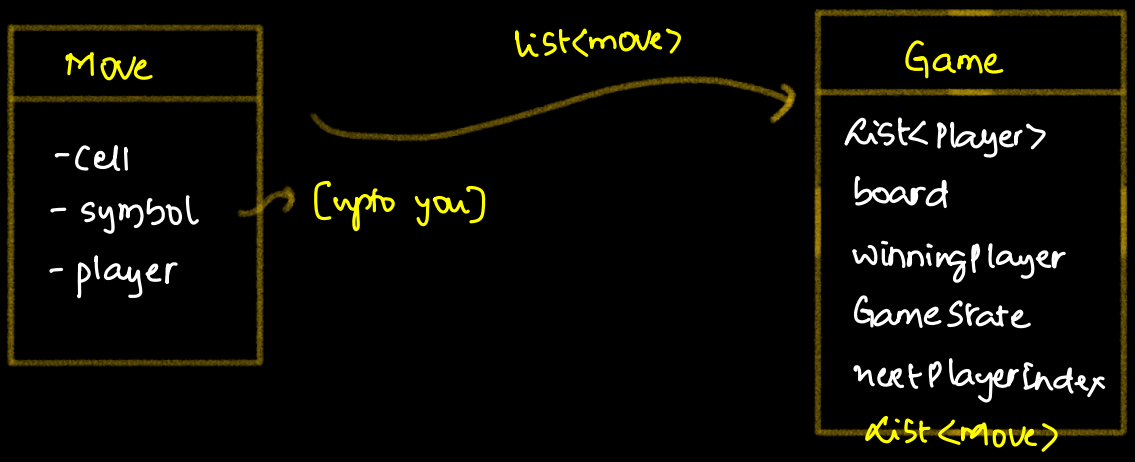
Bot is also a player.



What'll is covered?_

1. Game → GameState,
2. Player → PlayerType
3. Bot → DifficultyLevel
4. HumanPlayer
5. Board
6. Cell → CellState

UNDO



Google +.

failure reason ----

1. late entry to the market.

1. Flw like spring boot.
2. Flw like react
3. _____
4. _____

} They're all used even today.

Fb was very famous & has already taken over the market.

Design patterns

1. Builder -> for validations of game creation
   1. only one bot
   2. each player should have unique symbol
   3. No. of players = (size of board -1).

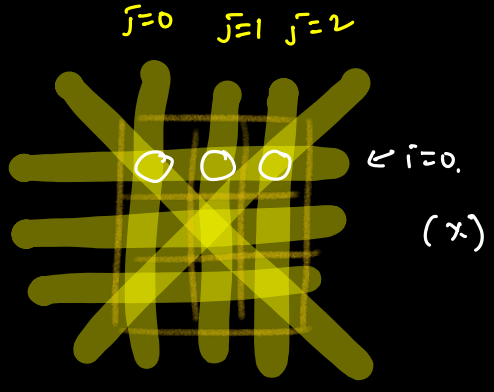
2. Strategy ->

3. Factory: For the corresponding diff level get BotPlayingStrategy.

How to find the winner

How to identify victory--

1. Same char on entire row
2. Same char on entire col
3. Same char on entire dia



#code:

```
for (Player player: players)
    Symbol = player.getSymbol();
    // checks for win via row
    for(i=0; i<n; i++)
        isSoln = true
        for (j=0; j<n; j++)
            if(board[i][j].symbol != symbol)
                isSoln = false
                break

        if (isSoln == true)
```

TC: $O(N^3)$

return true

// Same logic col & dia

Method 2: If Keerthi makes a move, can sanjay win?_

Check the above logic for single player. TC: $O(N^2)$.

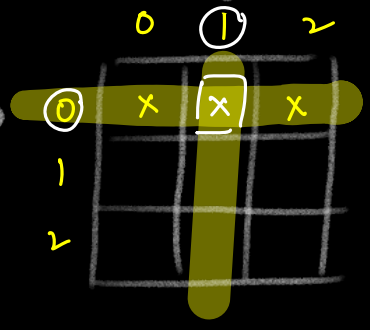
Method 3: If Keerthi makes a move in row1, can he win via row 2.

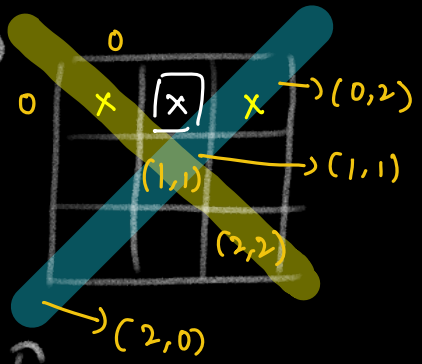
```
boolean checkWinner (board, cell)
    int k = cell.row, l = cell.col;
    // for row.
    isSol^n = true
    for (j=0; j<n; j++)
        if (board[k][j] != cell.symbol)
            isSol^n = false

    if (isSol^n == true)
        return true

    // for col
    isSol^n = true
    {

    // for dia
        if (k==l) => check in 1st dia
        if (k+l == (n-1)) => check in 2nd dia
```

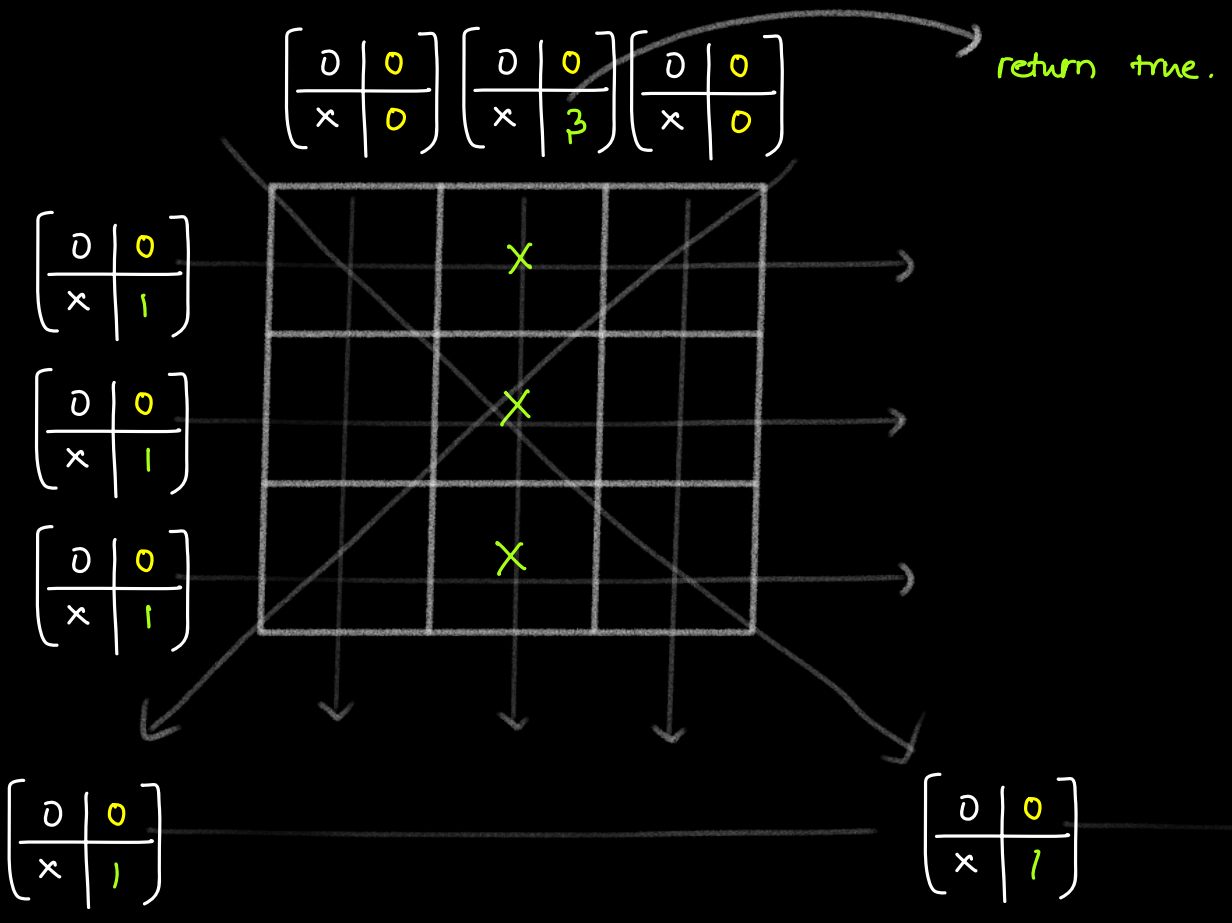




TC: $O(N)$

Method 4: Create a map for every row, col, dia.

<Symbol, frequency of symbol>



HW.

1. write code for this logic
2. Create models 4 strategies for the class dia in intelliJ
3. Try to complete tic tac toe.