三目並べ

「３目並べ」は、交互に石を置いていき、縦、横、斜めのどこかに自分の列を作れば勝ちというゲームです。置いた石は動かしません。

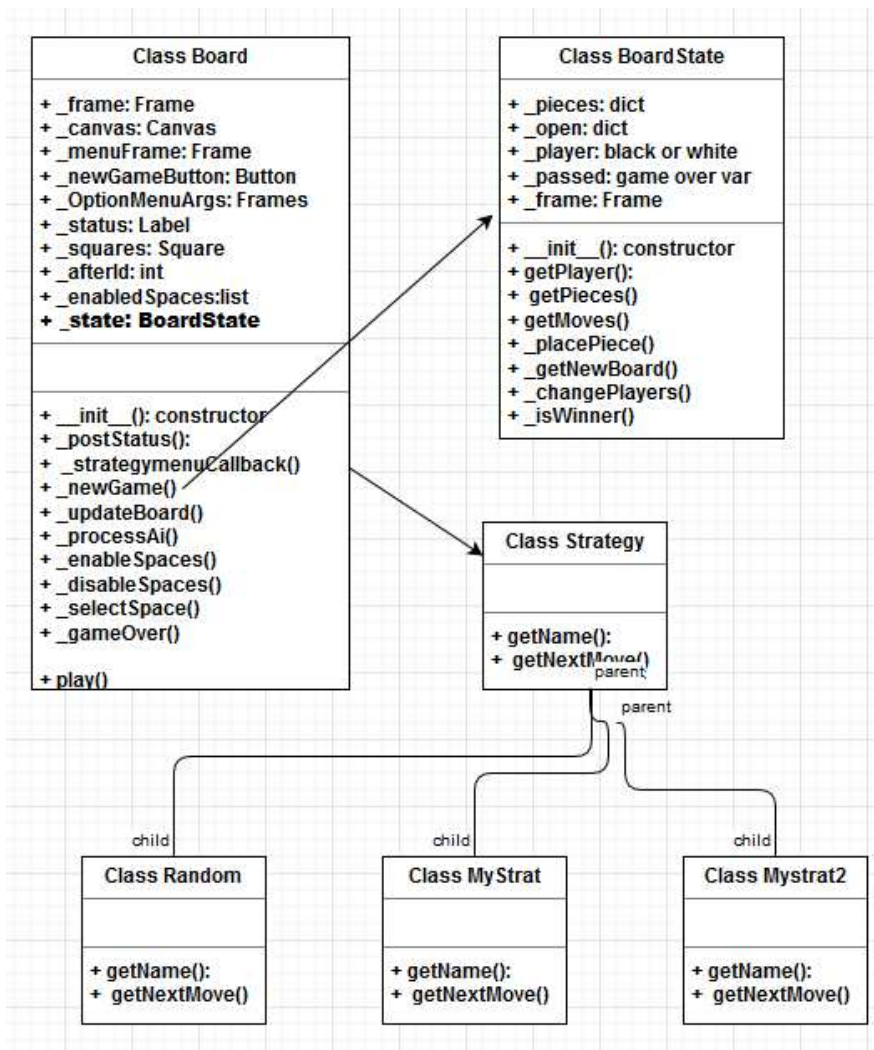様々な呼び名: *Tic tac toe* （アメリカ）,Noughts and Crosses （イギリス）, *Morpion*（フランス）,틱택토 (韓国語)

ヒューリスティック

先手：

前述の通り9カ所のどこに打っても、相手も最善を尽くしてきた場合には引き分けになってしまう。しかし、もし相手のミスを狙うなら、角に打つのが得策だろう。

後手：

先手が中心、角、辺のどれに打ってきたかによって変わる。ここでは先手が○、後手が×である。後手は×で示した位置以外に打つと、負けが決定してしまう。

BoardState

Holds one state of the board.

```
def __init__(self, boardstate=None):
    "Creates a new board state.  If a board state is supplied, it is copied"
    if boardstate:
        # copy an existing board state
    else:
        # create a new board state
        # Note: x goes from 0 to 2, y goes from 0 to 2
        # _pieces is a list of pieces on the board; _pieces[x,y] = player no: 1 or 2
        # this is the opening state - 2 pieces for each player in center of board
        # _open is a list of open spaces next to occupied spaces
        # it is used to narrow the search space for legal moves
        # _open[x,y] = 1 means space is open
```

- getPlayer() and getPieces() return information about the state.
- getMoves() computes legal moves that can be made from this state.

```
'''Returns a list of valid next moves and board states.
   Each item is (x,y,newBoardState). x,y in range 0-2.
   If there is no legal move (game over), the list will be empty.
'''
```

Board

"Holds the Tk GUI and the current board state"

```
def __init__(self, strategies=()):
    '''Initialize the interactive game board.  An optional list of
       computer opponent strategies can be supplied which will be
       displayed in a menu to the user.
    '''
```