Package 'rt3'

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Type Package

Title Tic-Tac-Toe Package for R

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Description Play the classic game of tic-tac-toe (naughts and crosses).

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EMPTY *Constant for the empty square. It's value is the character "_".*

Description

It's value is the character "_".

Usage

```
EMPTY
```

Format

An object of class `character` of length 1.

`firstAvailableMovePlayer` *Player that always takes the first move in the list of valid moves.*

Description

Internally this player calls getMoves and then picks the first entry in the list of moves. A player is a function that takes a game state as input and returns a valid move index.

Usage

```
firstAvailableMovePlayer(gameState)
```

Arguments

`gameState`	The gameState that the player should act on.

Value

moveIndex Index to a valid move as returned by the getMoves function.

Examples

```
gameState <- startGame()
move <- firstAvailableMovePlayer(gameState)
```

`gameState` *The game state is represented by a list of 8 values.*

Description

board The boards state represented by a list. It contains a list of X's, O's and EMPTY's. It's initially filled by EMPTY's.

currentPlayer The player who needs to make the next move. This either X or O.

startingPlayer the player who was the first player to move in this game state. This either X or O.

moves The list of moves made by players to get to this game state. This initially filled with 0's.

movesP The player turn list. It contains a list of alternating X's and O's

numMoves Number of moves made to get to this game state.

isDone This indicates wheter this is a final game state. It is final if either X or O has won if there is no winner: NONE.

winner If there is a winner in this games state the value is either X or O. If the game state is a draw or the game is not finished the value is NONE.

Usage

```
gameState
```

Format

An object of class `list` of length 8.

`getMoves` *Get the list of valid move from the game state.*

Description

Get the list of valid move from the game state.

Usage

```
getMoves(gameState)
```

Arguments

`gameState`	The gameState for which moves must be calculated.

Value

validMoves An array (["integer"]) of valid moves based on the provided game state.

Examples

```
gameState <- startGame()
validMoves <- getMoves(gameState)
```

---

makeMove *Apply the move to the current game state an produce a new game state.*

Description

Apply the move to the current game state an produce a new game state.

Usage

```
makeMove(gameState, move)
```

Arguments

gameState	The gameState to apply the move to.
move	The move to be applied to the game state.

Value

gameState The game state after applying the move to the game state.

Examples

```
gameState <- startGame()
gameState <- makeMove(gameState,1)
```

NONE *Constant for no winner. It's value is the character "_".*

Description

It's value is the character "_".

Usage

```
NONE
```

Format

An object of class character of length 1.

O — *Constant for the O player.*

Description

It's value is the character "O".

Usage

```
O
```

Format

An object of class `character` of length 1.

playGame — *Play a game of Tic-Tac-Toe using the two provided stragies.*

Description

Play a game of Tic-Tac-Toe using the two provided stragies.

Usage

```
playGame(px, po)
```

Arguments

px	The X player strategy.
po	The O player strategy.

Value

gameState The final gameState after playing a full game.

Examples

```
px <- firstAvailableMovePlayer
py <- randomMovePlayer
finalGameState <- playGame(px,py)
```

randomMovePlayer *Player that picks a random move*

Description

Internally this player calls getMoves and then picks an entry in the list of moves at random.

A player is a function that takes a game state as input and returns a valid move index.

Usage

```
randomMovePlayer(gameState)
```

Arguments

gameState	The gameState that the player should act on.

Value

moveIndex Index to a valid move as returned by the getMoves function.

Examples

```
gameState <- startGame()
move <- randomMovePlayer(gameState)
```

rt3 *rt3: A Package for Playing Tic-Tac-Toe in R.*

Description

The rt3 package provides functions to allow a user to simulate tic-tac-toe games. It provides a convenient gameState object as well as simple interface for developing new types of players.

Main Function

playGame Play a game of tic-tac-toe.

Structures

gameState A tic-tac-toe game state.

Constants

X The X player.

O The O player.

EMPTY The EMPTY constant. Used to indicate an empty board position.

NONE The NONE constant. Used to indicate a draw.

Support Functions

These functions are used by the playGame function.The will also be usefull in building game decsion trees for more complex players.

startGame Create a new tic-tac-toe game state.

getMoves Get the current set of valid moves for a given game state

makeMove Apply a move to the given game state and return the resulting game state

Built-In Player Functions

randomMovePlayer A player that plays random valid moves

firstAvailableMovePlayer A player that always plays the first move available

References

https://en.wikipedia.org/wiki/Tic-tac-toe

`startGame` *Start a new game*

Description

This function starts a new game. It randomly assigns a starting player and returns a new game state object.

Usage

```
startGame()
```

Value

gameState A new gameState.

Examples

```
gameState <- startGame()
```

`X` *Constant for the X player.*

Description

It's value is the character "O".

Usage

```
X
```

Format

An object of class `character` of length 1.

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