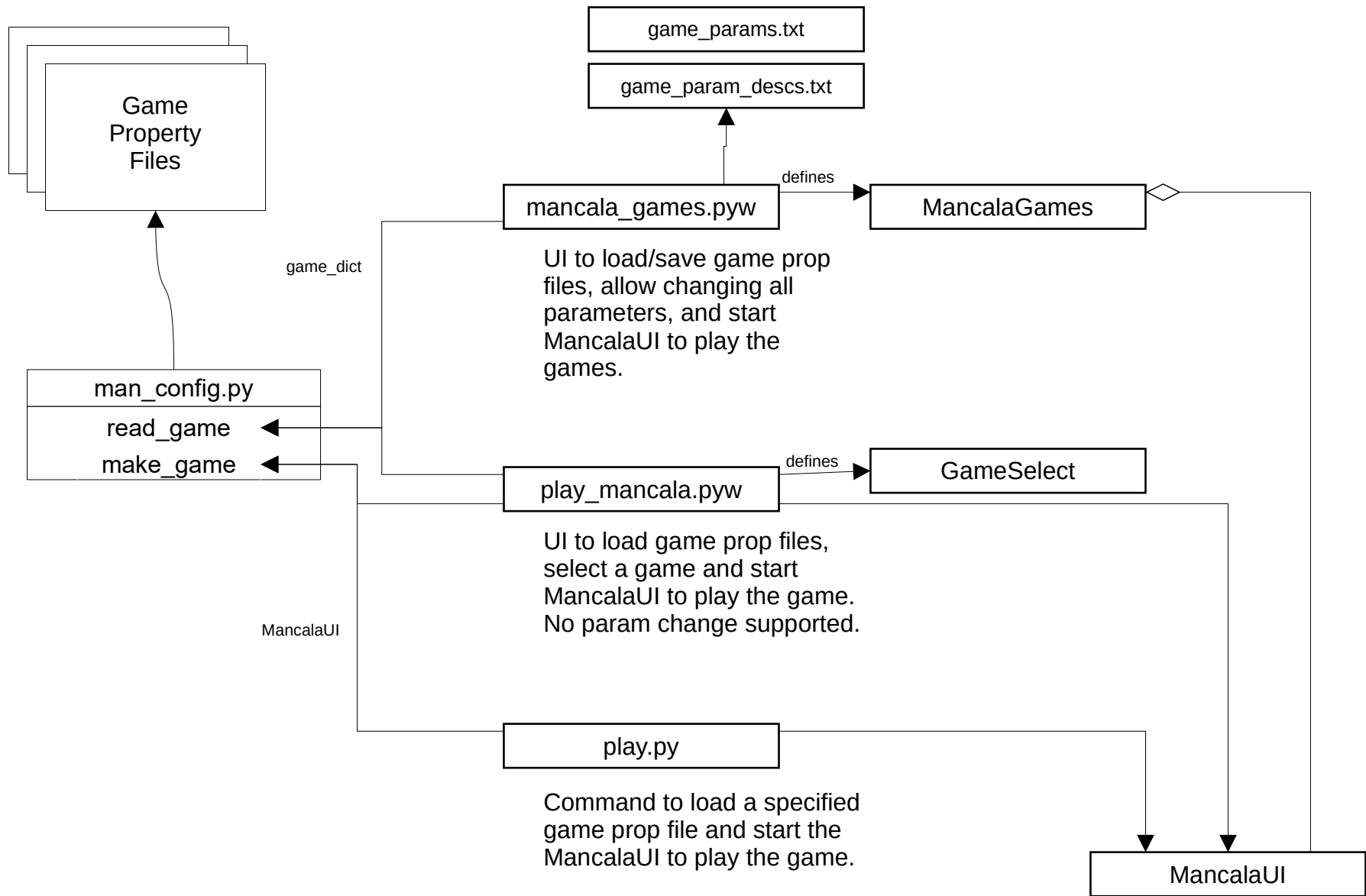
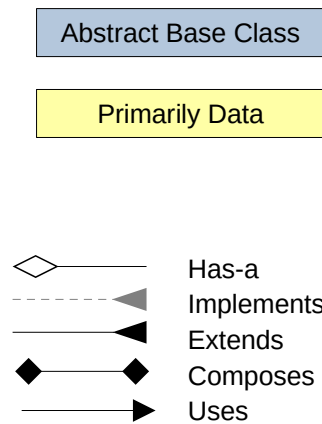


Mancala Games



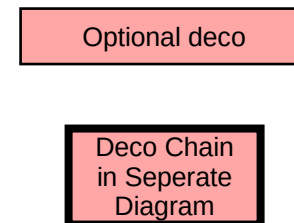
Notation Conventions

Class Diagram Conventions



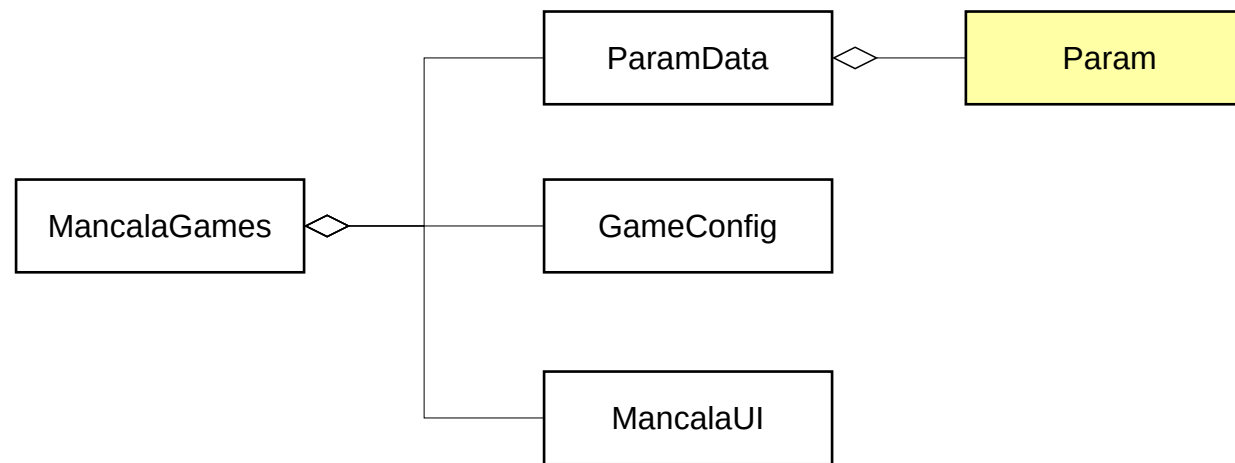
Deco Chain Conventions

- One path down the deco chain is used.
- Intersecting arrows are decision points.
- Shown in **call order** from start dot (constructed in reverse order).
- Calls down the deco chain maybe at any point in each deco's processing.
- All paths shown might not be possible (see ginfo_rules).



MancalaGames

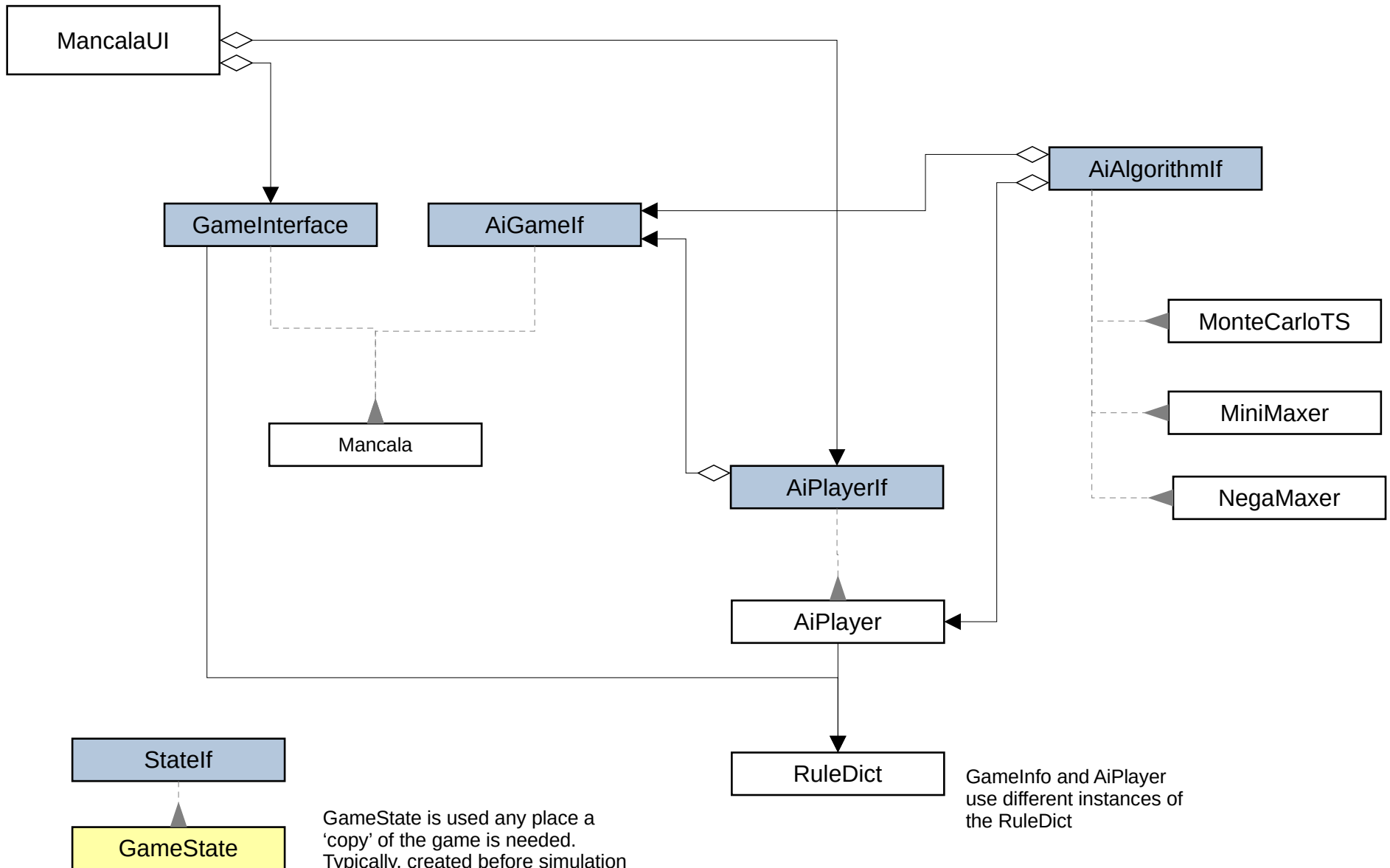
(the Mancala Games UI class)



game_params.txt and game_param_descs.txt are loaded into the ParamData class.

Management of the game configuration file is done with the GameConfig class in MancalaUI

Mancala, GameState, AIPlayer and AIAlgorithm

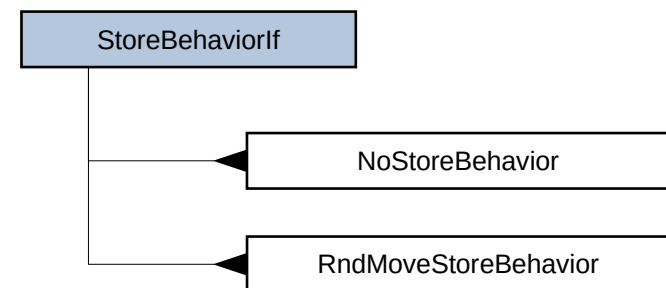
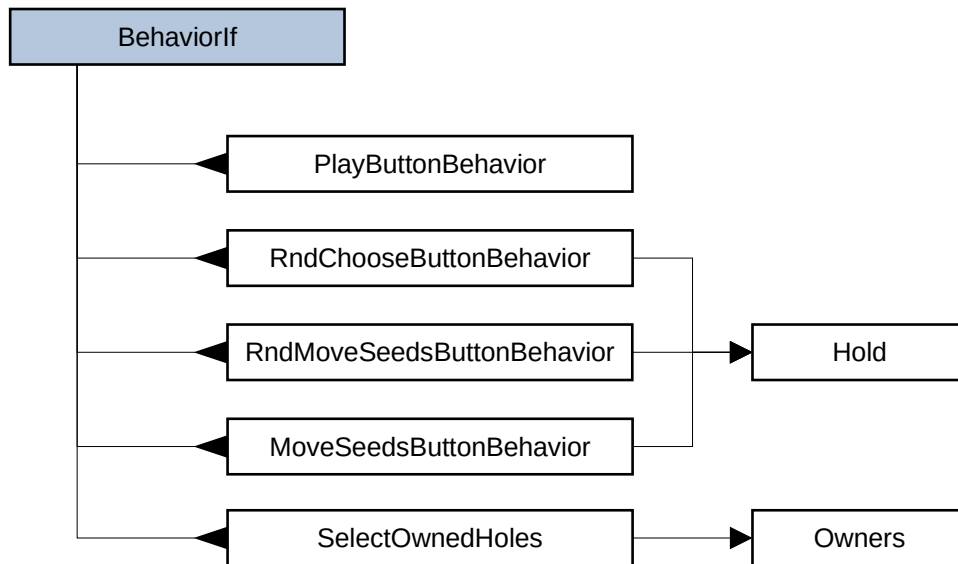
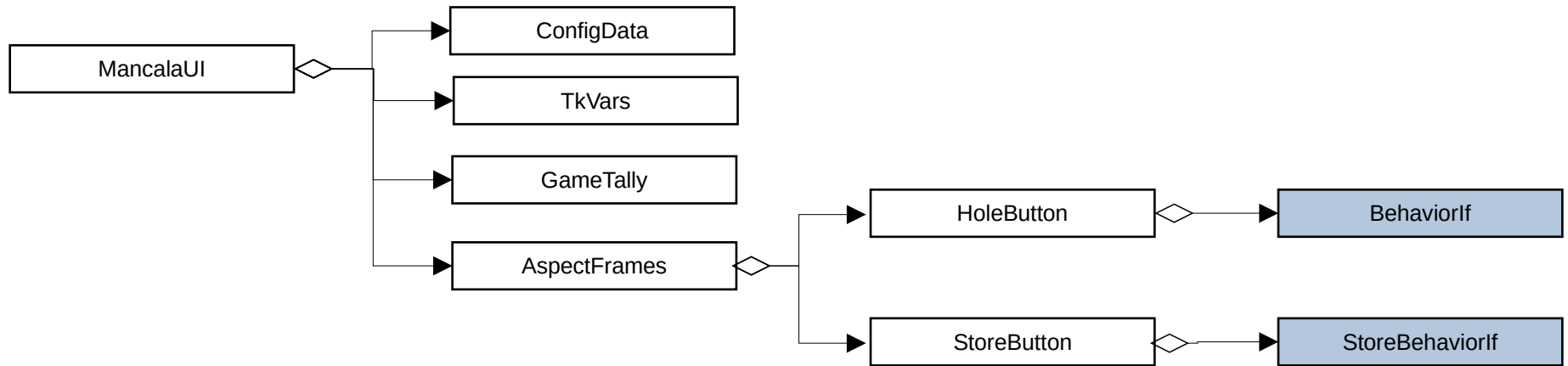


GameState is used any place a 'copy' of the game is needed. Typically, created before simulation and restored after.

Created and set via the state property of the Mancala class.

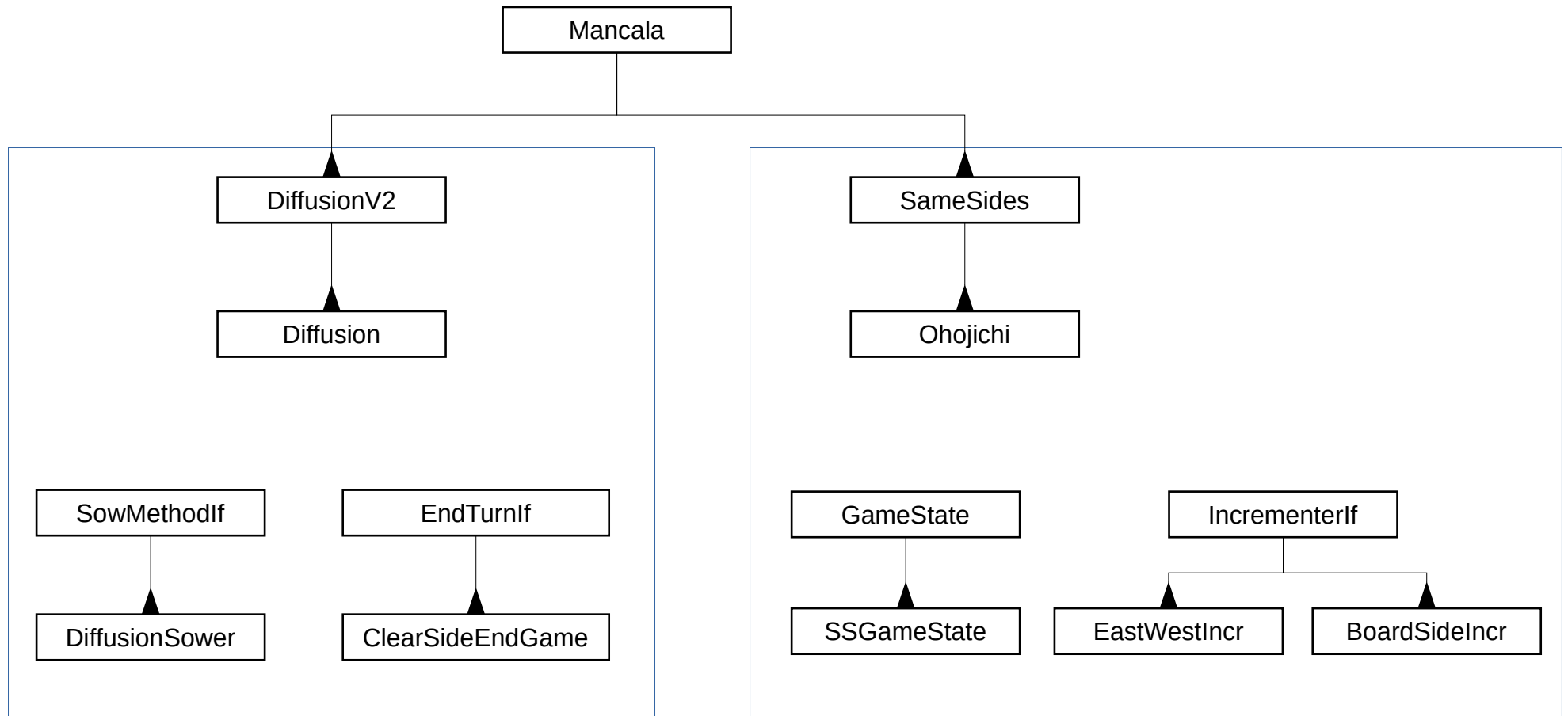
GameInfo and AiPlayer use different instances of the RuleDict

Mancala UI Classes

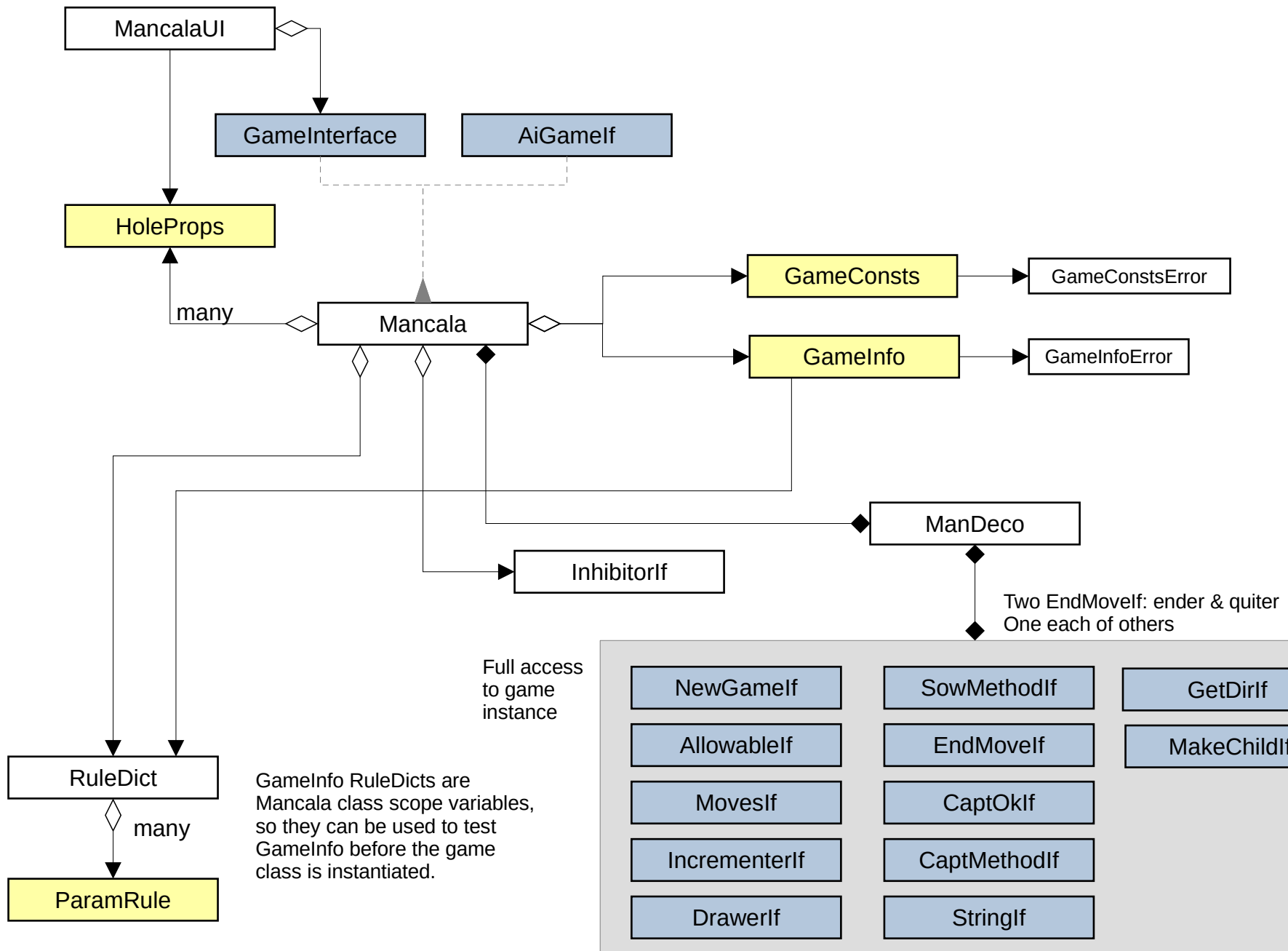


Hold and Owners are used to collect a few global variables and operations. These 2 classes are never instantiated.

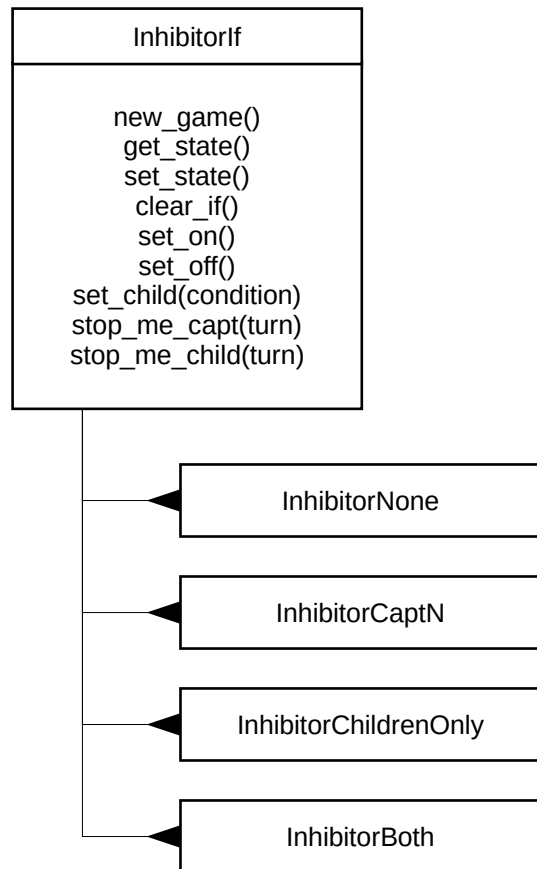
Mancala Classes



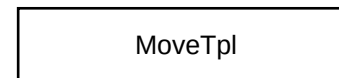
Mancala Classes



Import Classes for Moves



The decorator chains and button behaviors use and control the inhibitor.



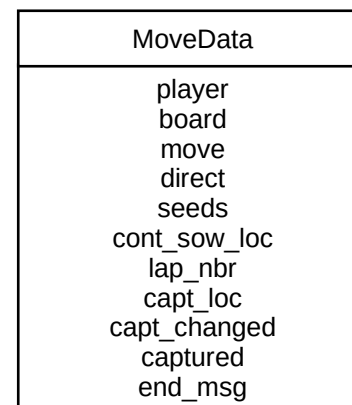
Moves are one of (based on game parameters):

1. position
2. (position, direction)
3. (row, position, direction)

MoveTpl prints the moves nicely.

Row is in terms of the UI, that is Top/True is 0 and Bottom/False is 1. This is the “not” of the game.turn.

Moves are created when initializing the HoleButtons for the human players and via the `get_moves` deco chain for the AI player.



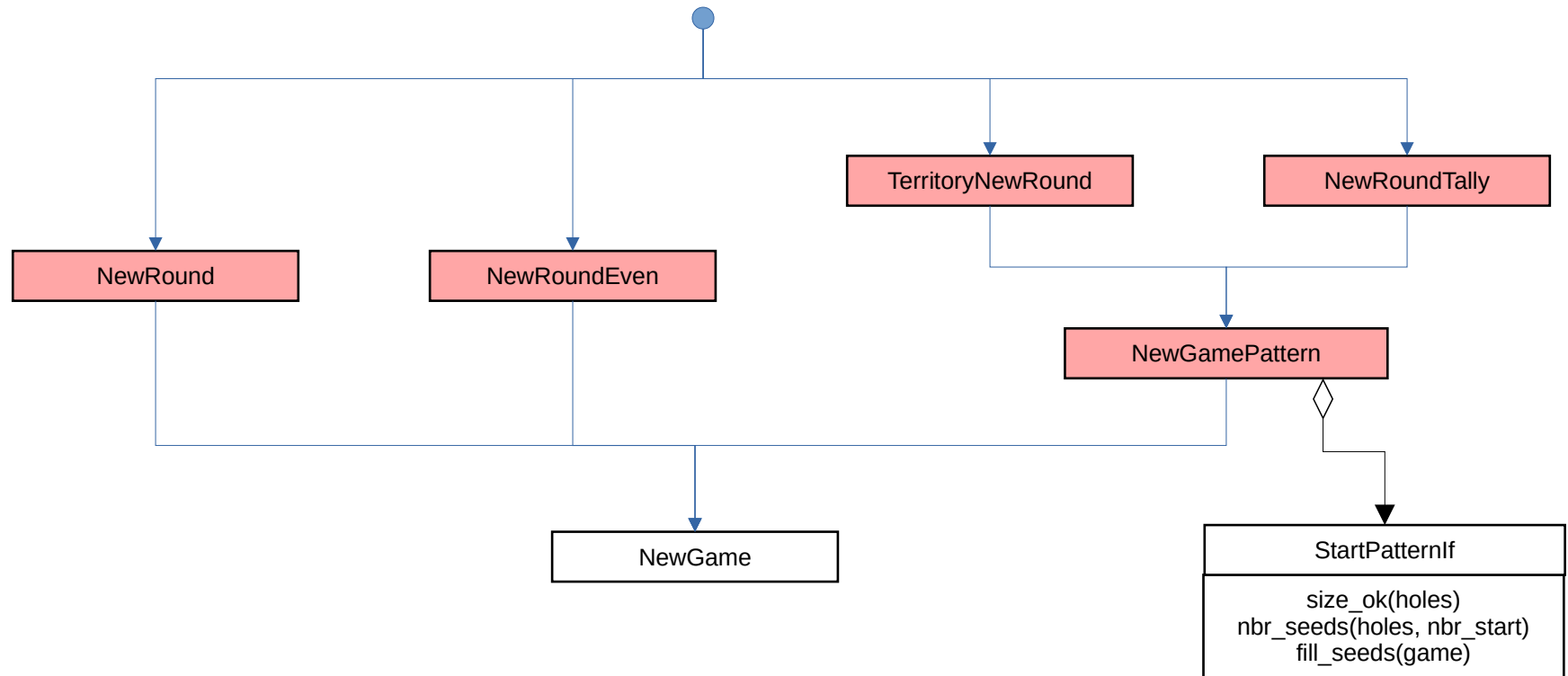
MoveData is used to communicate information about each move between the deco chains and individual decorators.

See class comment for where each field is set and/or updated.

Decorator Usage

Game Op/Step	Primary Decorator	Other Classes & Decorators Used	Description
New Game	new_game	StartPattern, inhibitor	Setups the game for initial play. Applies any prescribed moves.
Determine Drawable Holes	allow		Return a list of holes that are playable.
Collect Moves	get_moves		Return a list of possible moves.
Draw seeds to start a move	drawer		Parse the move, determine number of seeds to sow, possibly leave one seed
Determine sow direction	get_direction		Convert the move & location into an actual sowable direction: clockwise or counter-clockwise.
Sow	sower	MoveData, incr, make_child, inhibitor	Drop the seeds into the board holes.
Capture seeds	capturer & capt_ok	MoveData, incr, make_child, inhibitor	Perform any captures.
Evaluate end of game	ender	MoveData	At the end of each move determine if the game is over: game has been won, no more moves, game outcome can't change, etc.
Logging	get_string		Creates an ASCII string for the game.
Force end of game	quitter		The game needs to end either because of endless sow or user selection. Something fair will be done.

New Game Decorators and Chain



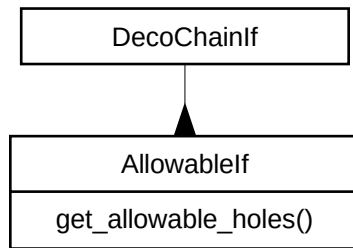
State variables changed:

blocked
board
owner
starter
store
turn

Parameters:

blocks
goal
min_move
round_starter
round_fill
rounds
start_pattern

Allowables Decorators and Chain

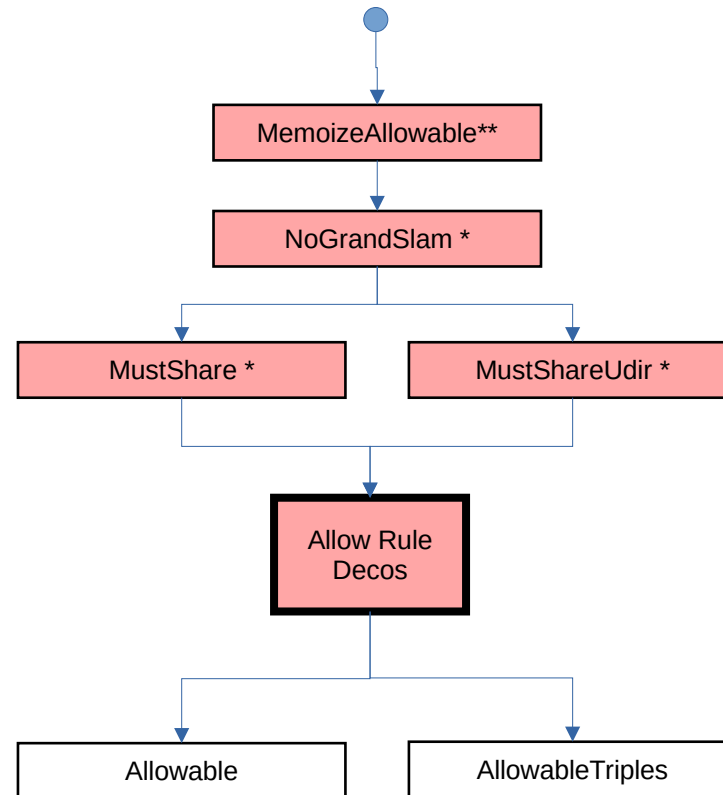


State variables read:

turn
board
store
blocked
owner
child
mcount

Parameters:

min_move
allow_rule
mlength
mustshare
grandslam
udir_holes

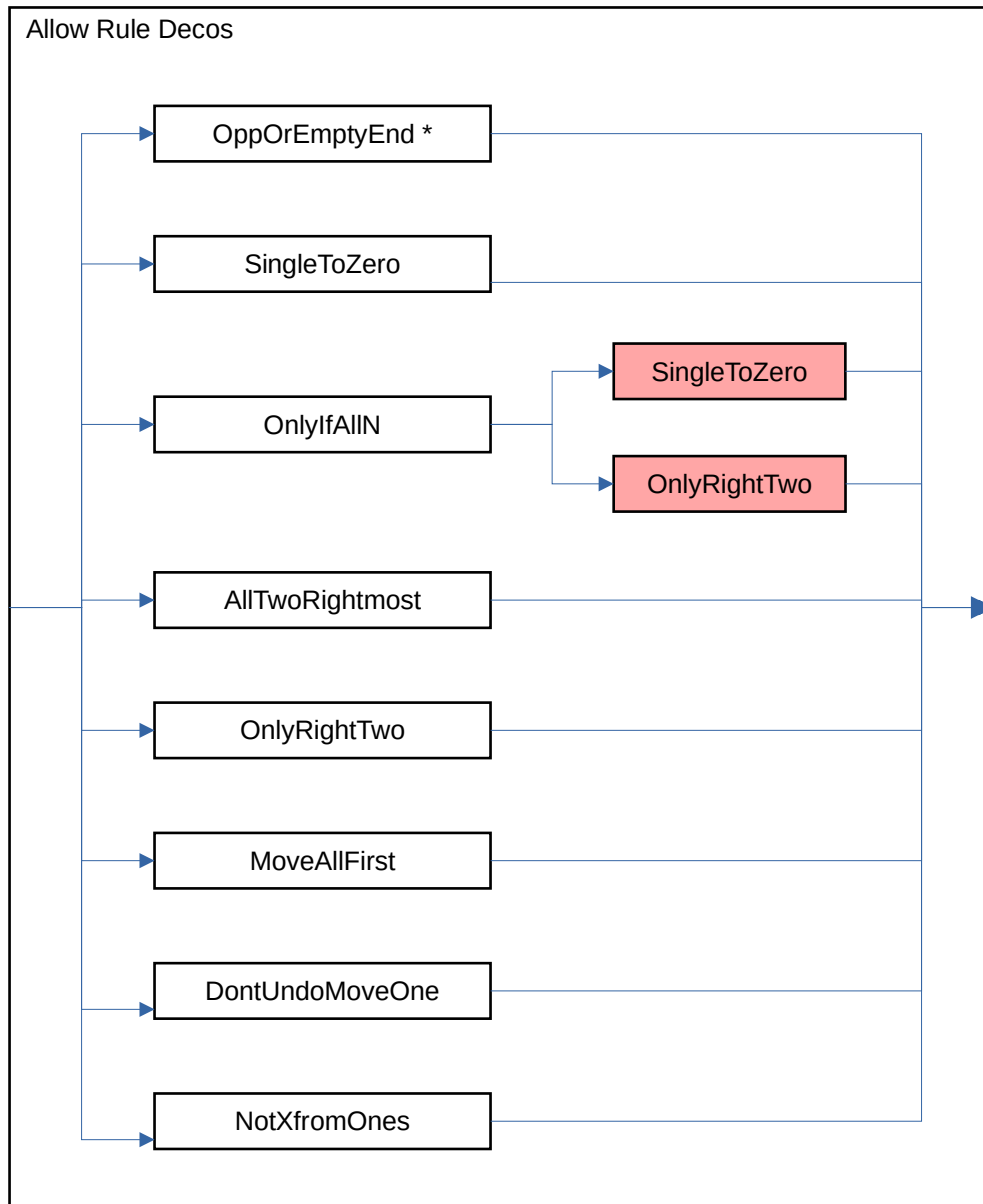


Notes:

* Simulates some portion of moves to determine allowables

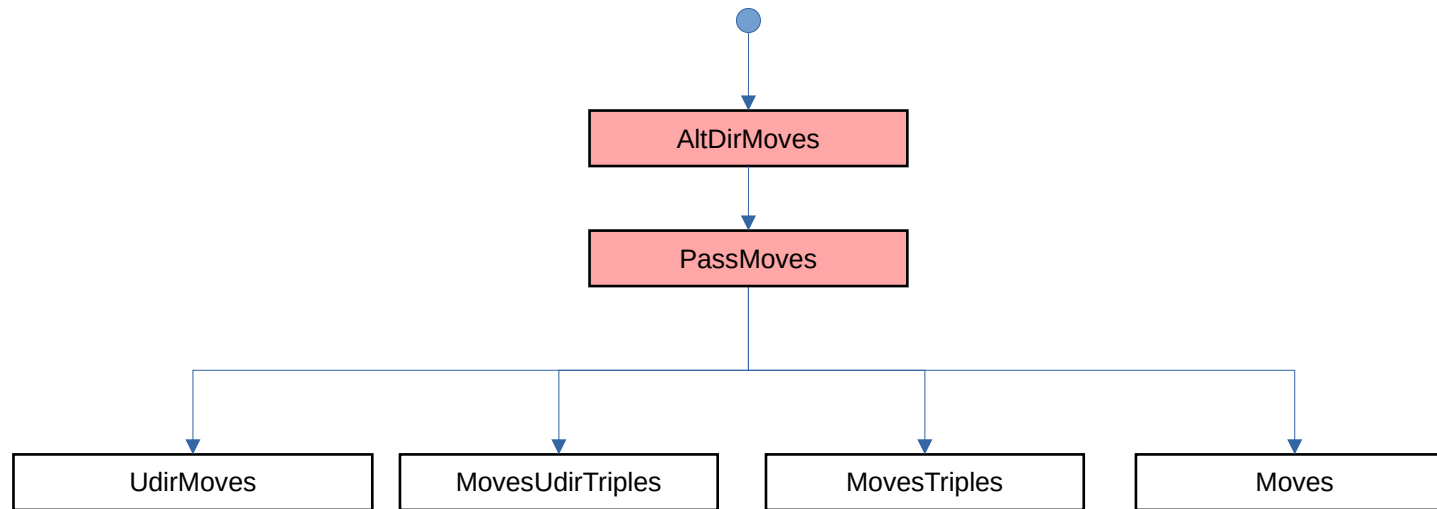
** MemoizeAllowable is used for deco's that simulate moves

Allow Rule Decos



Notes:
Some allow rule decos are shown more than once for clarity.
* Simulates some portion of moves to determine allowables

Get Moves Decorators and Chain

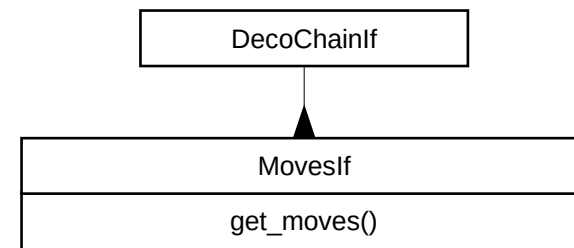


State variables read:

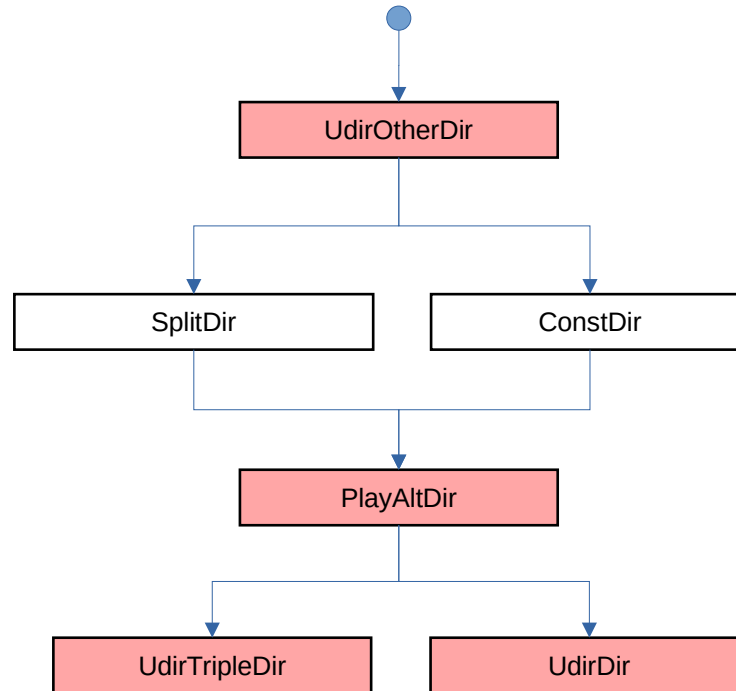
blocked
board
owner
starter
store
turn

Parameters:

mlength
mustpass
sow_direct
udir_holes
udirect

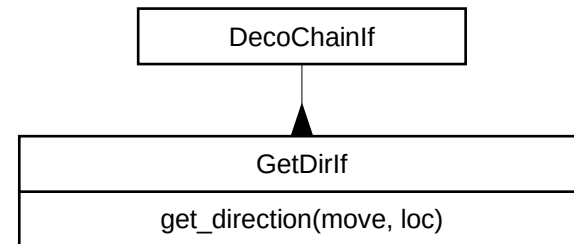


Get Direction Decorators and Chain

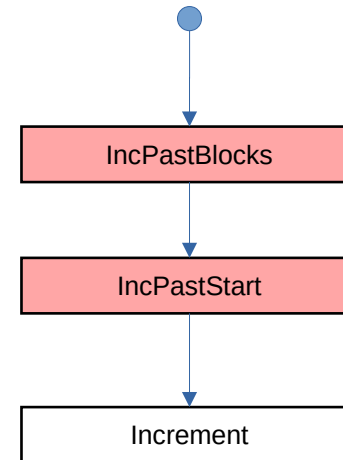
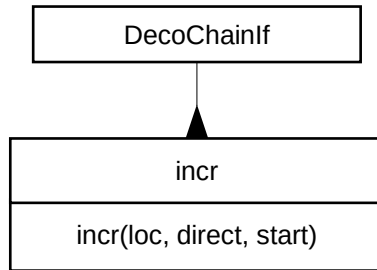


State variables read:
mcount
turn

Parameters:
no_sides
sow_direct
udir_holes
udirect



Incrementer Decorators and Chains



State variables read:
blocked

Parameters:
blocks
skip_start

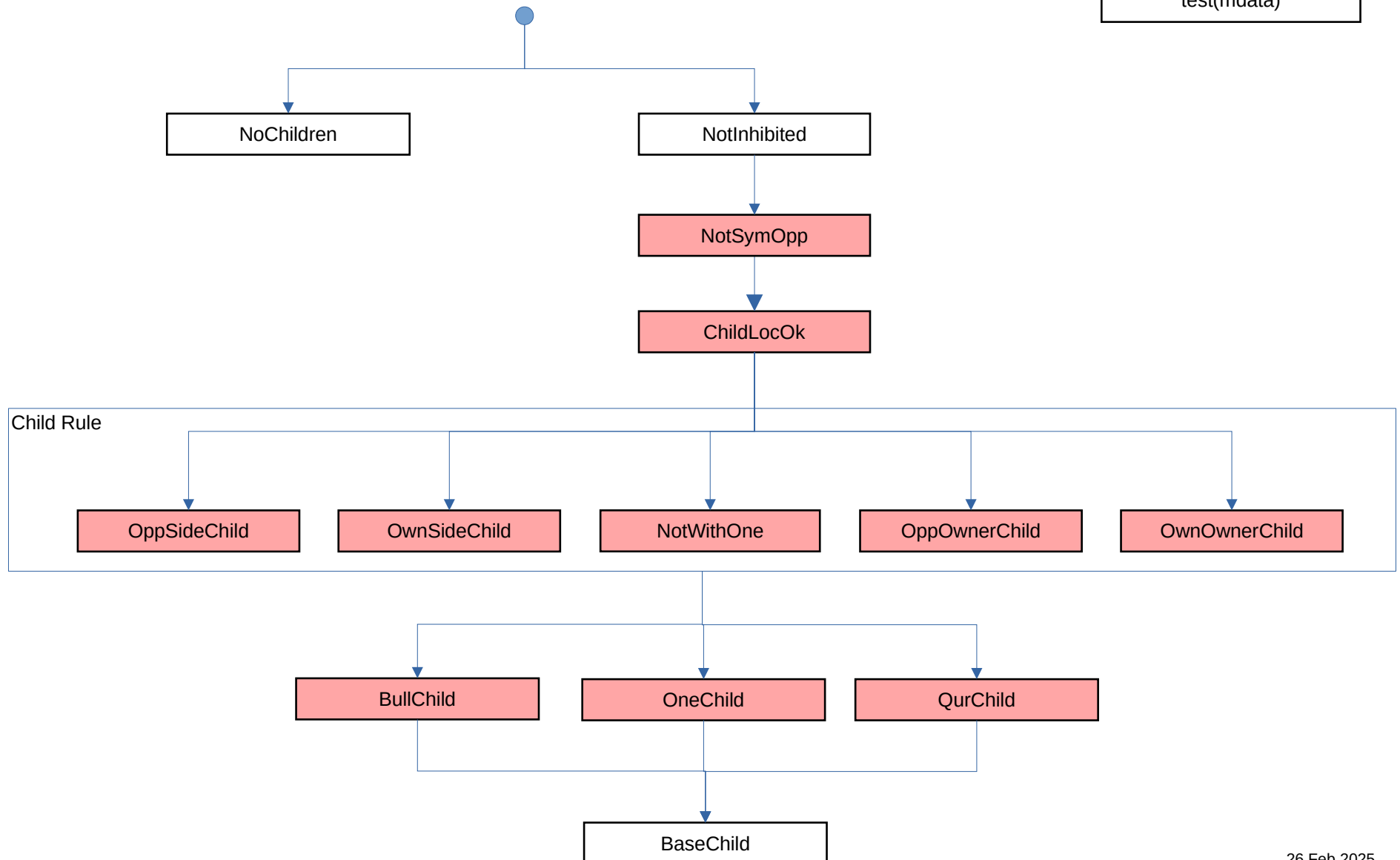
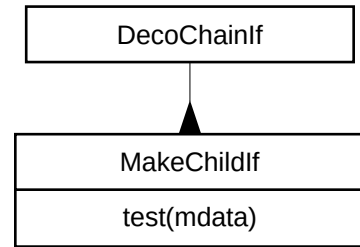
MakeChild Decorator and Chain

State variables read:

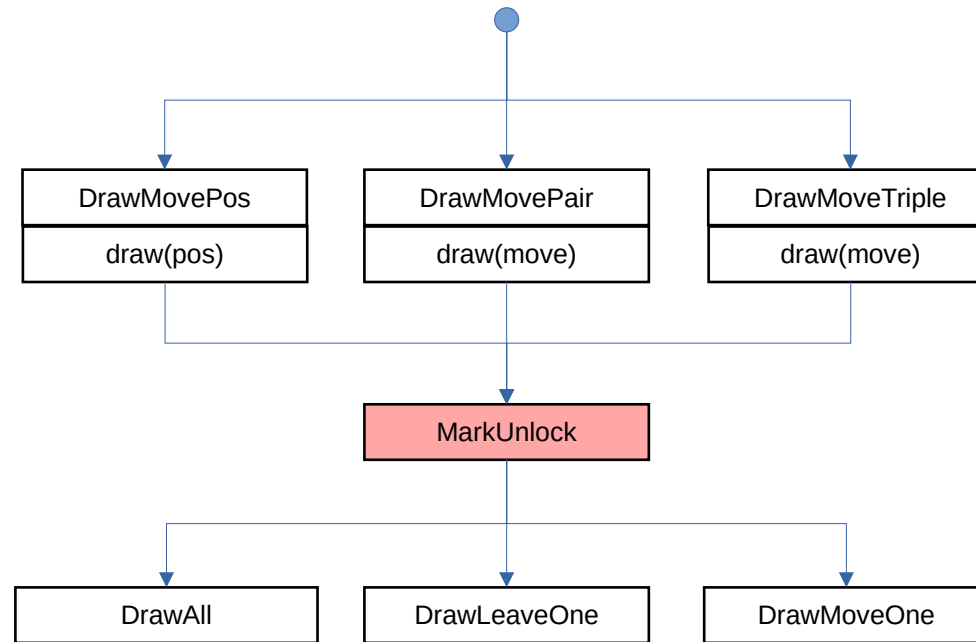
board
child
inhibitor
owner
turn

Parameters:

child_cvt
child_locs
child_rule
child_type



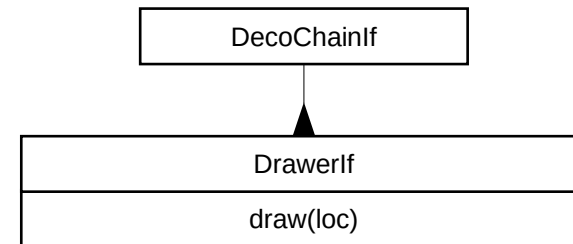
Draw Decorators and Chain



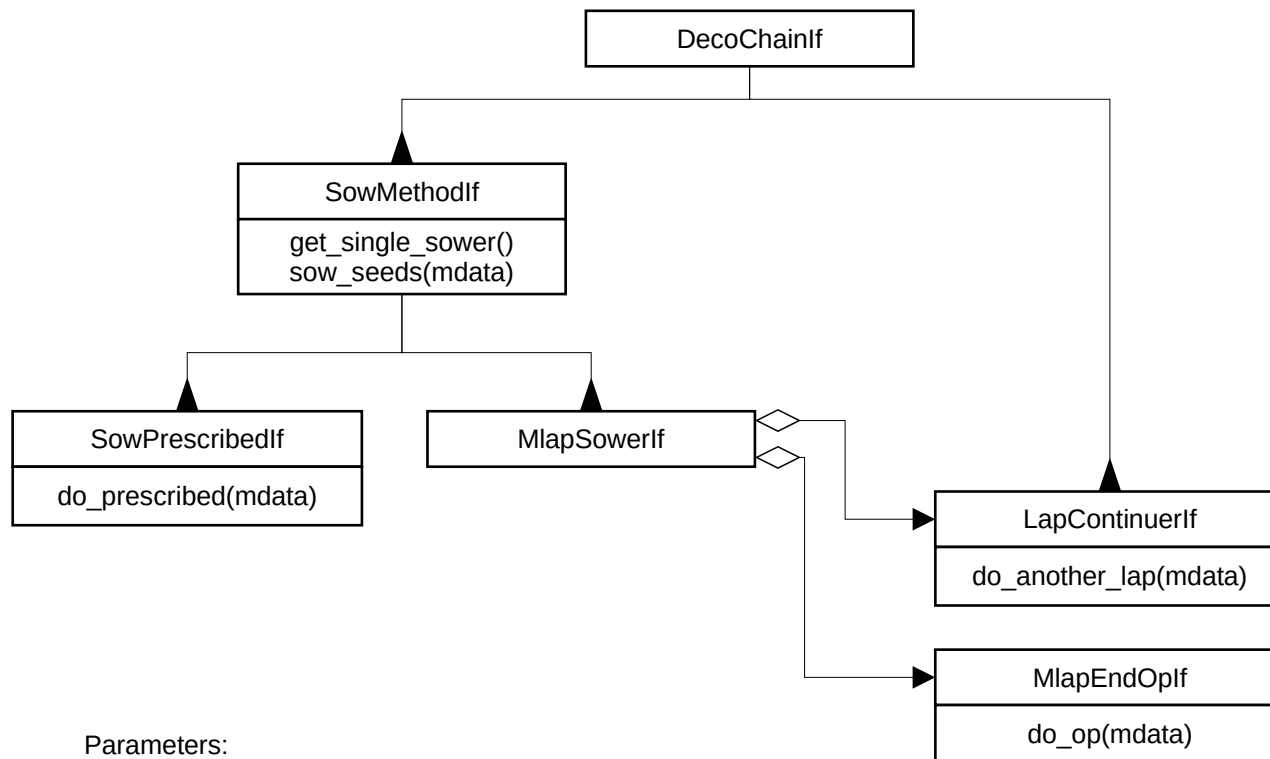
The first drawer converts the move into board location.

State variables:
Read:
 turn
Changed:
 board
 unlocked

Parameters:
allow_rule
mlength
move_one
moveunlock
sow_start



Sower Decorators



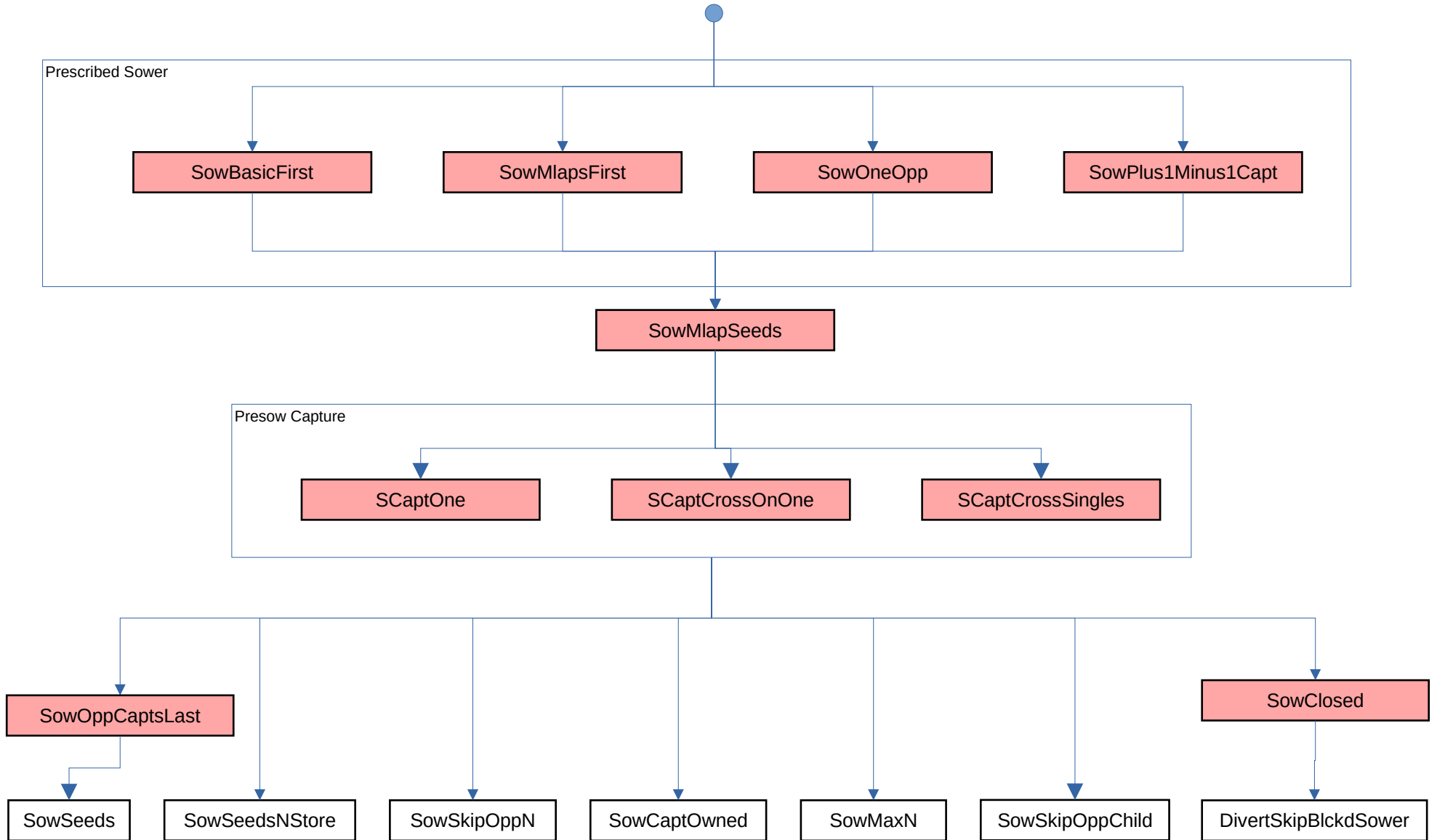
State variables:

Reads
inhibitor
turn
child
mcount
Changes
board
store
blocked

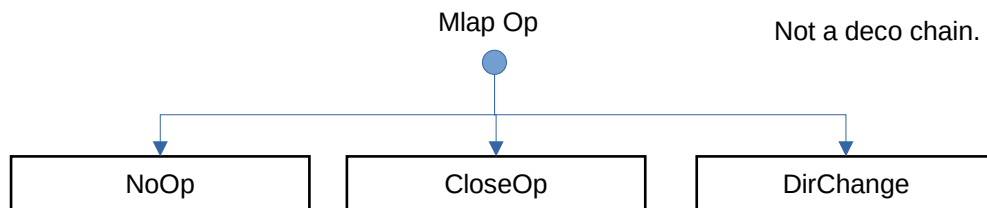
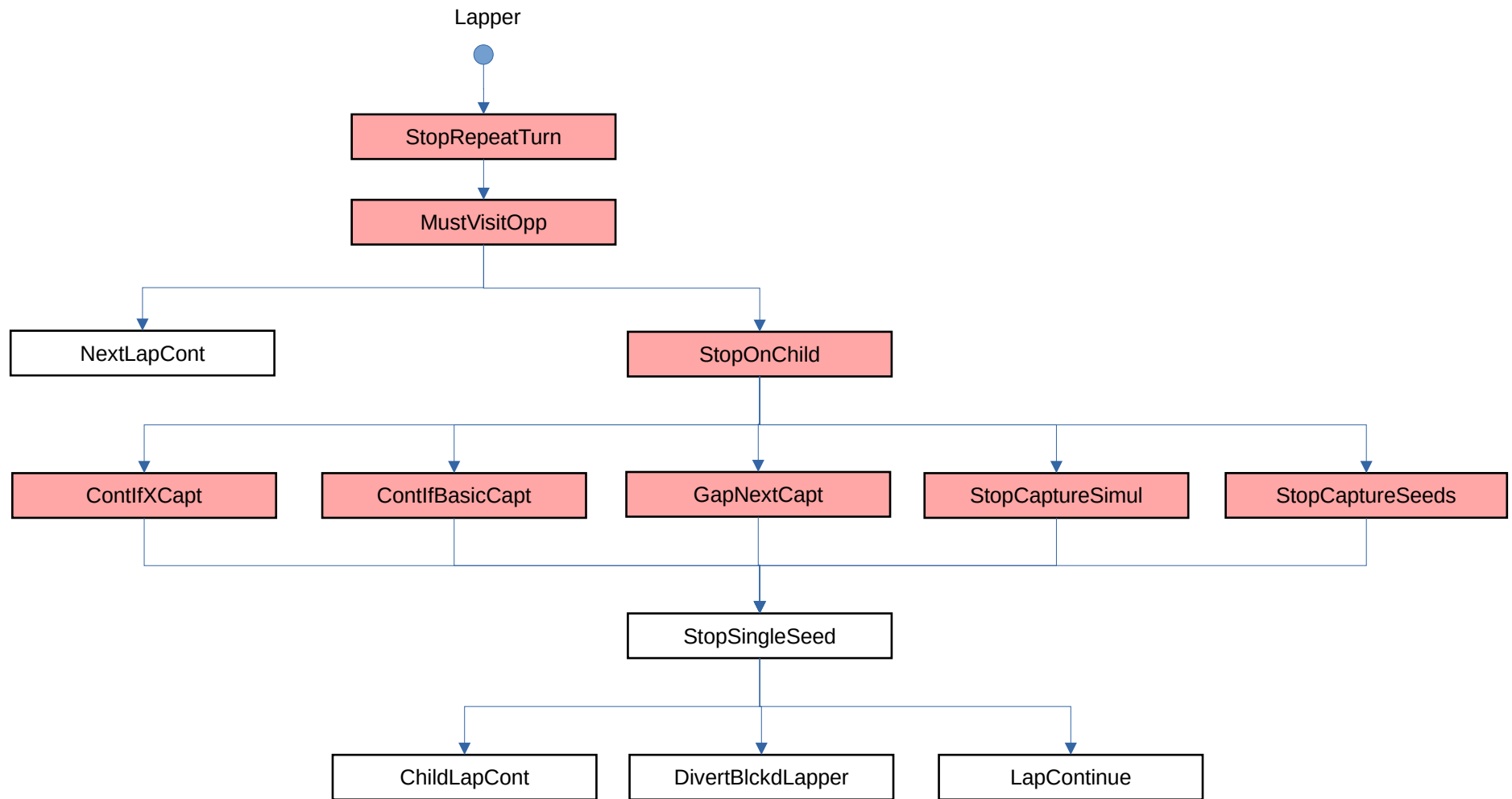
Parameters:

capt_max
capt_min
capt_on
child_type
crosscapt
evens
goal
gparam_one
mlaps
prescribed
presowcapt
sow_direct
sow_own_store
sow_param
sow_rule
visit_opp

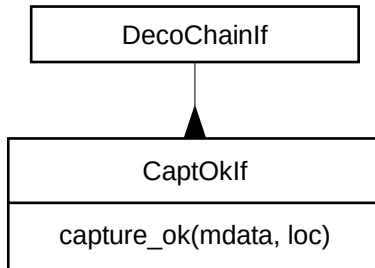
Sower Deco Chain



Lap Continuer Deco Chain and Mlap Operation



Capt Ok Decorators and Chains

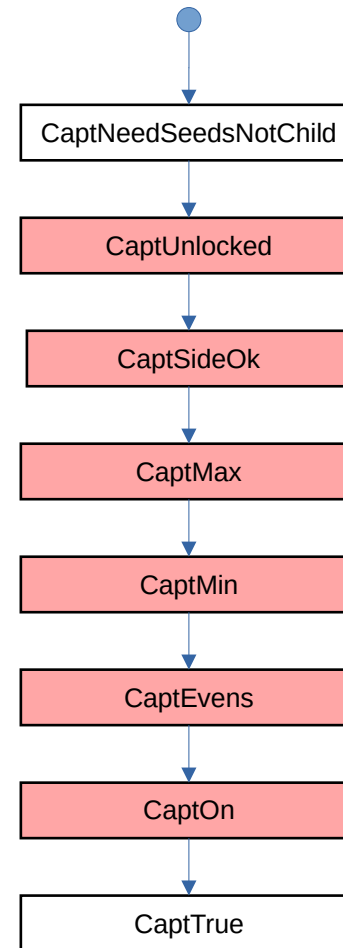


State variables read:

board
child
turn
unlocked

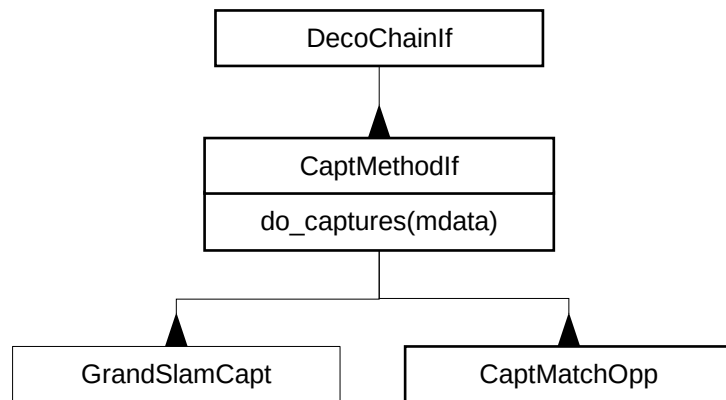
Parameters:

capt_max
capt_min
capt_on
capt_side
moveunlock



These are effectively ANDed.
If any deco condition is false, it
returns false, otherwise it calls
down the deco chain.

Capturer Decorators and Chain



State variables

Reads

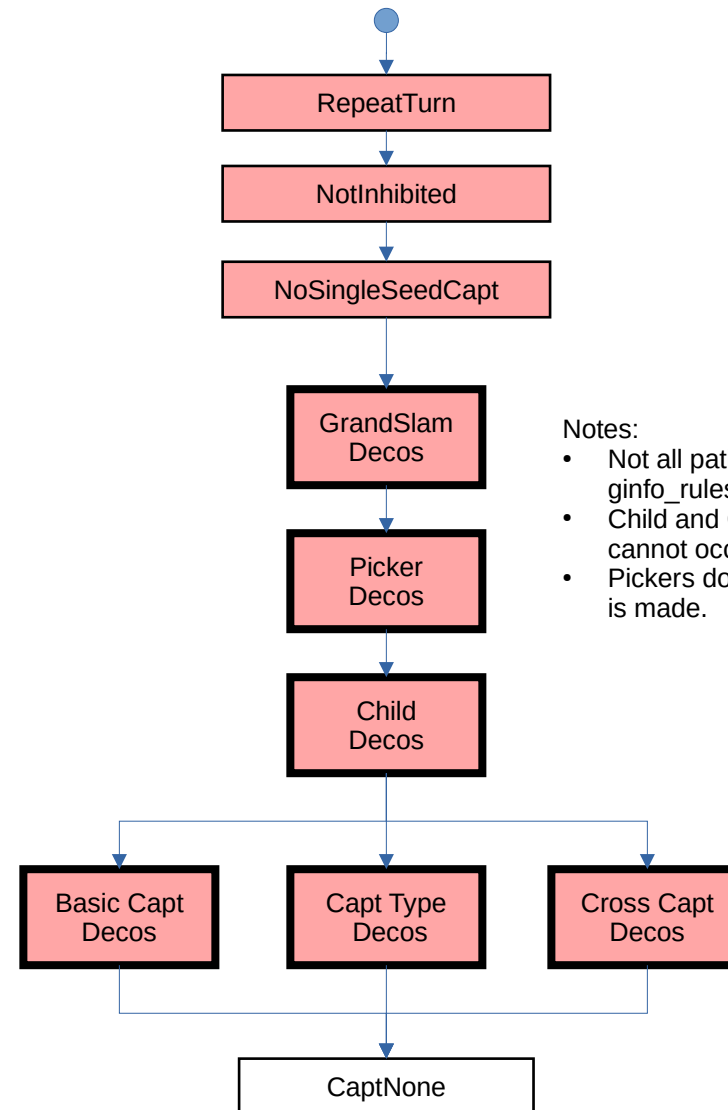
inhibitor
starter
turn

Changes

board
child
store

Parameters:

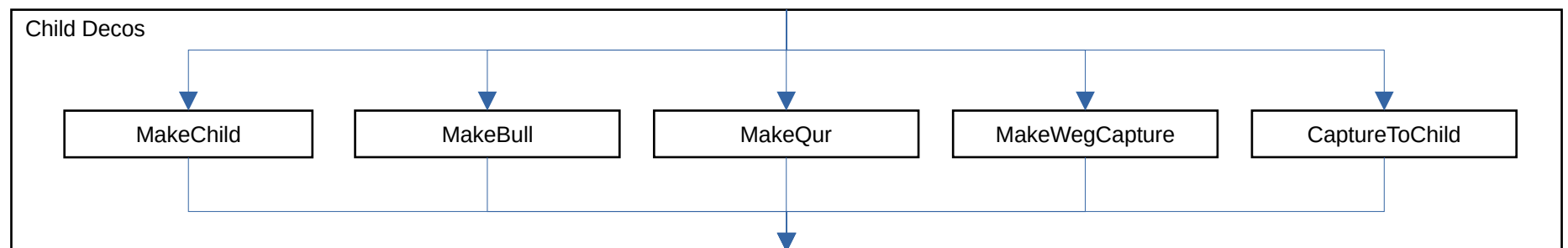
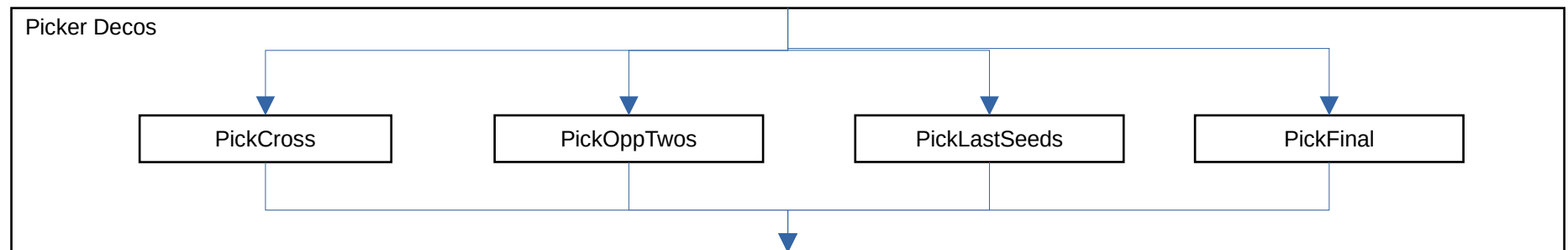
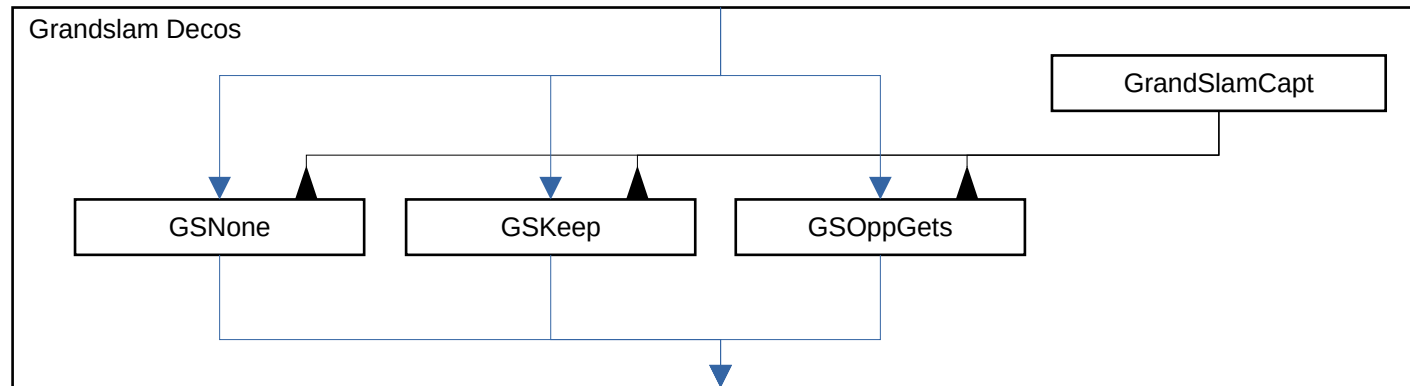
capsamedir
capt_max
capt_min
capt_on
capt_rturn
capt_side
capt_type
child_cvt
child_type
crosscapt
evens
grandslam
mlaps
multicapt
nocaptmoves
nosingcapt
pickextra
prescribed
round_fill
xc_sown
xcpickown



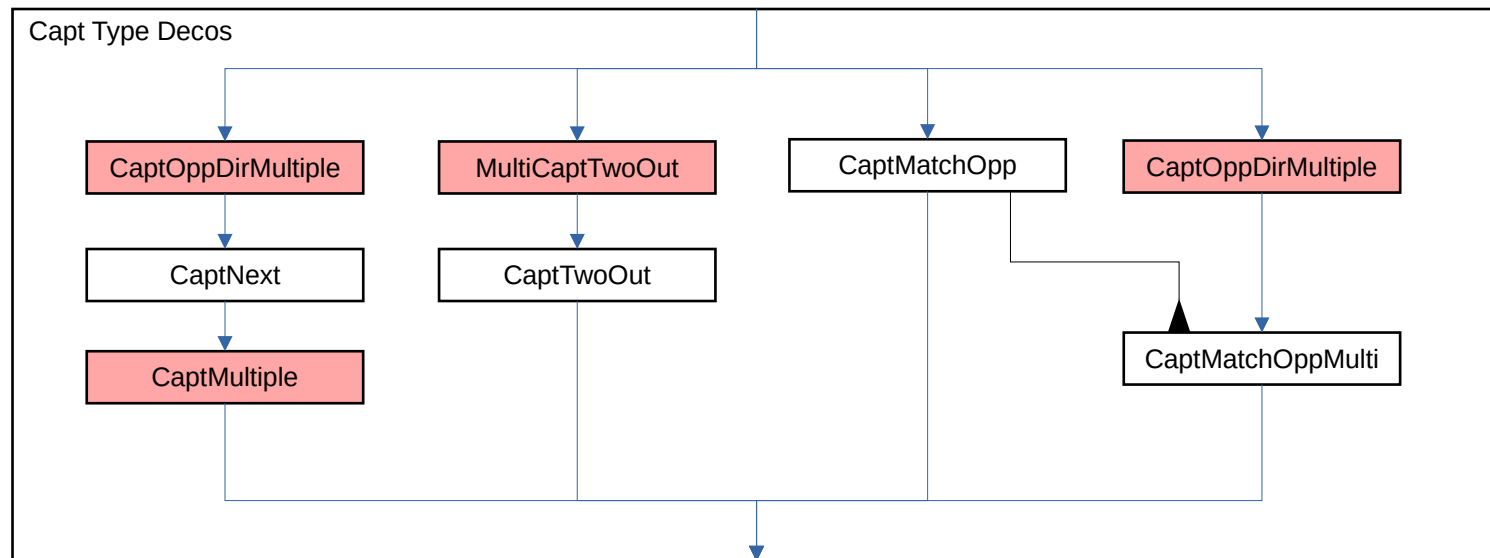
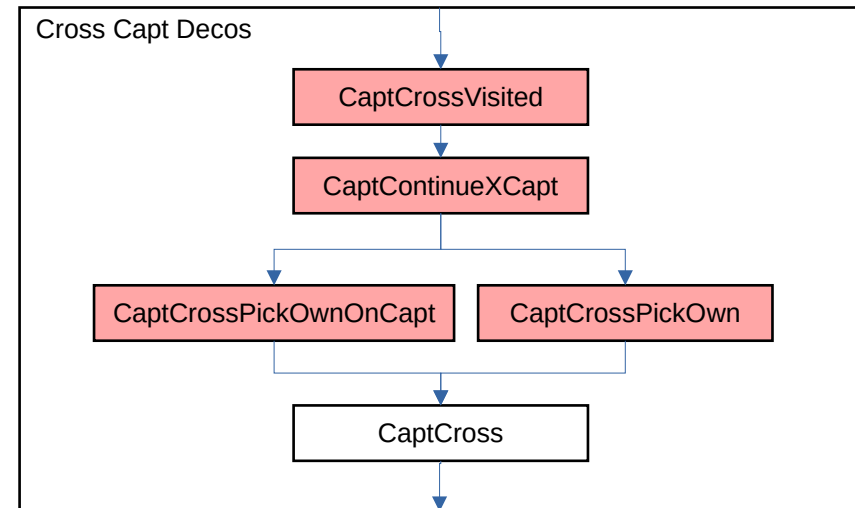
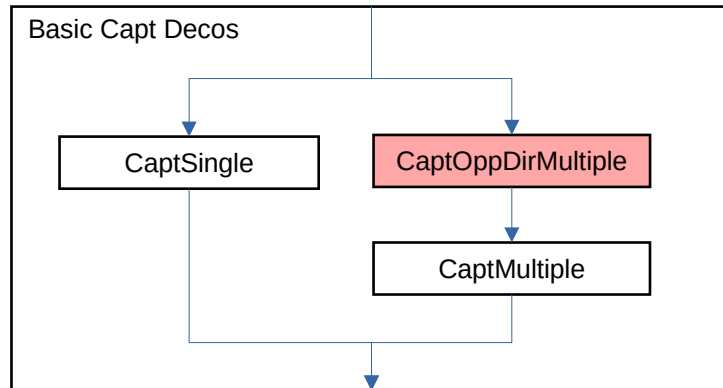
Notes:

- Not all paths are allowed: see ginfo_rules.
- Child and Grand Slam decos cannot occur together.
- Pickers do nothing when a child is made.

Capturer Deco Chains (1 of 2)



Capturer Deco Chains (2 of 2)



Ender & Quitter Decorators and Chains (1 of 2)

State variables:

Reads:

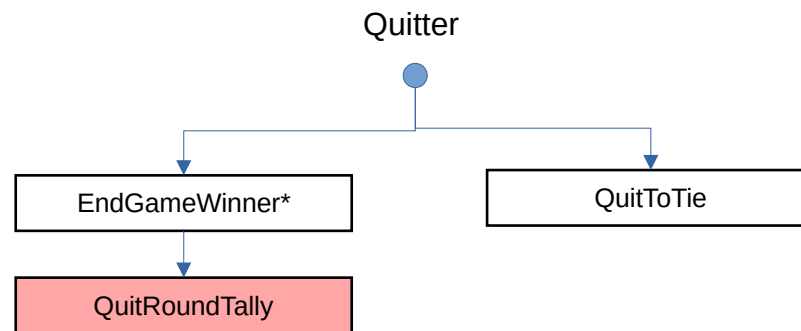
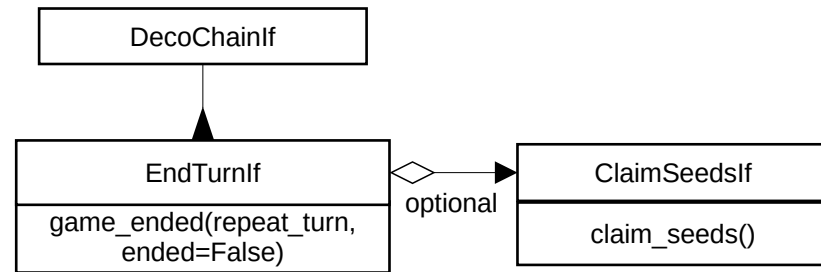
child
owner
turn

Changes:

board
store

Parameters:

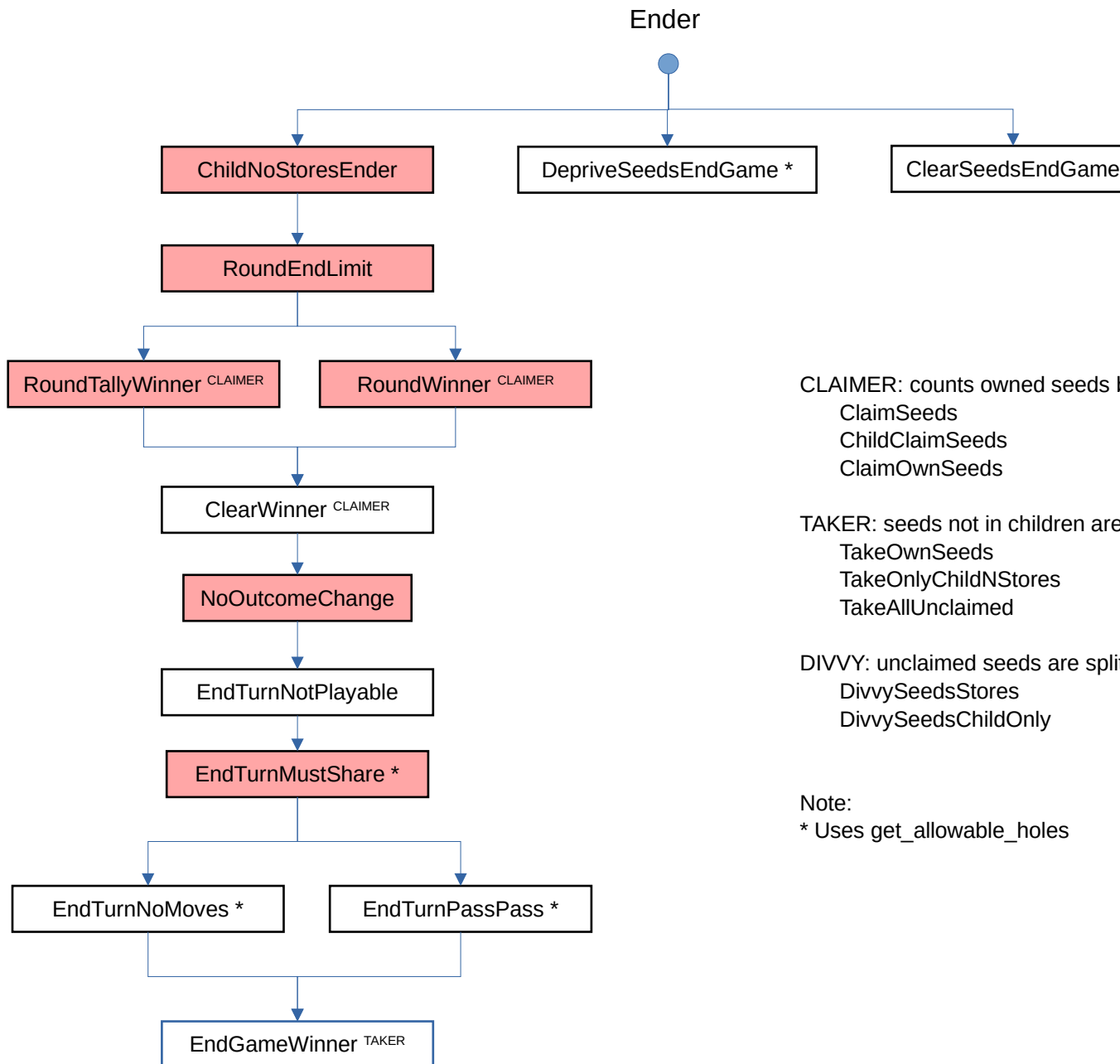
capt_min
capt_next
capt_on
capttwoout
child_cvt
child_type
crosscapt
evens
goal
gparam_one
min_move
mlaps
mustpass
mustshare
no_sides
round_fill
rounds
sow_own_store
stores
unclaimed



Note:

*A claimer, taker or divvier is selected based on the unclaimed, child_type and store properties (see next page).

Ender & Quitter Decorators and Chains (2 of 2)



CLAIMER: counts owned seeds but does not move them:

- ClaimSeeds
- ChildClaimSeeds
- ClaimOwnSeeds

TAKER: seeds not in children are claimed and moved to stores:

- TakeOwnSeeds
- TakeOnlyChildNStores
- TakeAllUnclaimed

DIVVY: unclaimed seeds are split between players:

- DivvySeedsStores
- DivvySeedsChildOnly

Note:

* Uses get_allowable_holes