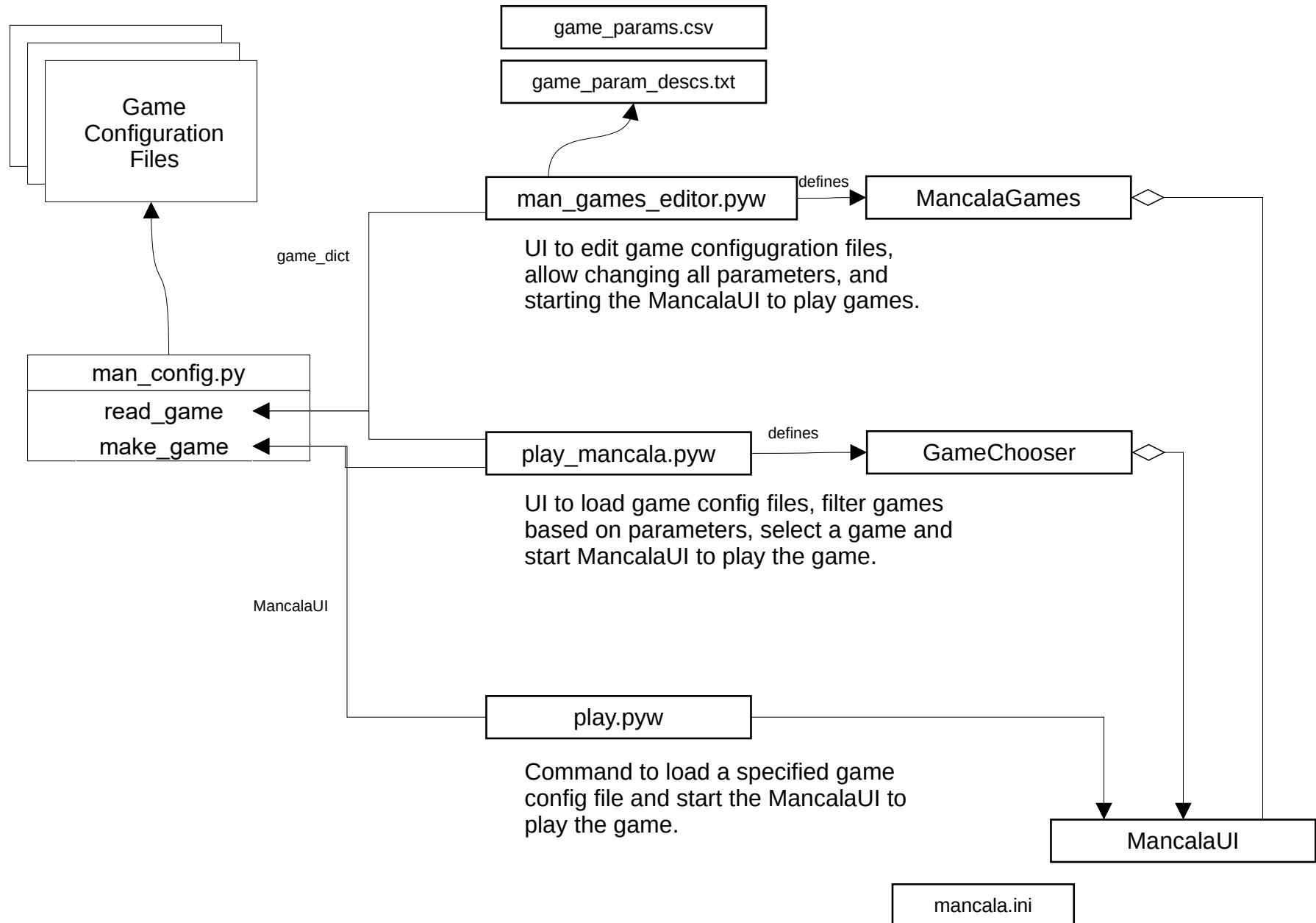
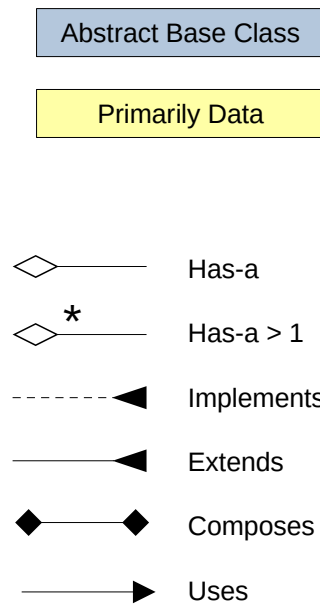


# Mancala Games



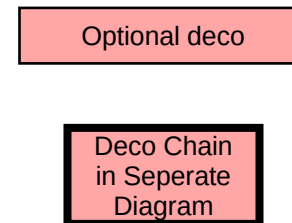
# Notation Conventions

## Class Diagram Conventions



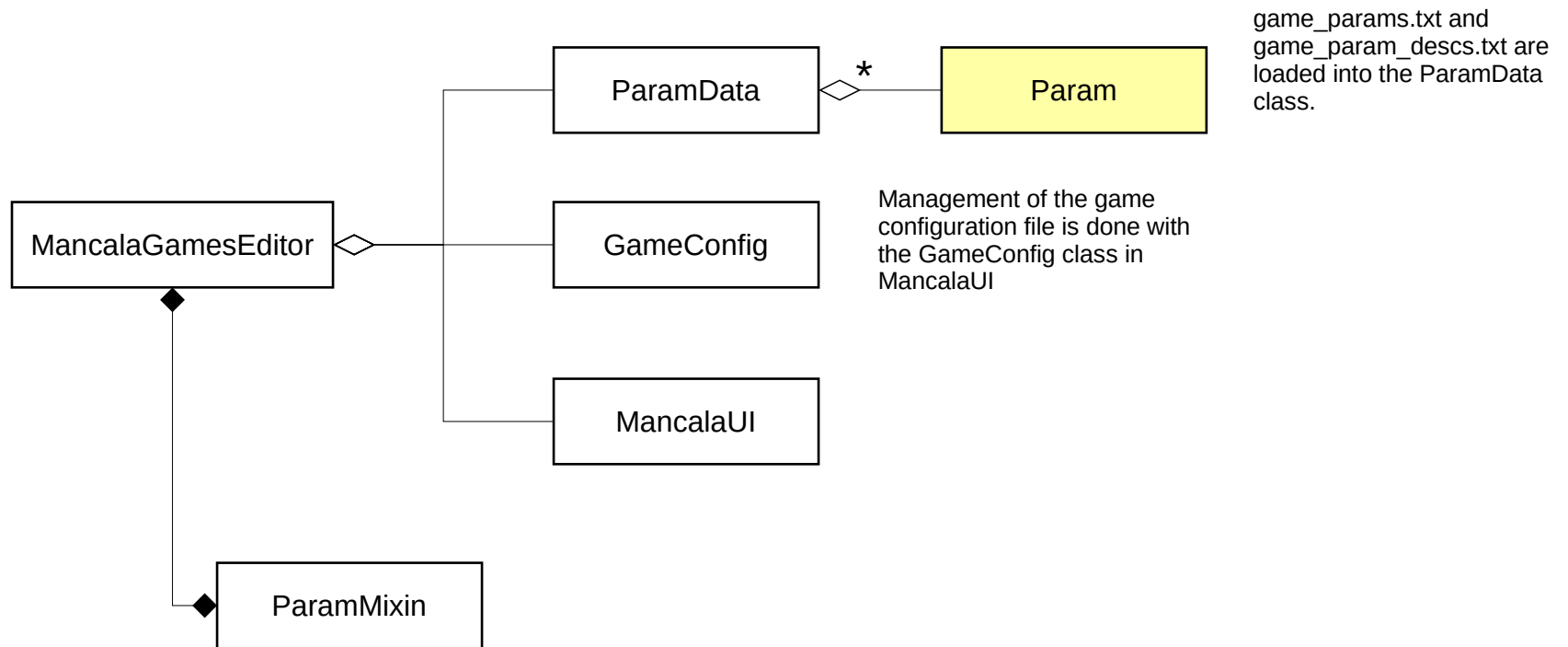
## Deco Chain Conventions

- 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.
- Some deco's do not call down the deco chain even if there is a follow-on deco.
- All paths shown might not be possible (see ginfo\_rules).



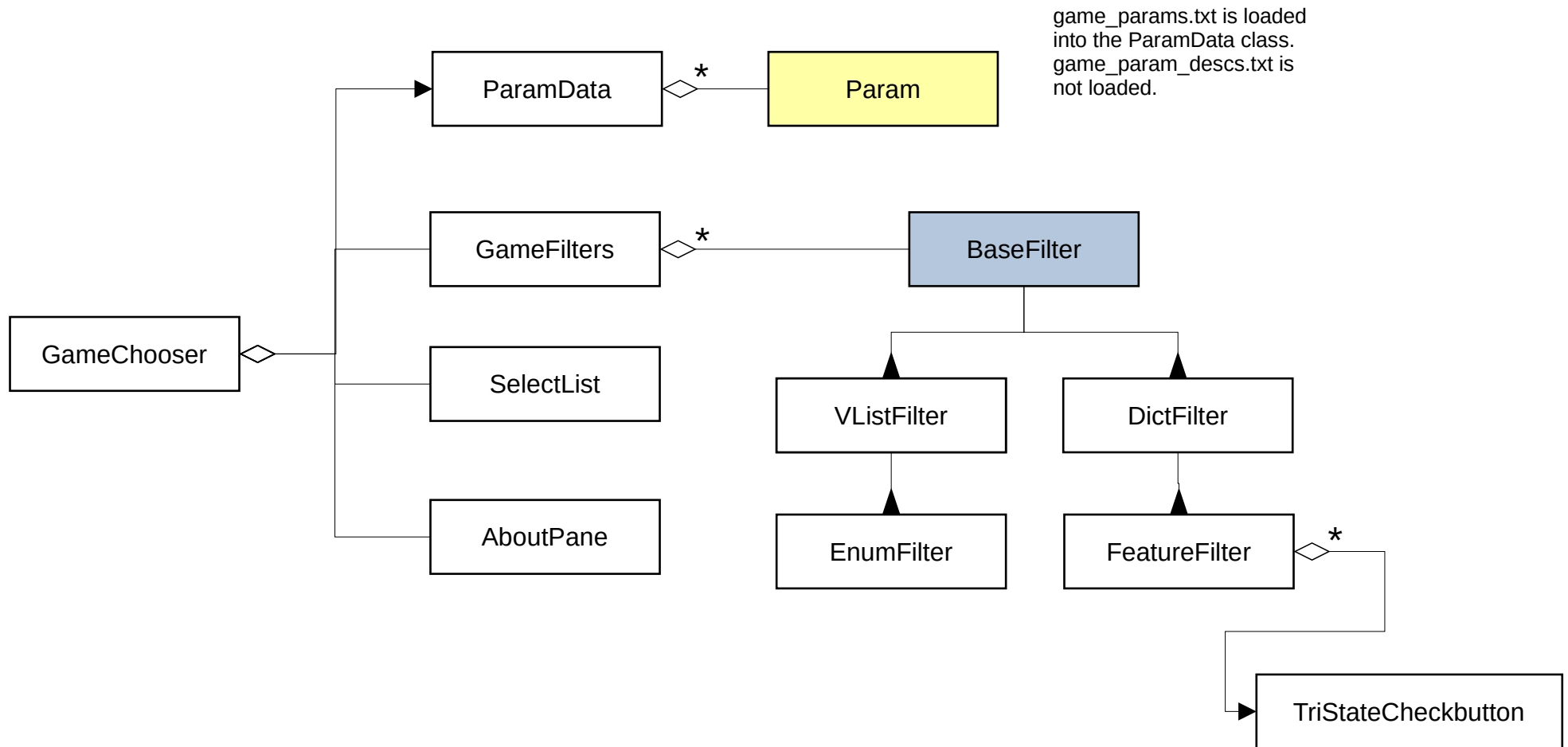
# MancalaGamesEditor

## man\_games\_editor.py



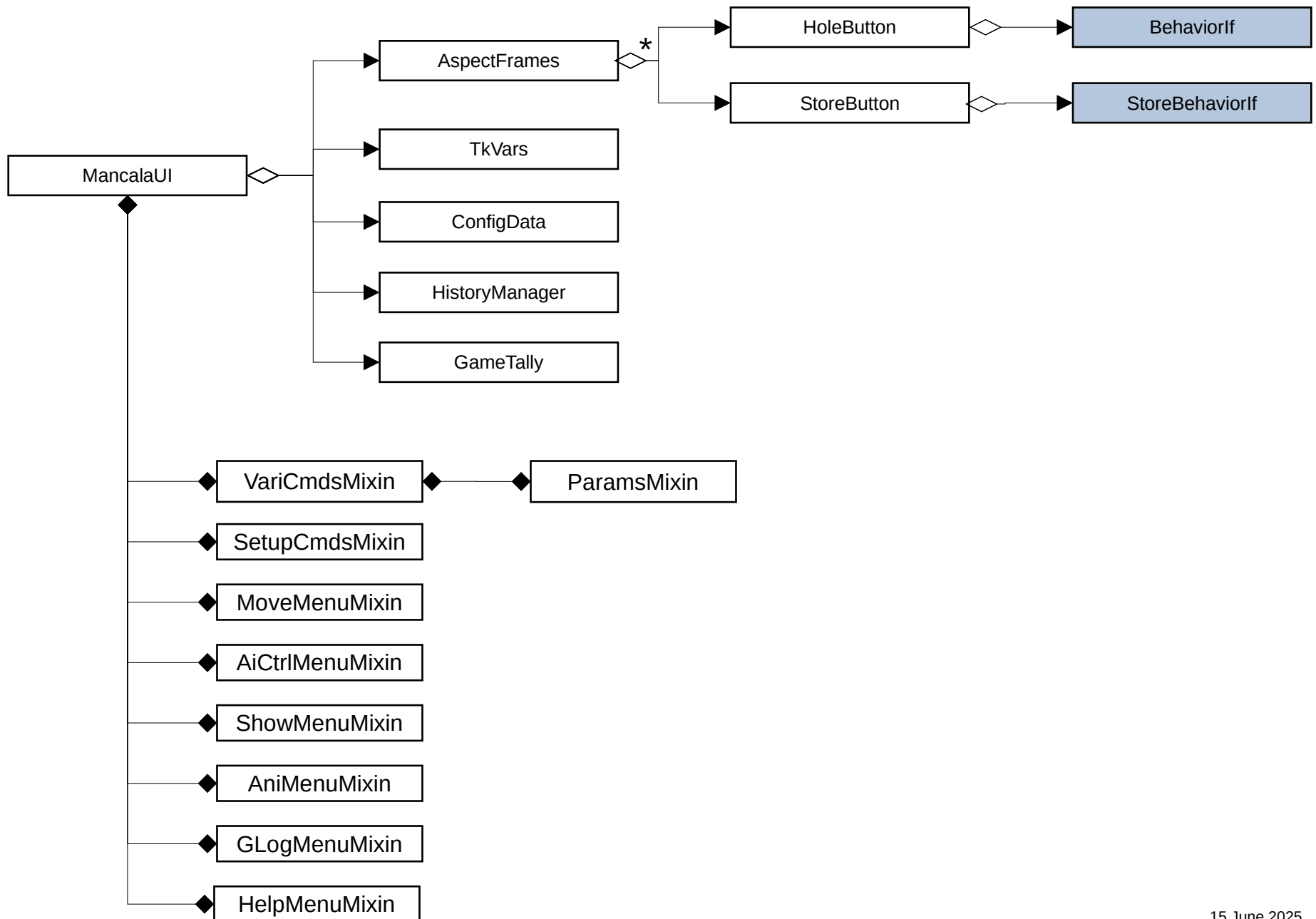
# GameChooser

## play\_mancala.py

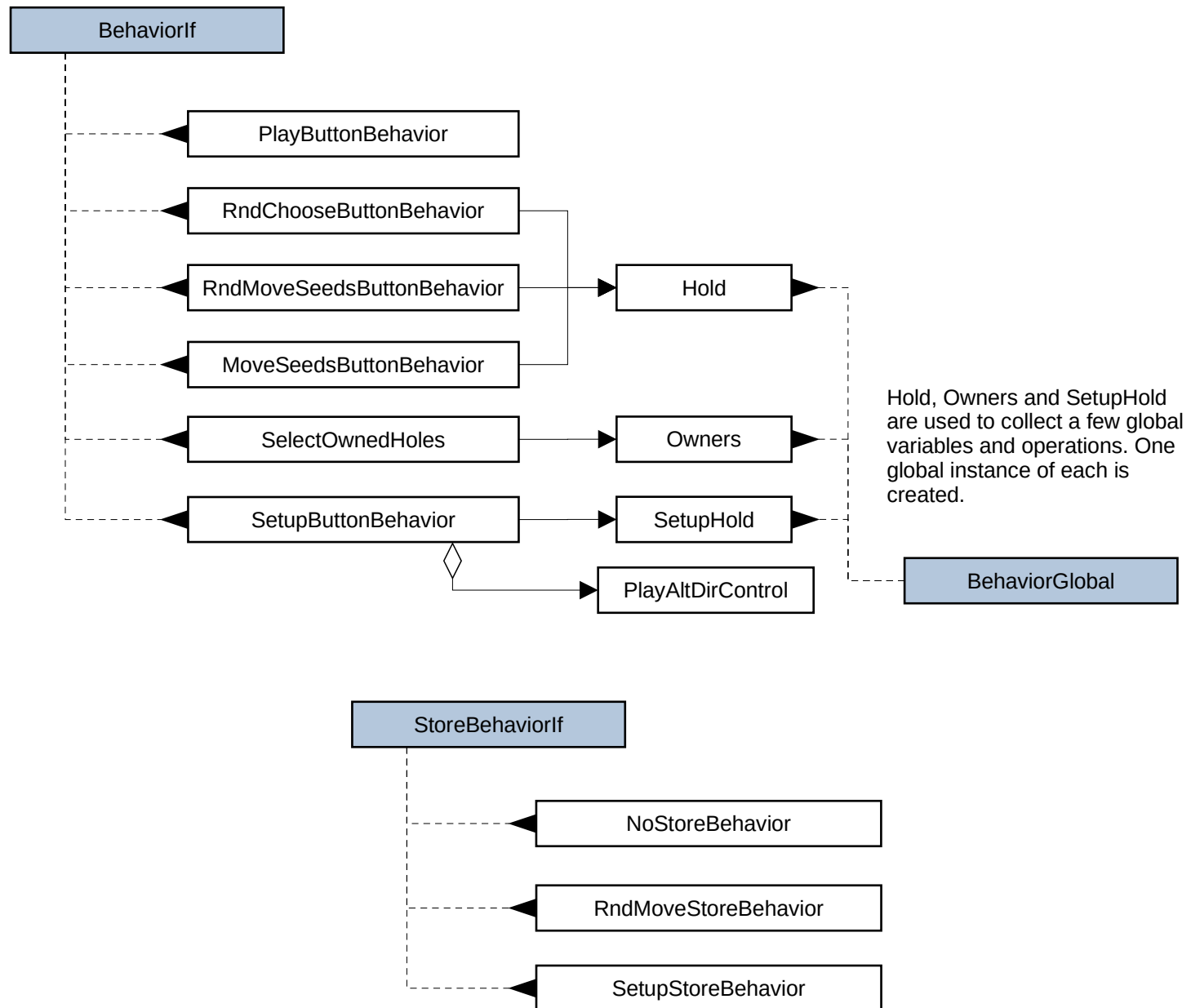


# MancalaUI Classes

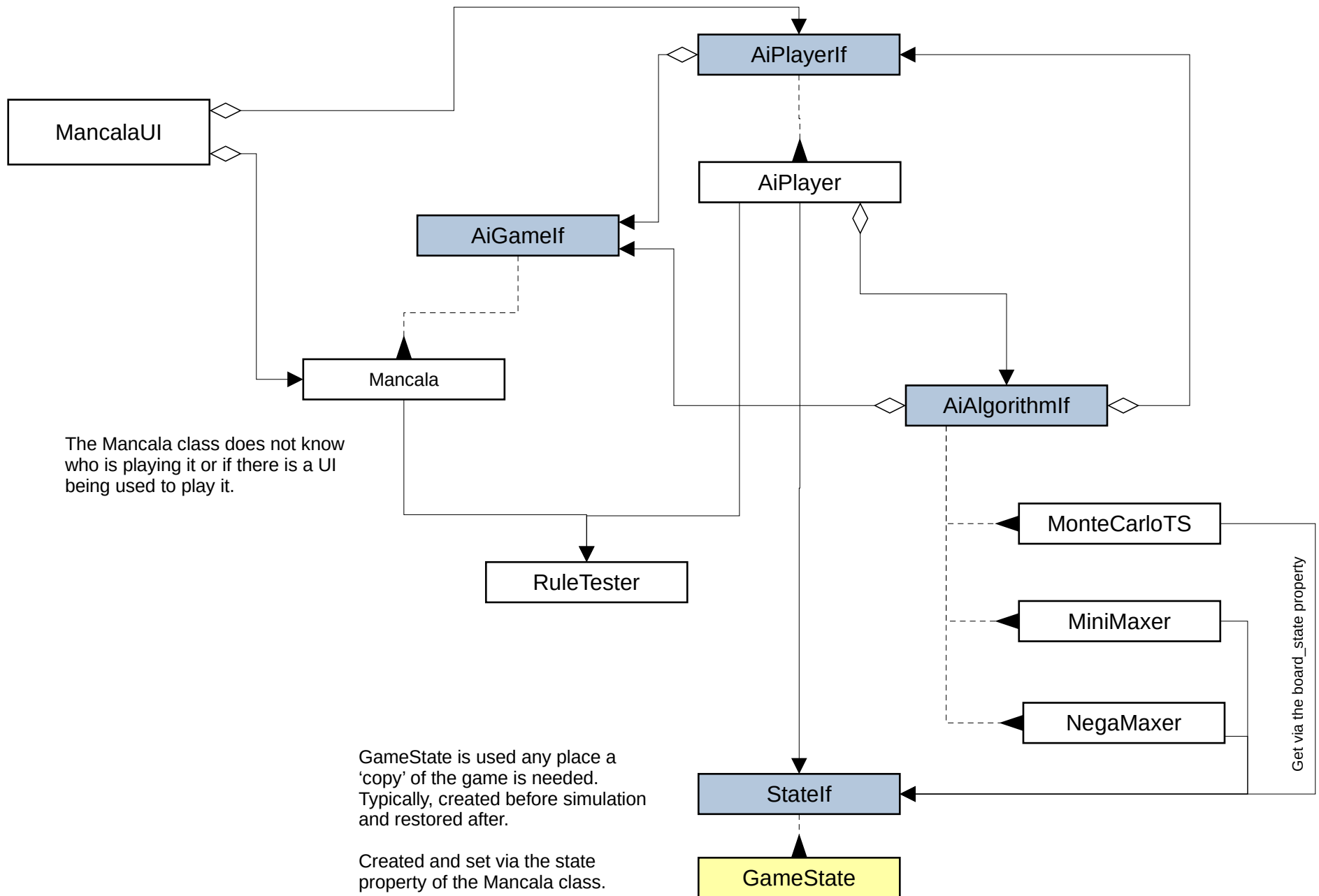
mancala.py



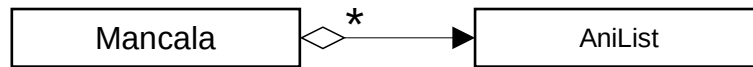
# Behavior Classes for MancalaUI



# AIPlayer and AIAlgorithm Integration



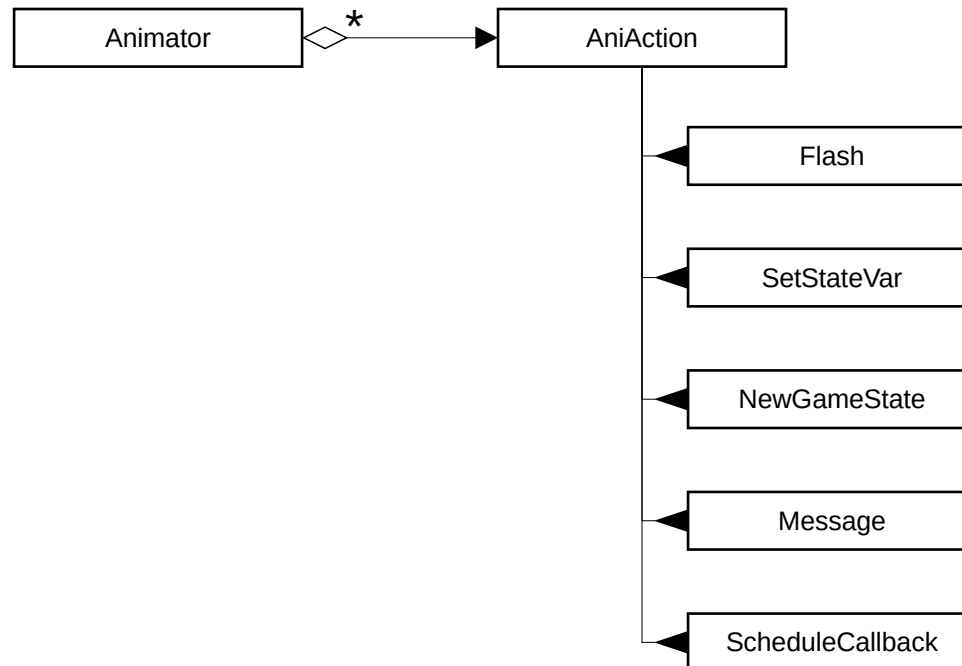
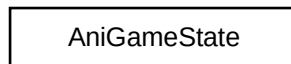
# Animator Classes



Assignments to an AniList generate SetStateVar animations.

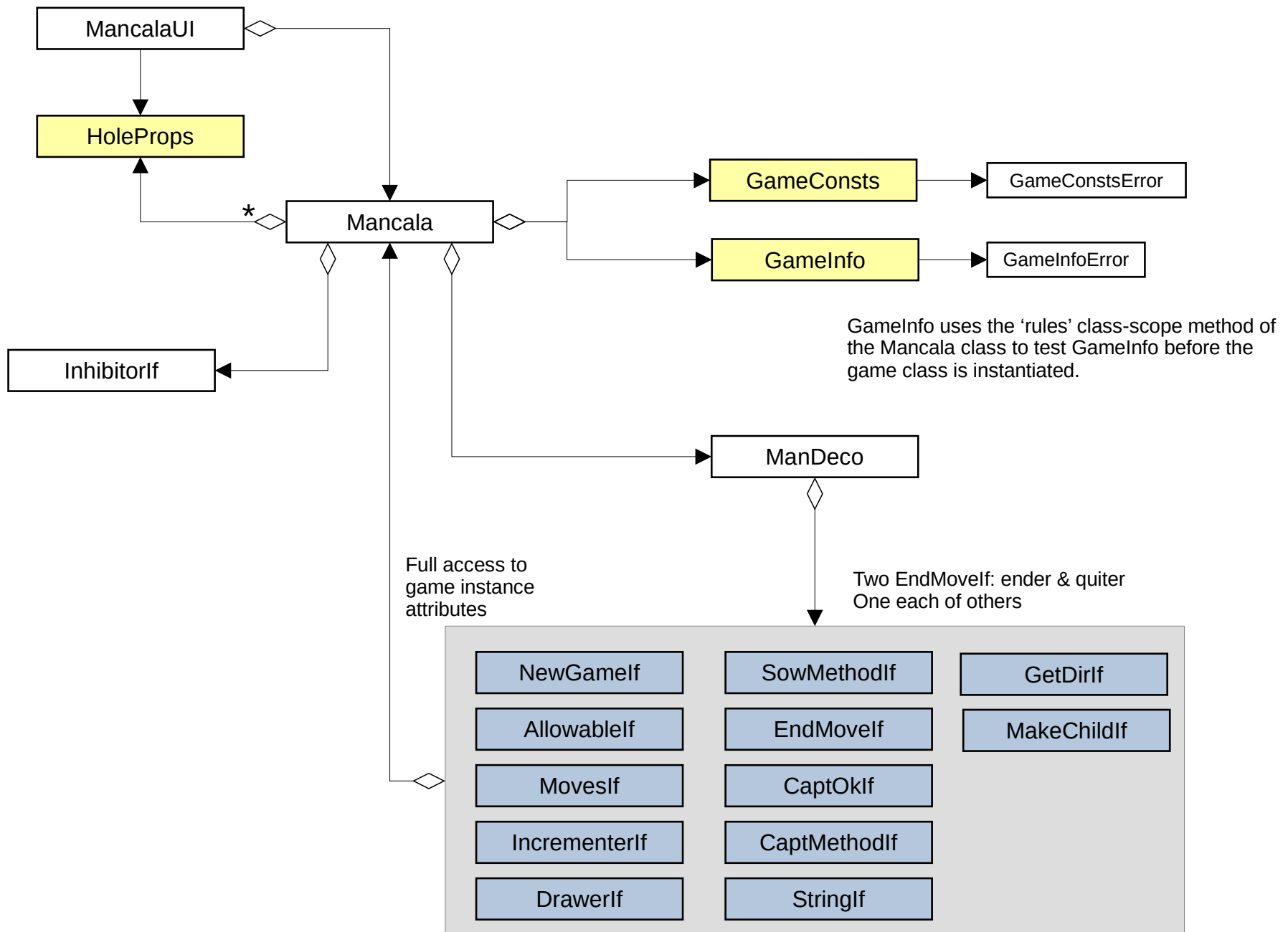
These animator hooks are used for 5 state variable and only when they are configured for use in a game.

These hooks are not included if animator.ENABLED is set False.

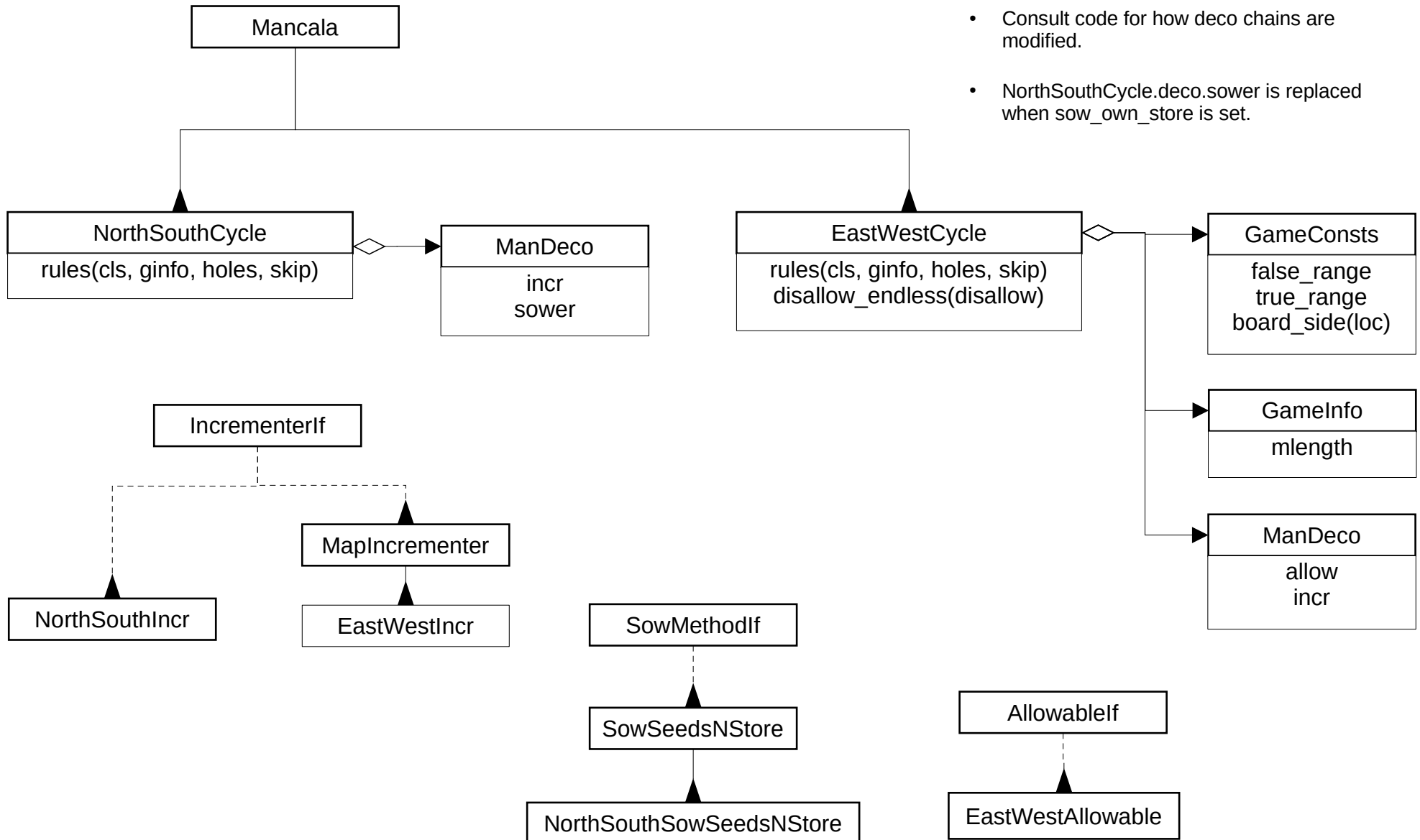




# Mancala Classes

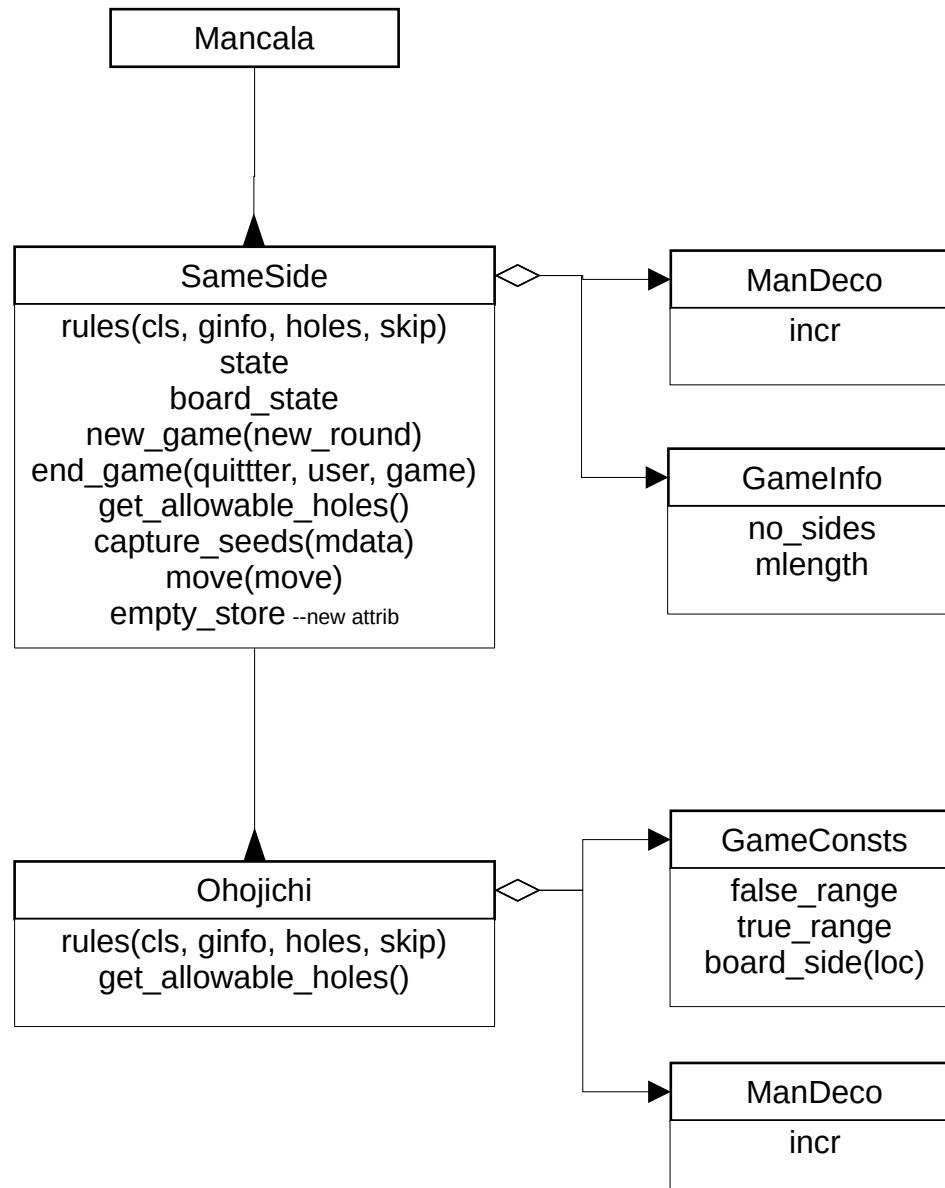


# Two Cycle Game Classes

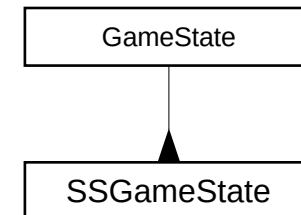


- Attributes and methods shown are overridden, reassigned or reconfigured.
- Consult code for how deco chains are modified.
- NorthSouthCycle.deco.sower is replaced when sow\_own\_store is set.

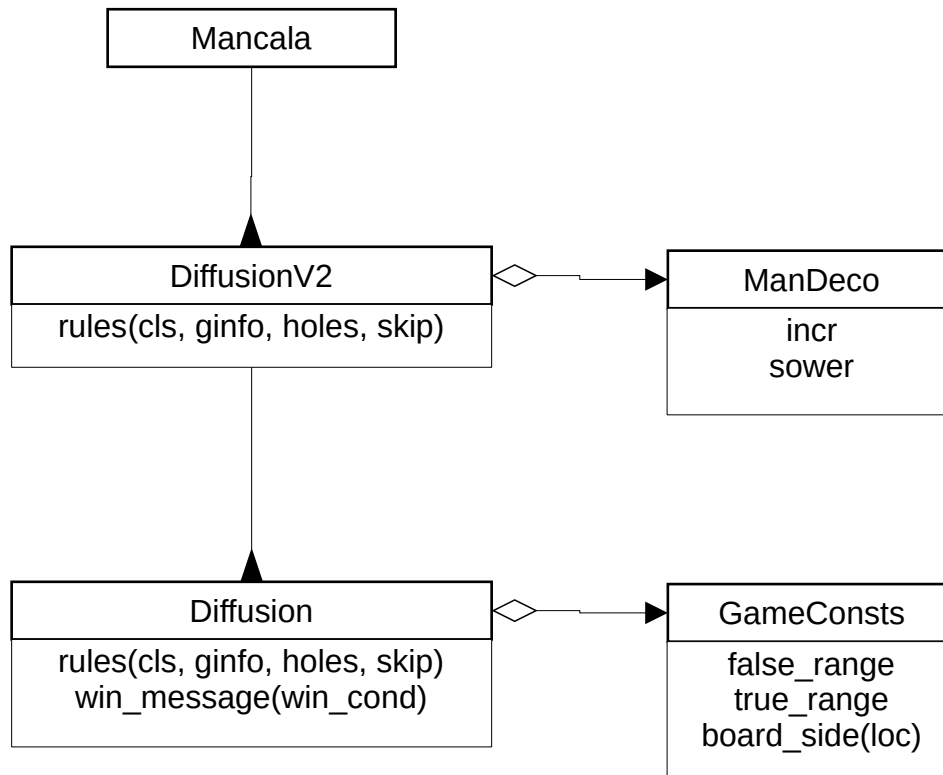
# SameSide and Ohojichi Game Classes



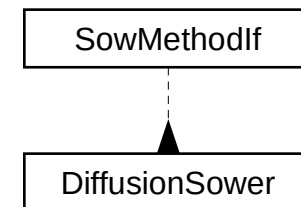
- Attributes and methods shown are overridden, reassigned or reconfigured.
- Each game class uses the appropriate two\_cycle incrementer as the base incrementer.
- Ohojichi only calls the allow deco chain when on the first part of turns, not on the place seeds opposite part.



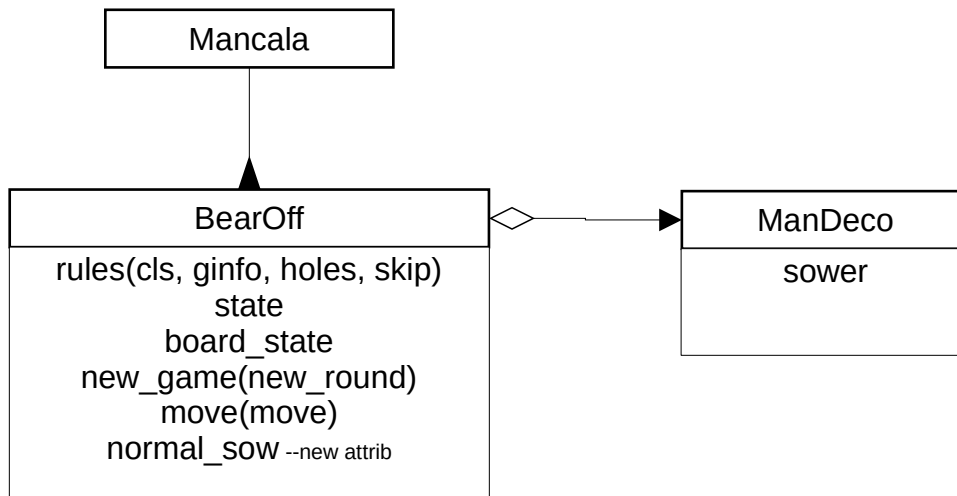
# Diffusion and DiffusionV2 Game Classes



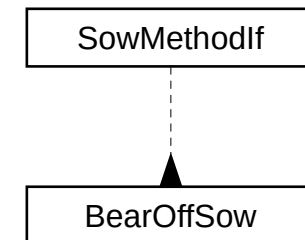
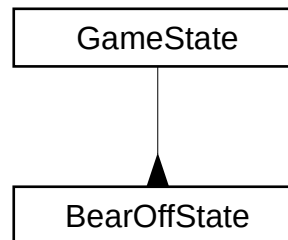
- Attributes and methods shown are overridden, reassigned or reconfigured.
- The incr deco chain is cleared because it should not be used: the sower is completely replaced and the capturer deco is CaptNone.
- Both game classes use the DiffusionSower.



# Bear Off Game Class

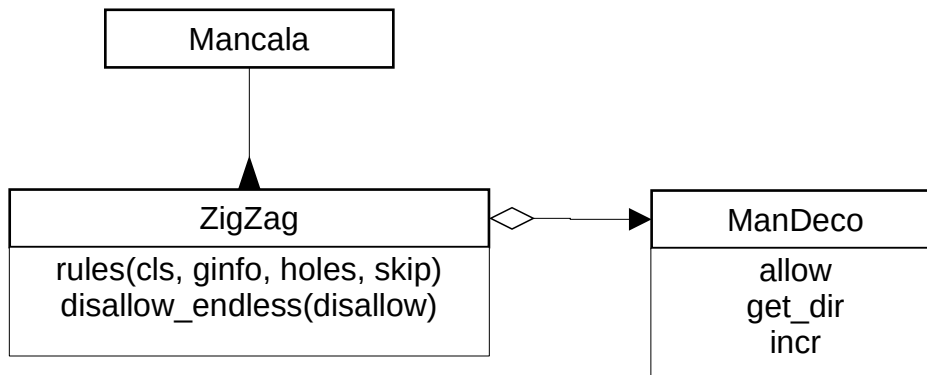


- Attributes and methods shown are overridden, reassigned or reconfigured.
- The BearOff sower is inserted in the deco chain before the single sower. The BearOffSower either does the bear off style sowing or calls down the deco chain to the original single sower.

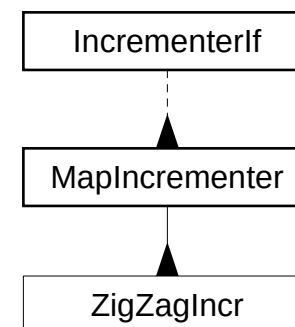
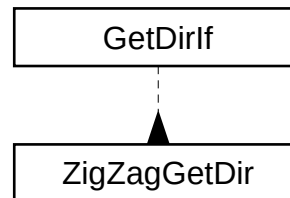
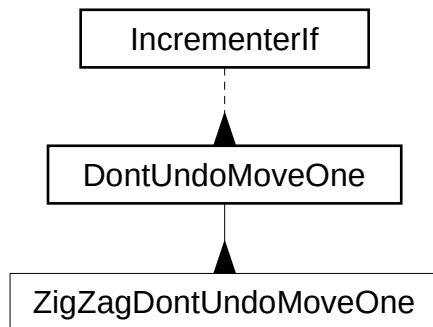


animation msg

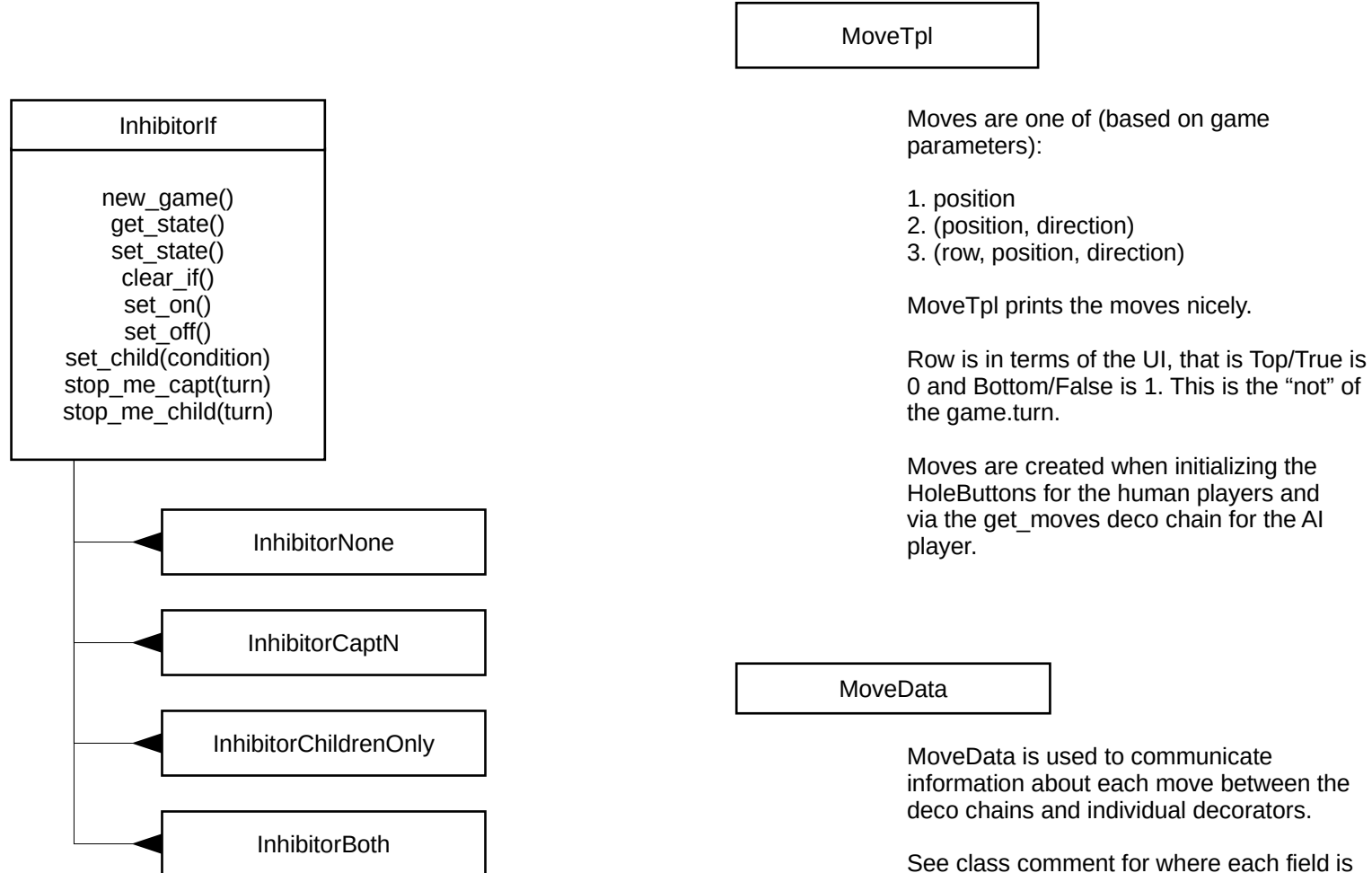
# ZigZag Game Class



- Attributes and methods shown are over-ridden, reassigned or reconfigured.
- ZigZag Cycle:
  - The ZigZag cycle is similar to the normal cycle in that each hole is visited once before any hole is visited a second time.
  - The cycle is generated as though sowing from South's Leftmost hole (loc 0) through the board to North's Rightmost hole.
  - The sow direction describes which way through this cycle and the incremter should move.
- Consult code for how deco chains are modified.



# Import Classes for Moves



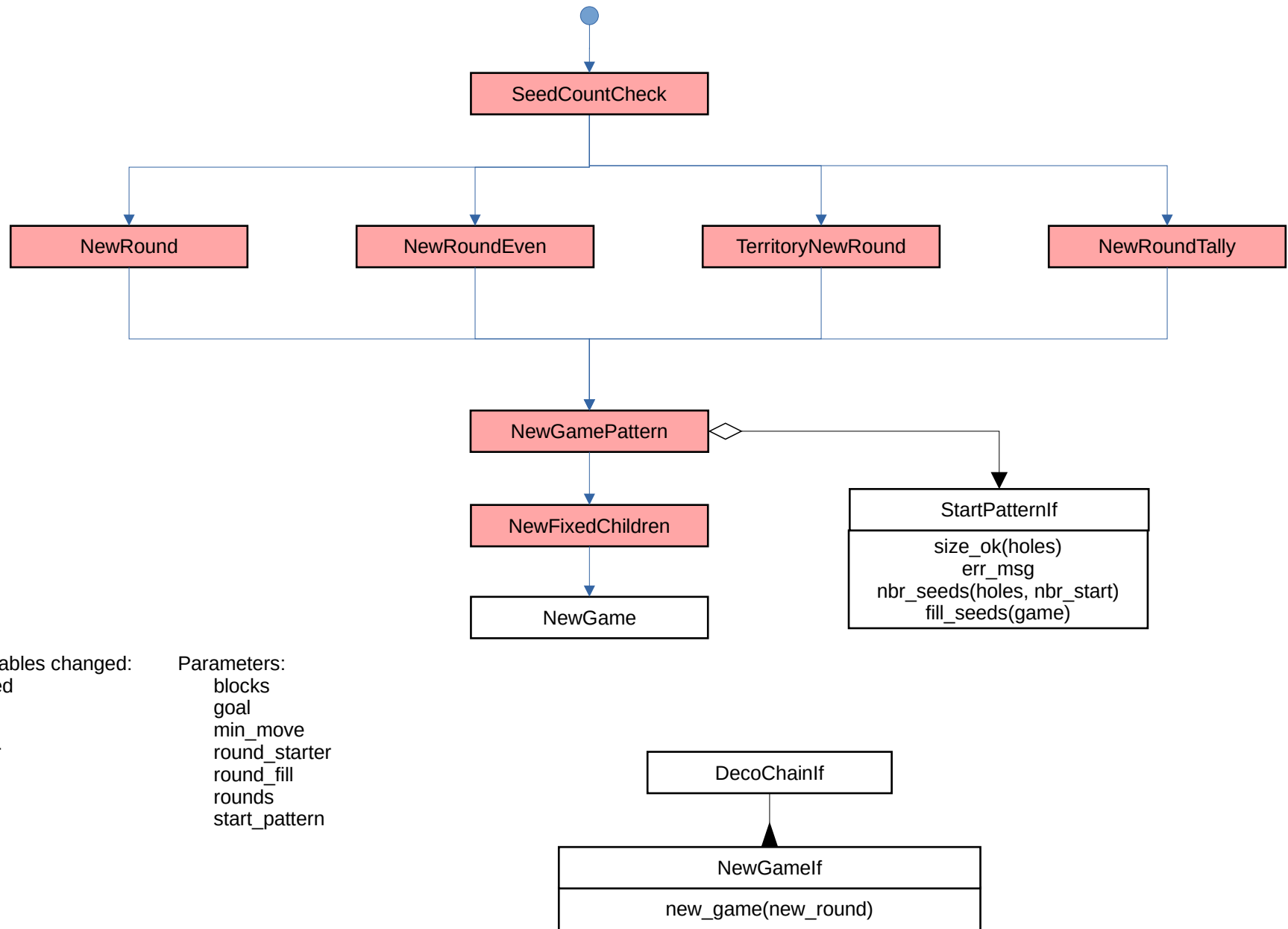
The decorator chains and button behaviors use and control the inhibitor.

# 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	MoveData	The game needs to end either because of endless sow or user selection. If not configured to do something else, unclaimed seeds are divvied between the players.



# New Game Decorators and Chain



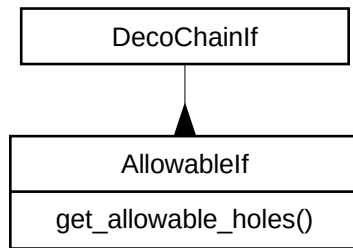
State variables changed:

blocked  
board  
owner  
starter  
store  
turn

Parameters:

blocks  
goal  
min\_move  
round\_starter  
round\_fill  
rounds  
start\_pattern

# Allowables Decorators and Chain

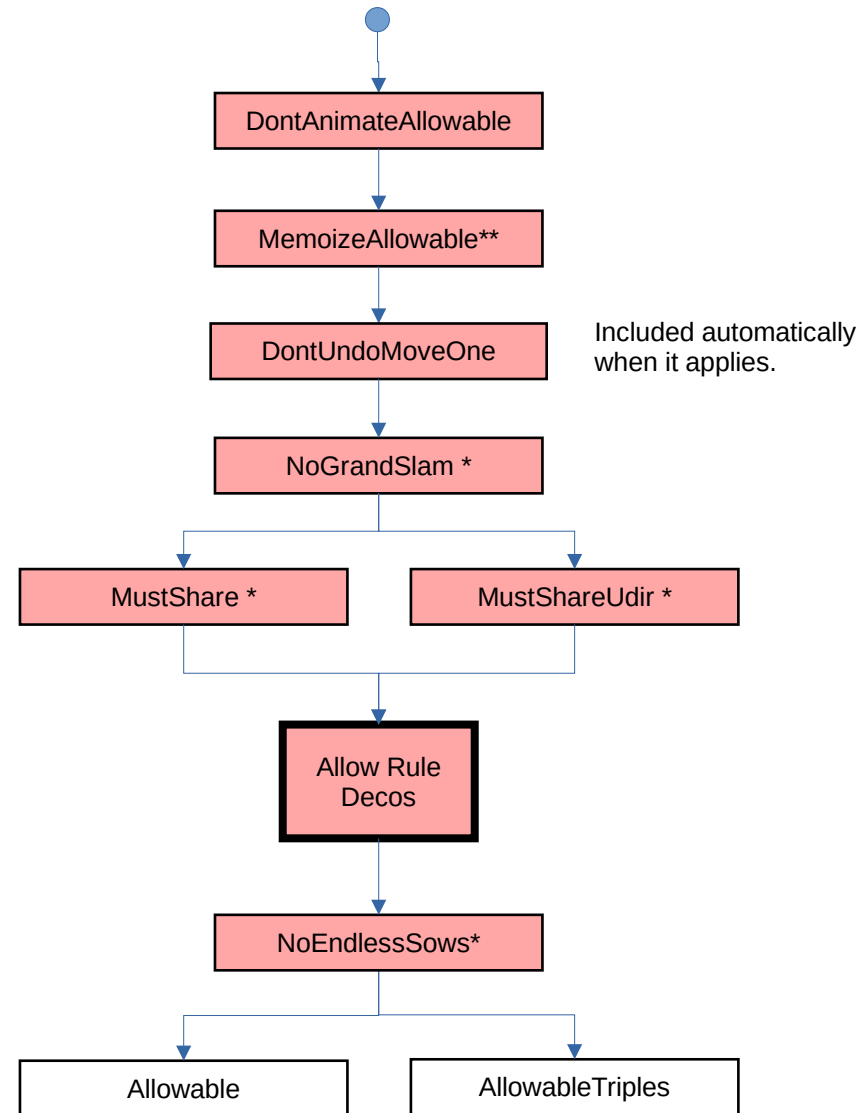


State variables read:

turn  
board  
store  
blocked  
owner  
child  
mcount

Parameters:

min\_move  
allow\_rule  
mlength  
mustshare  
grandslam  
udir\_holes

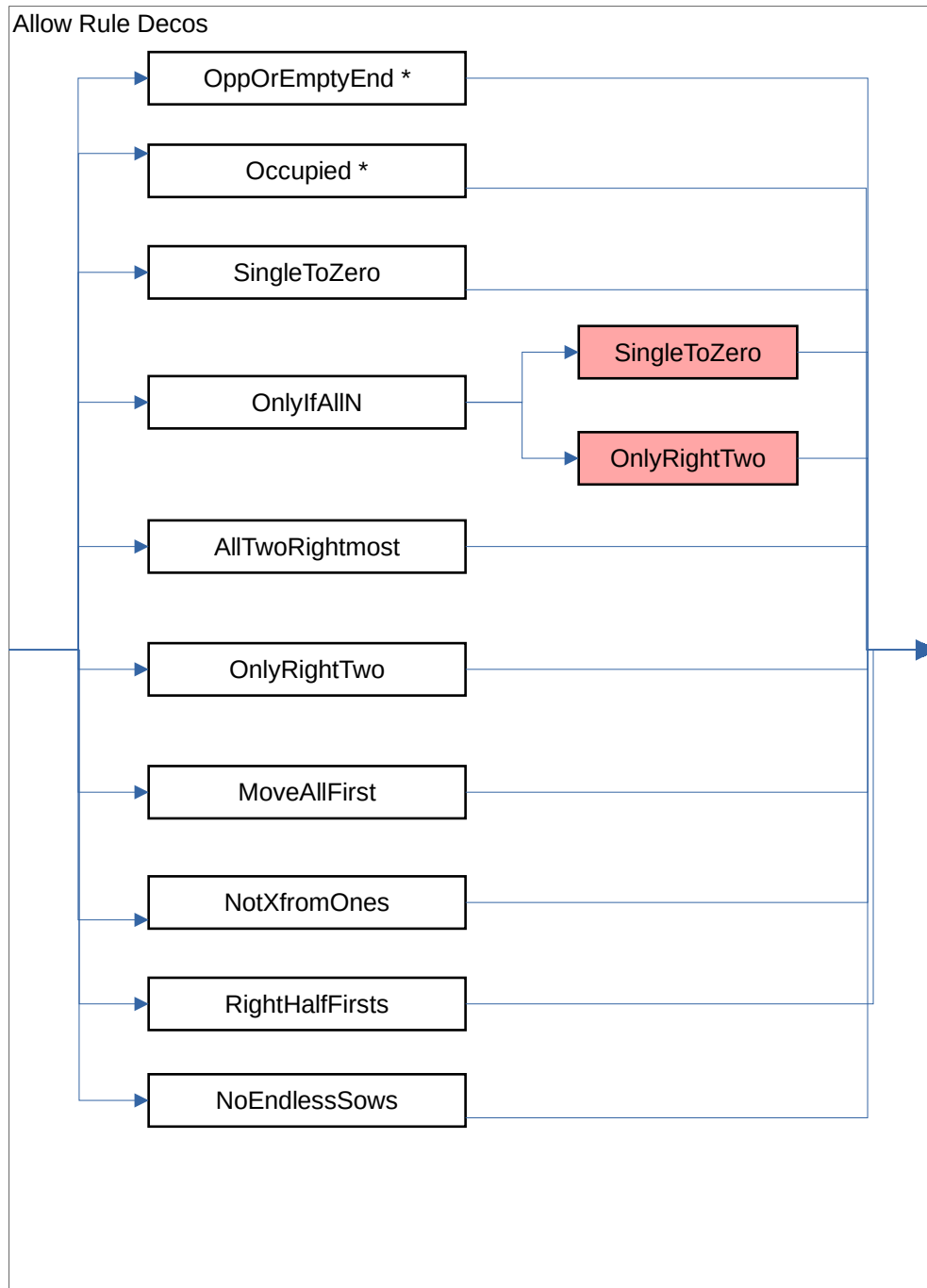


Notes:

\* Simulates some portion of moves to determine allowables

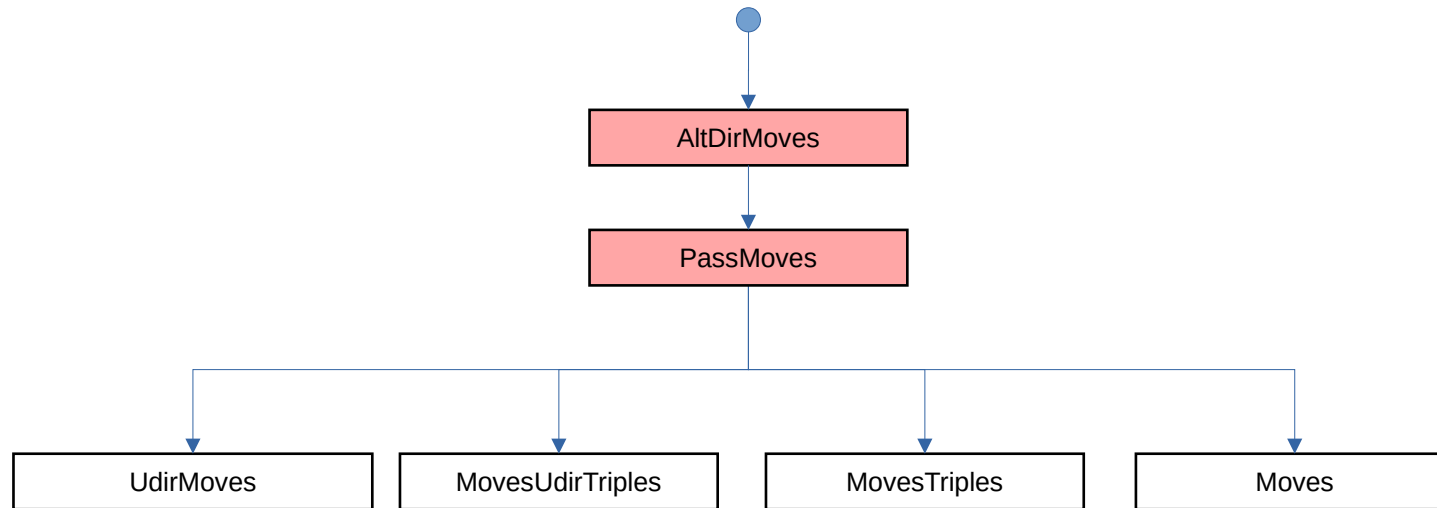
\*\* MemoizeAllowable is used for deco's that simulate moves

# 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

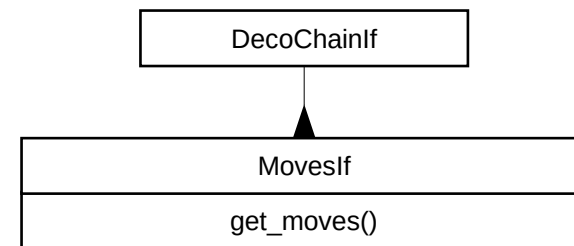


State variables read:

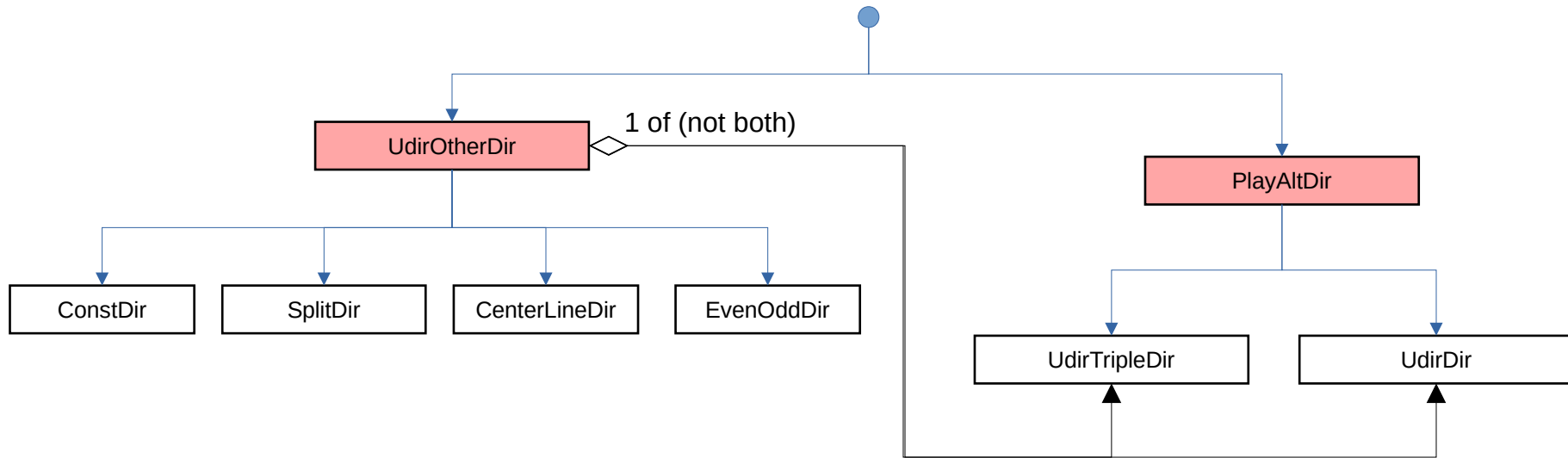
blocked  
board  
owner  
starter  
store  
turn

Parameters:

mlength  
mustpass  
sow\_direct  
udir\_holes  
udirect

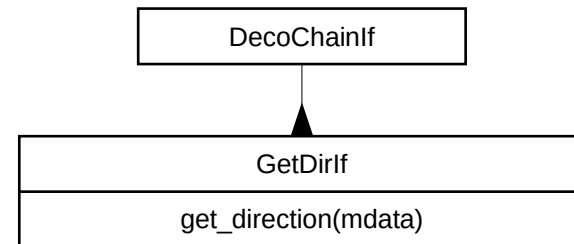


# Get Direction Decorators and Chain

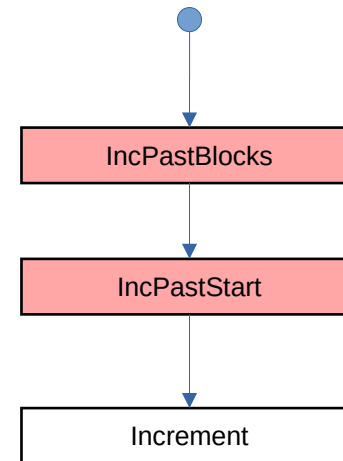
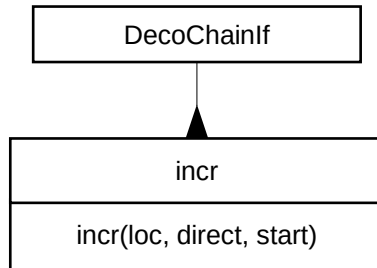


State variables read:  
mcount  
turn

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

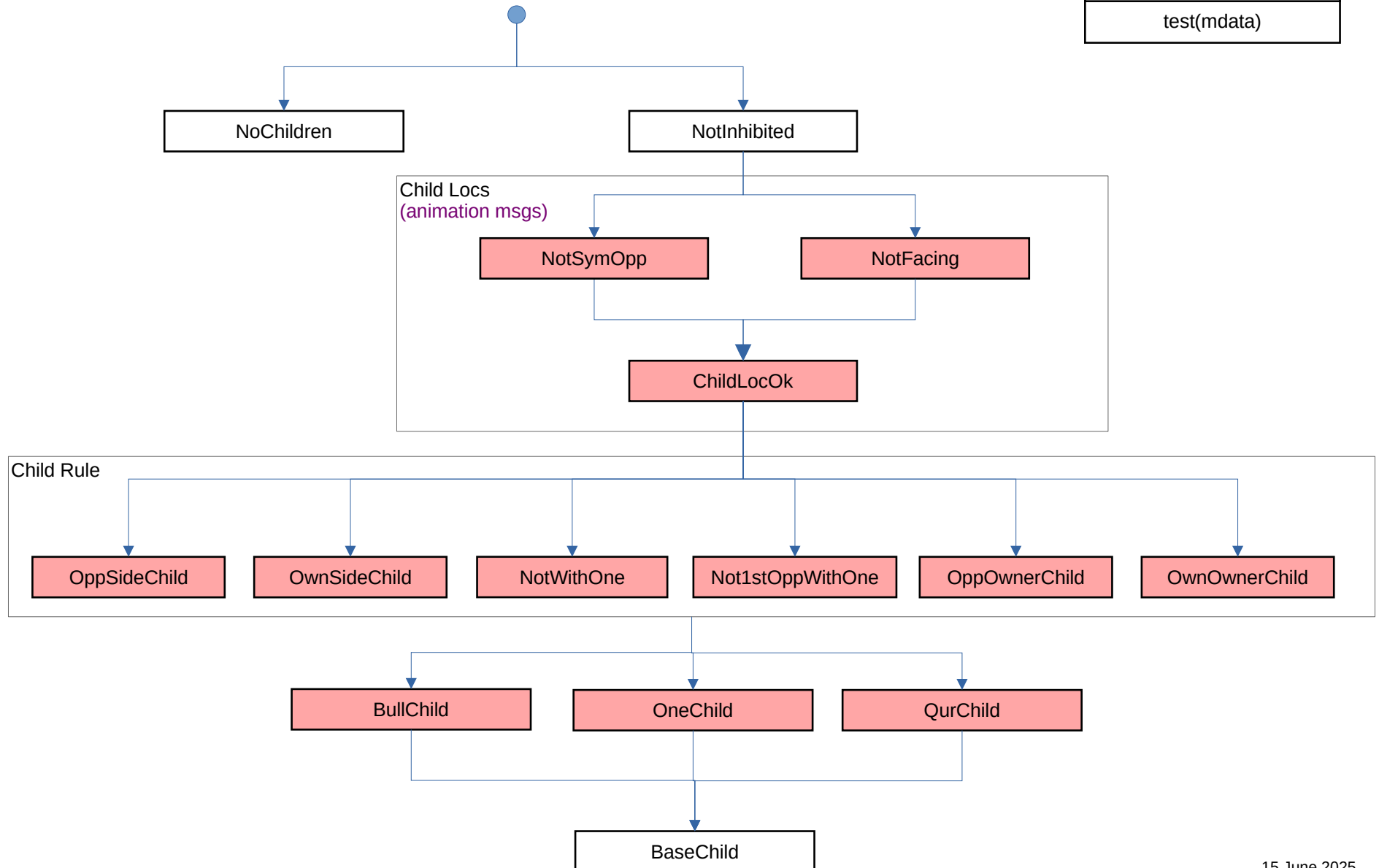
Parameters:

child\_cvt  
child\_locs  
child\_rule  
child\_type

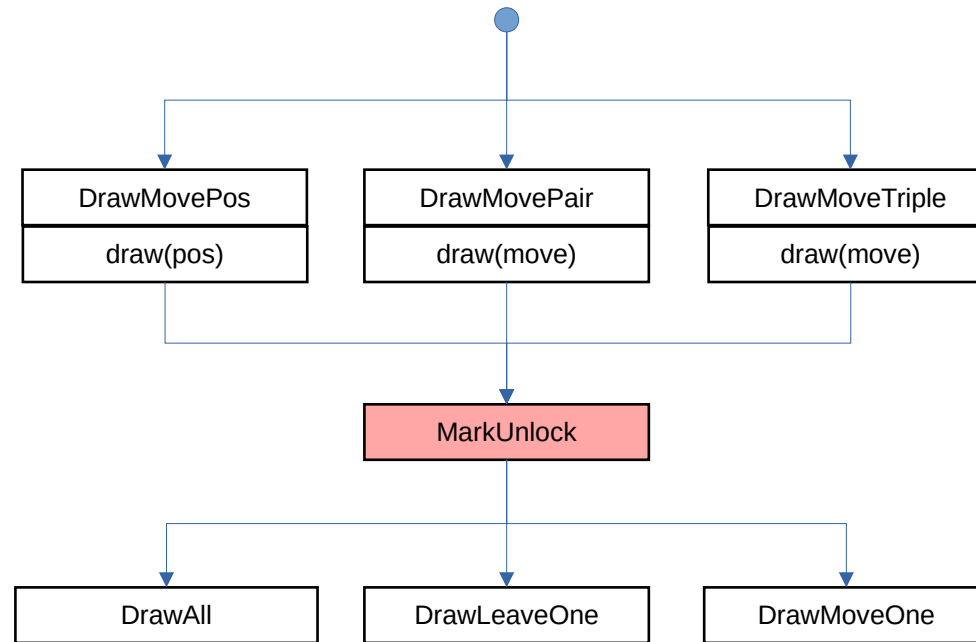
DecoChainIf

MakeChildIf

test(mdata)



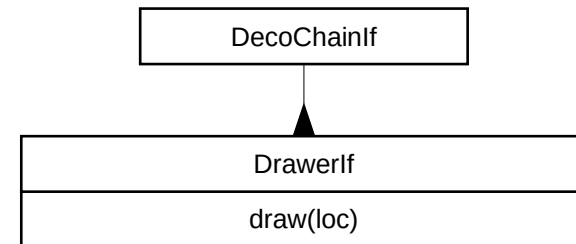
# Draw Decorators and Chain



The first drawer converts the move into board location.

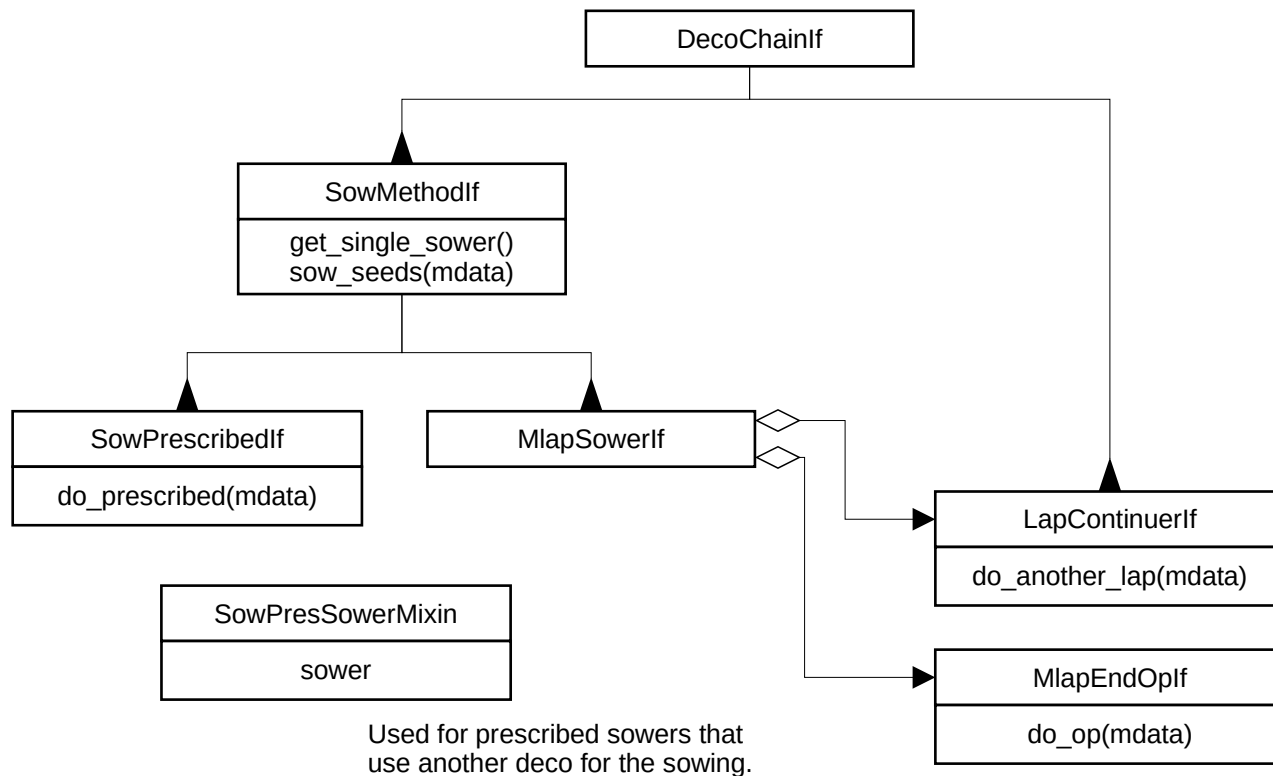
State variables:  
Read:  
    turn  
Changed:  
    board  
    unlocked

Parameters:  
allow\_rule  
mlength  
move\_one  
moveunlock  
sow\_start





# Sower Decorators



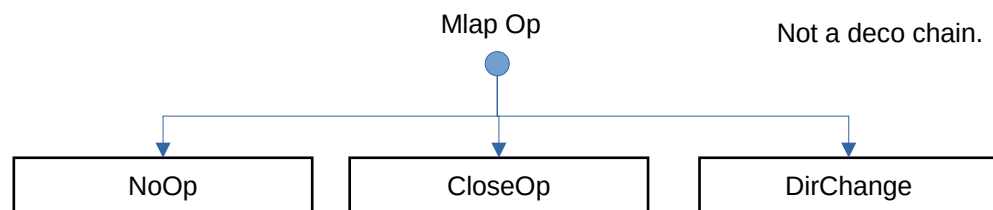
State variables:

Reads  
inhibitor  
turn  
child  
mcount  
Changes  
board  
store  
blocked

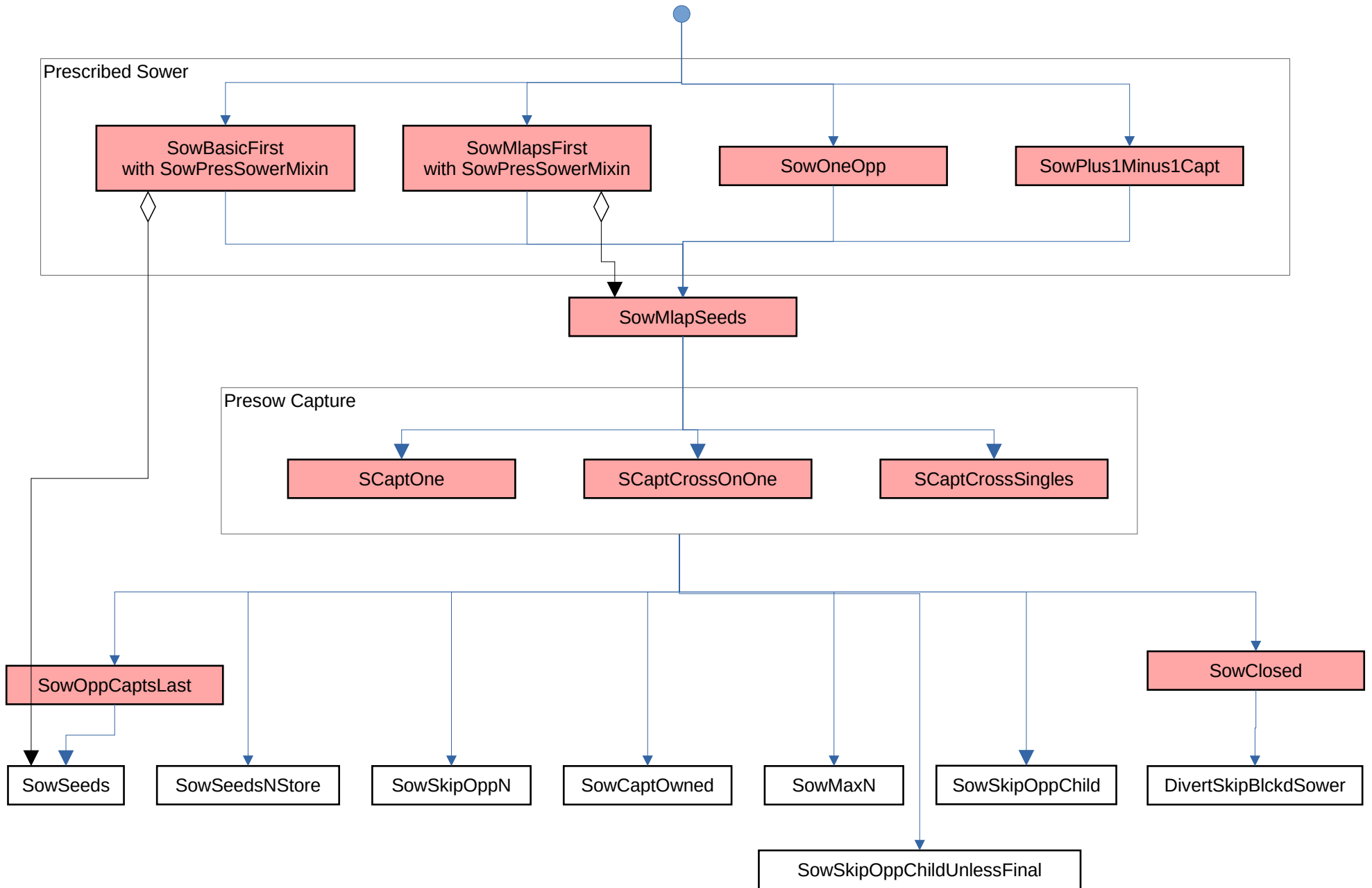
Parameters:

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

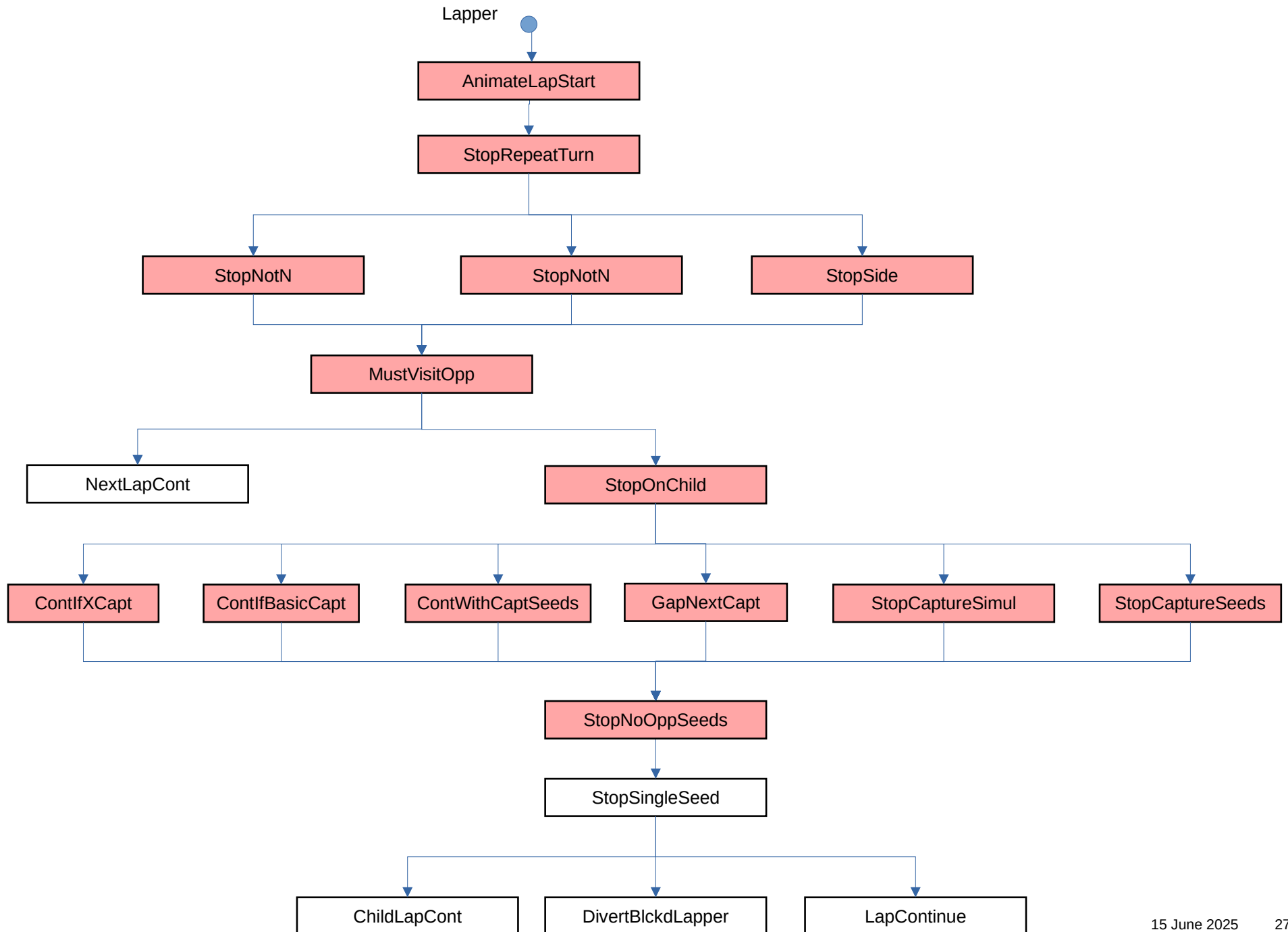
Used for prescribed sowers that use another deco for the sowing.



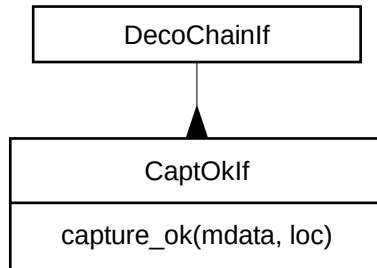
# Sower Deco Chain



# Lap Continuer Deco Chain and Mlap Operation

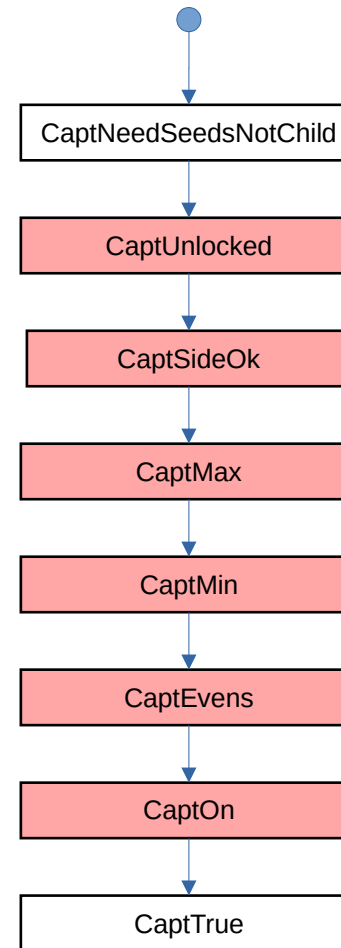


# Capt Ok Decorators and Chains



State variables read:  
board  
child  
turn  
unlocked

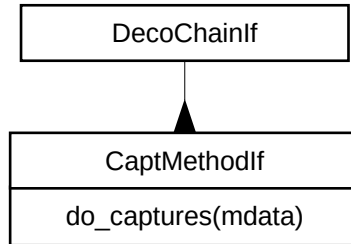
Parameters:  
capt\_max  
capt\_min  
capt\_on  
capt\_side  
moveunlock



This is the Basic Capture Criteria.

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

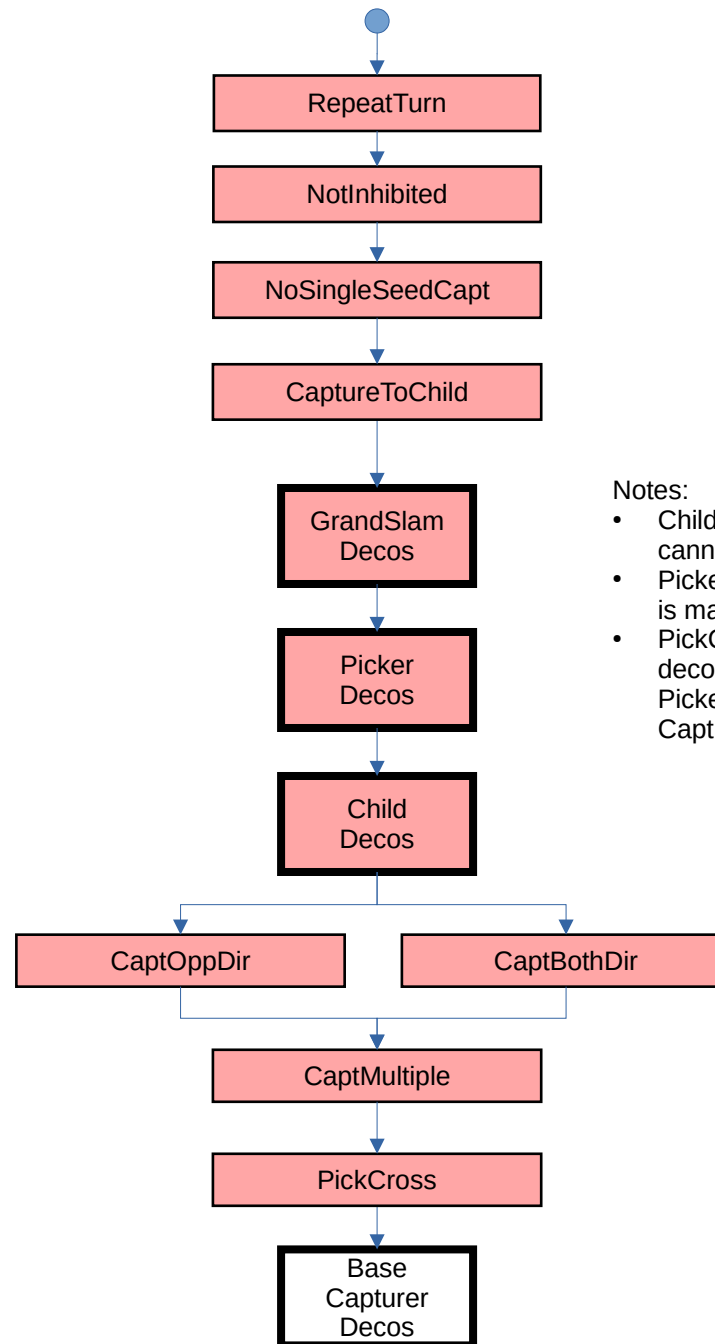
inhibitor  
starter  
turn

Changes

board  
child  
store

Parameters:

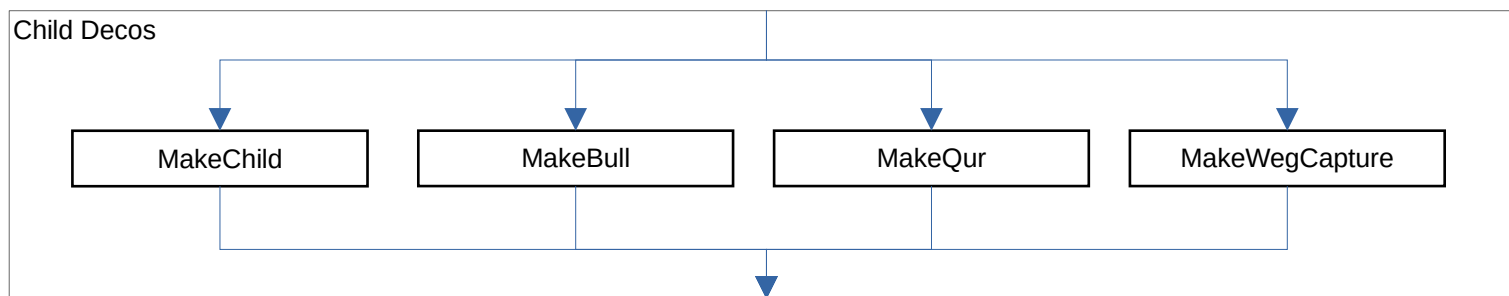
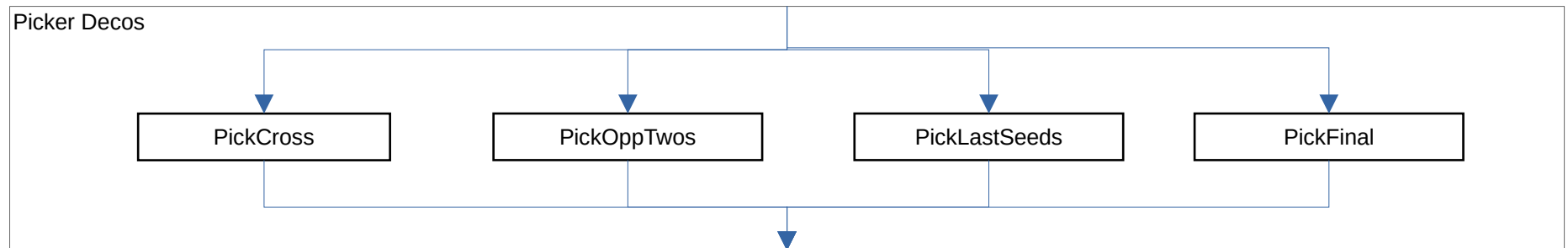
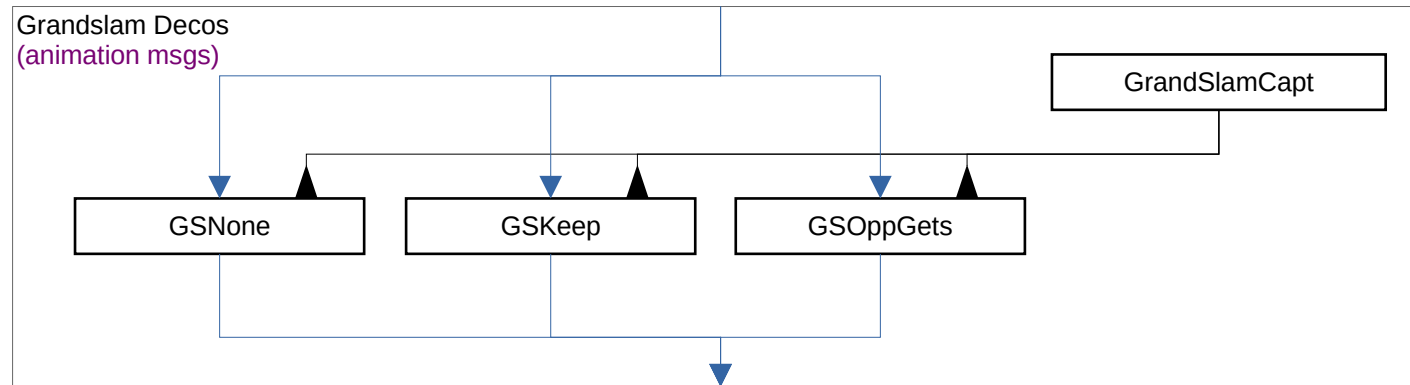
capsamedir  
capt\_max  
capt\_min  
capt\_on  
capt\_rturn  
capt\_side  
capt\_type  
child\_cvt  
child\_type  
crosscapt  
evens  
grandslam  
mlaps  
multicapt  
nocaptmoves  
nosingcapt  
pickextra  
prescribed  
round\_fill  
xc\_sown  
xcpickown



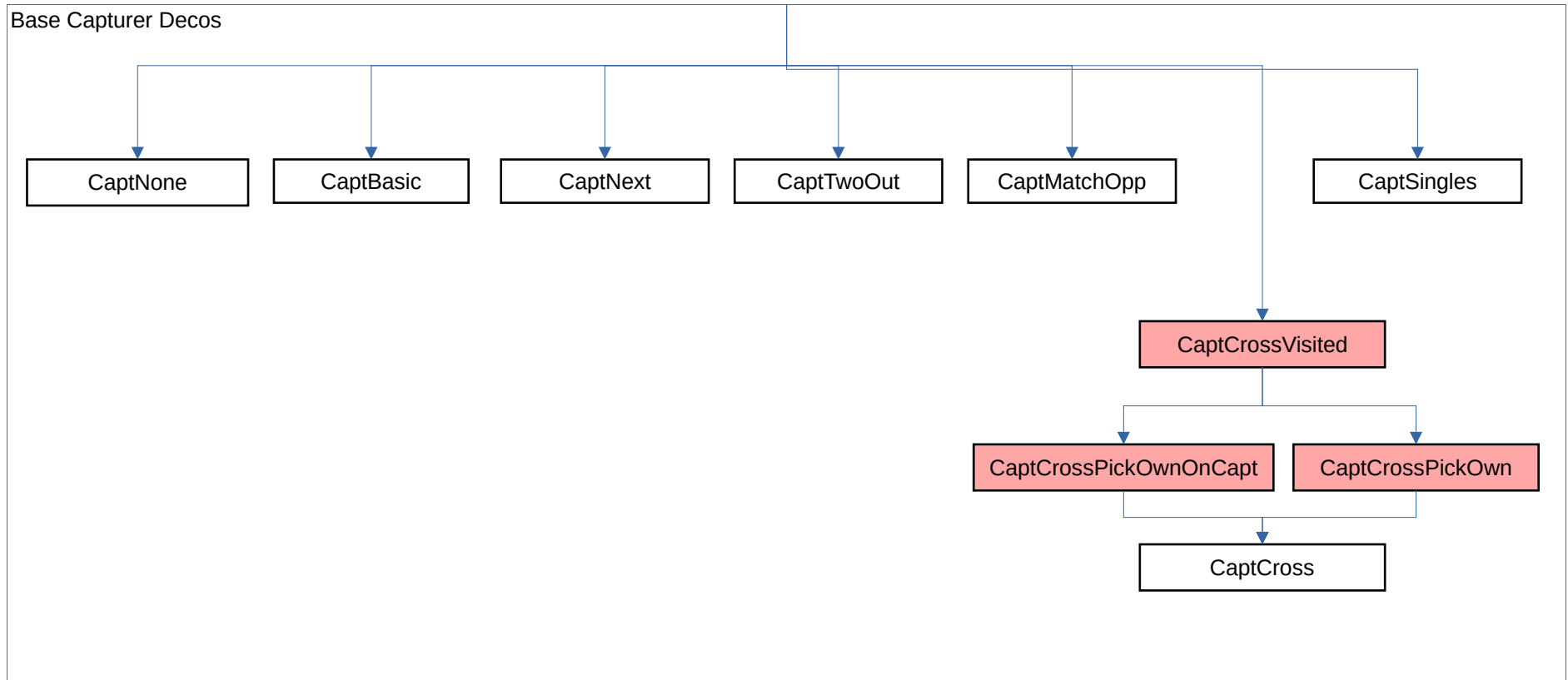
Notes:

- Child and Grand Slam decos cannot occur together.
- Pickers do nothing when a child is made.
- PickCross is only put in the deco chain once, either in Picker Decos or after CaptMultiple.

# Capturer Deco Chains (1 of 2)



# Capturer Deco Chains (2 of 2)



# Ender & Quitter Decorators and Chains (1 of 2)

State variables:

Reads:

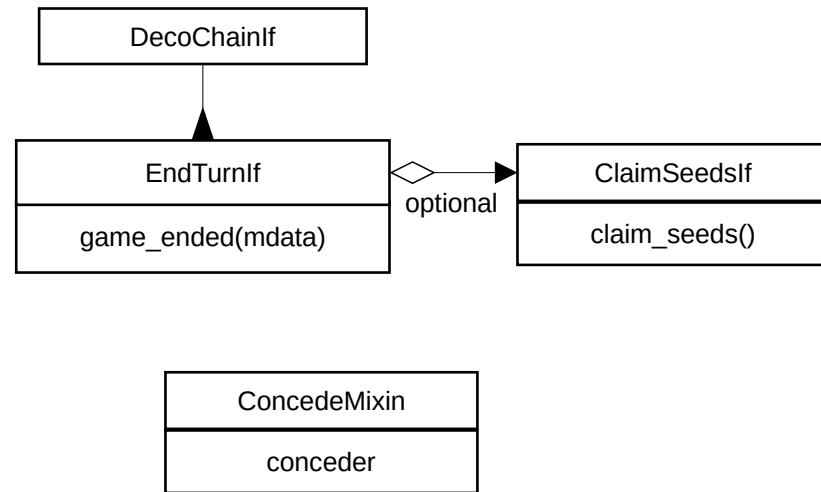
child  
owner  
turn

Changes:

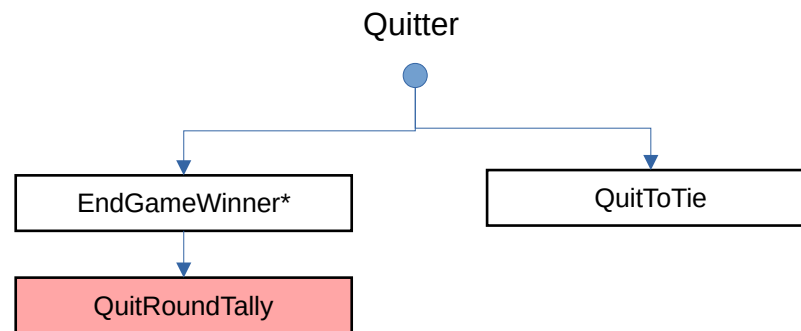
board  
store

Parameters:

capt\_min  
capt\_next  
capt\_on  
captwoout  
child\_cvt  
child\_type  
crosscapt  
evens  
goal  
gparam\_one  
min\_move  
mlaps  
mustpass  
mustshare  
no\_sides  
round\_fill  
rounds  
sow\_own\_store  
stores  
unclaimed



Used for enders that use a different criteria for ending when the user concedes a game.



Note:

\*For EndGameWinner in the quitter: a claimer, taker or divvier is selected based on the quitter, child\_type and store properties (see next page).



# Ender & Quitter Decorators and Chains

## (2 of 2)

