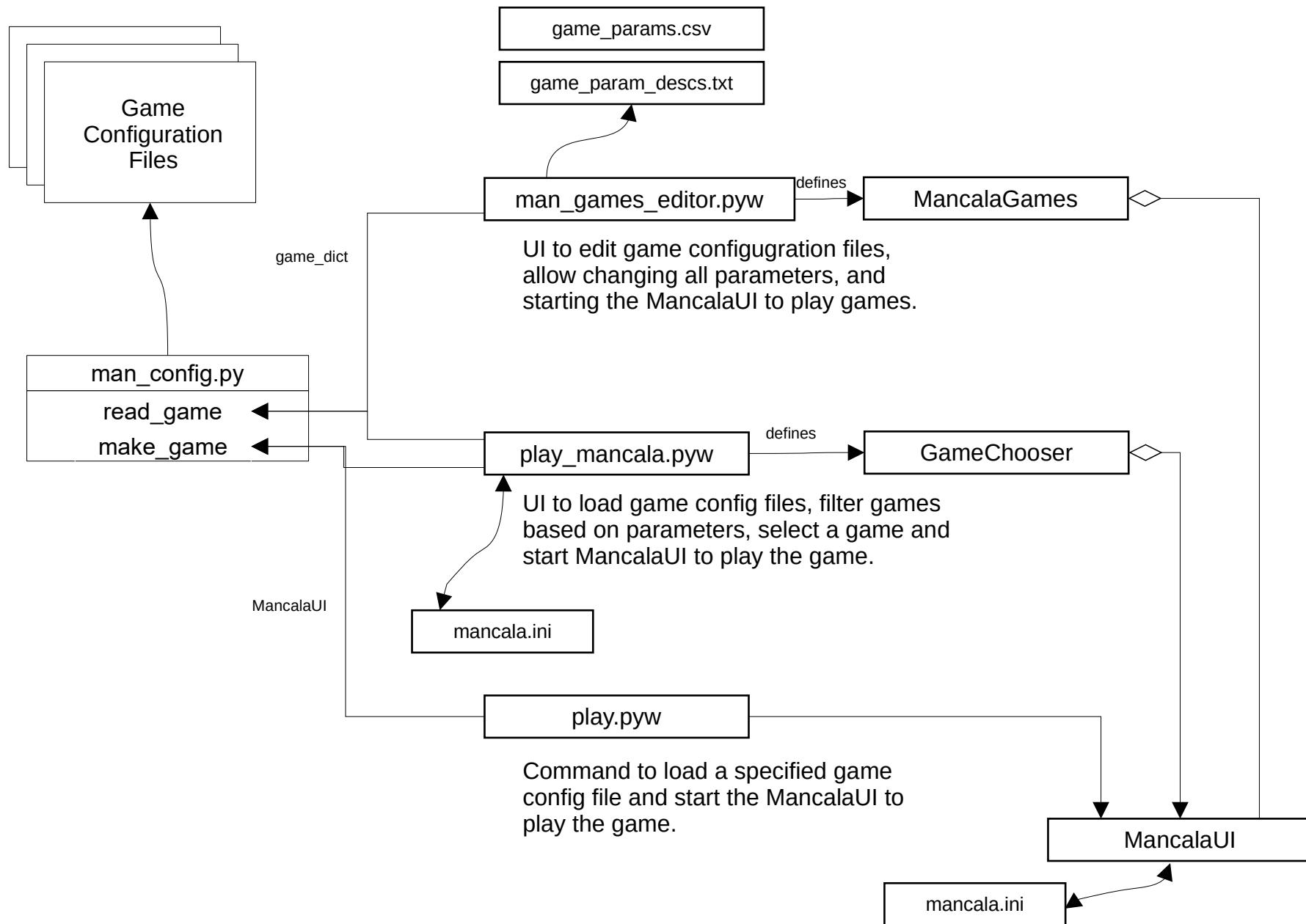
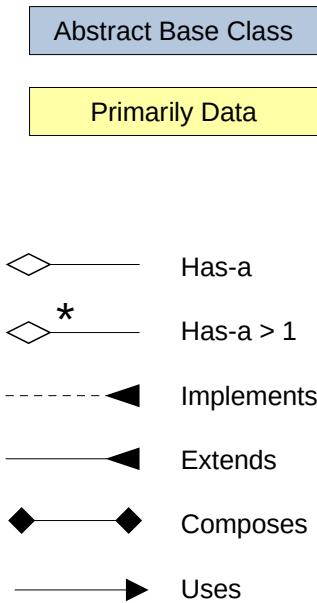


# Mancala Games



# Notation Conventions

## Class Diagram Conventions



## Deco Chain Conventions

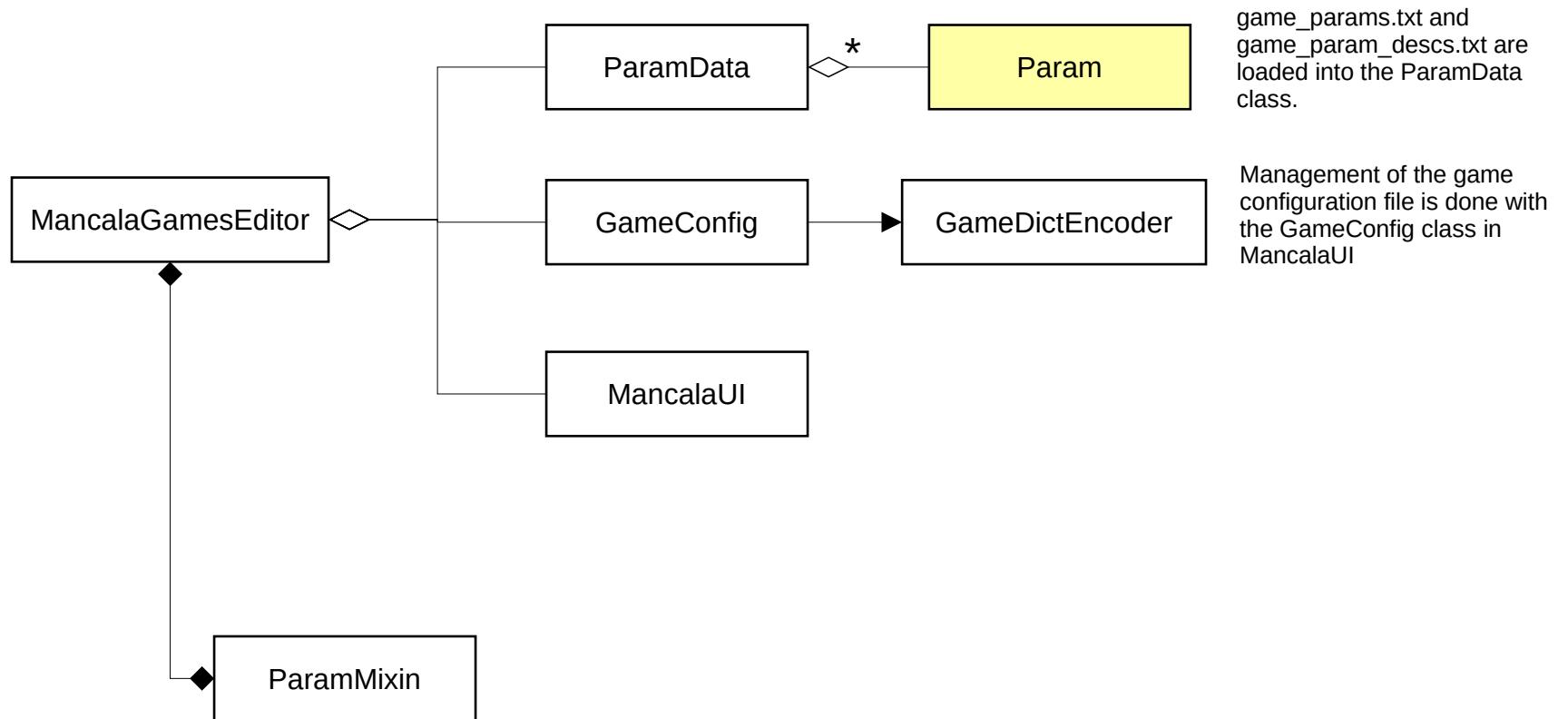
- One path down the deco chain is used.
- Intersecting arrows are decision points.
- Shown in **call order** from start dot ● (constructed in reverse order).
- Calls down the deco chain maybe at any point in each deco's processing.
- Some deco's do not call down the deco chain even if there is a follow-on deco.
- All paths shown might not be possible (see ginfo\_rules).

Optional deco

Deco Chain  
in Separate  
Diagram

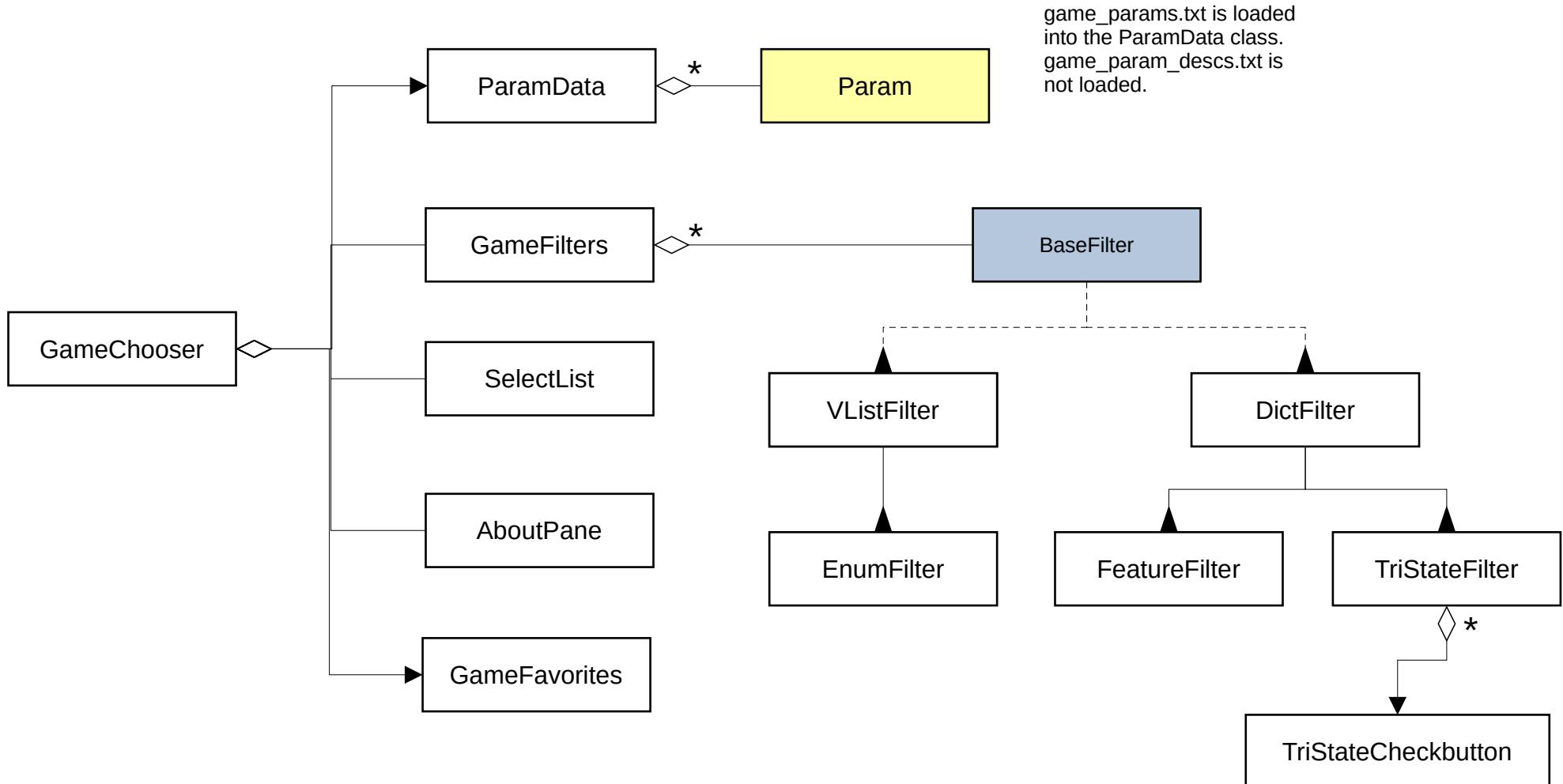
# MancalaGamesEditor

## man\_games\_editor.pyw



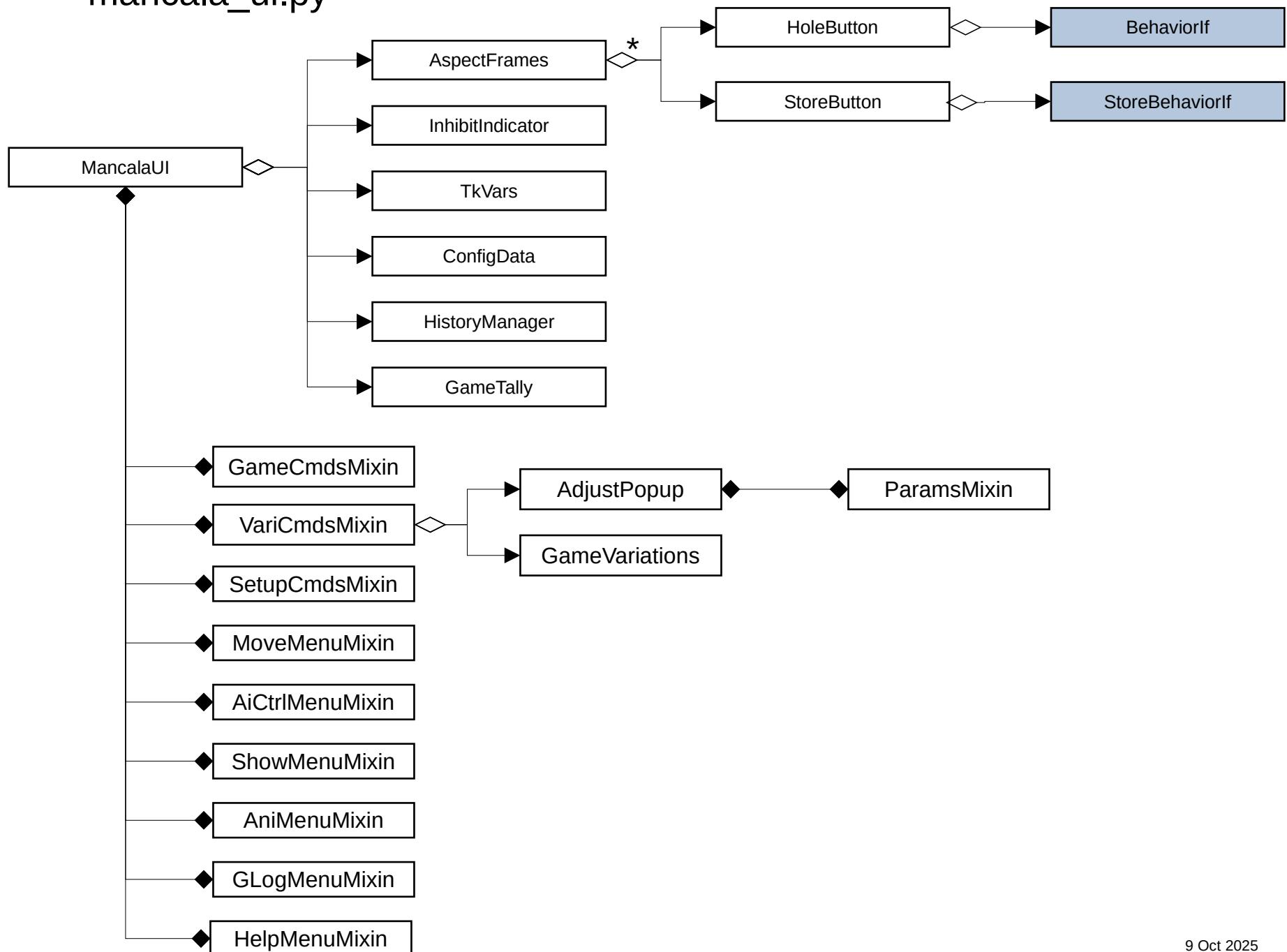
# GameChooser

## play\_mancala.pyw

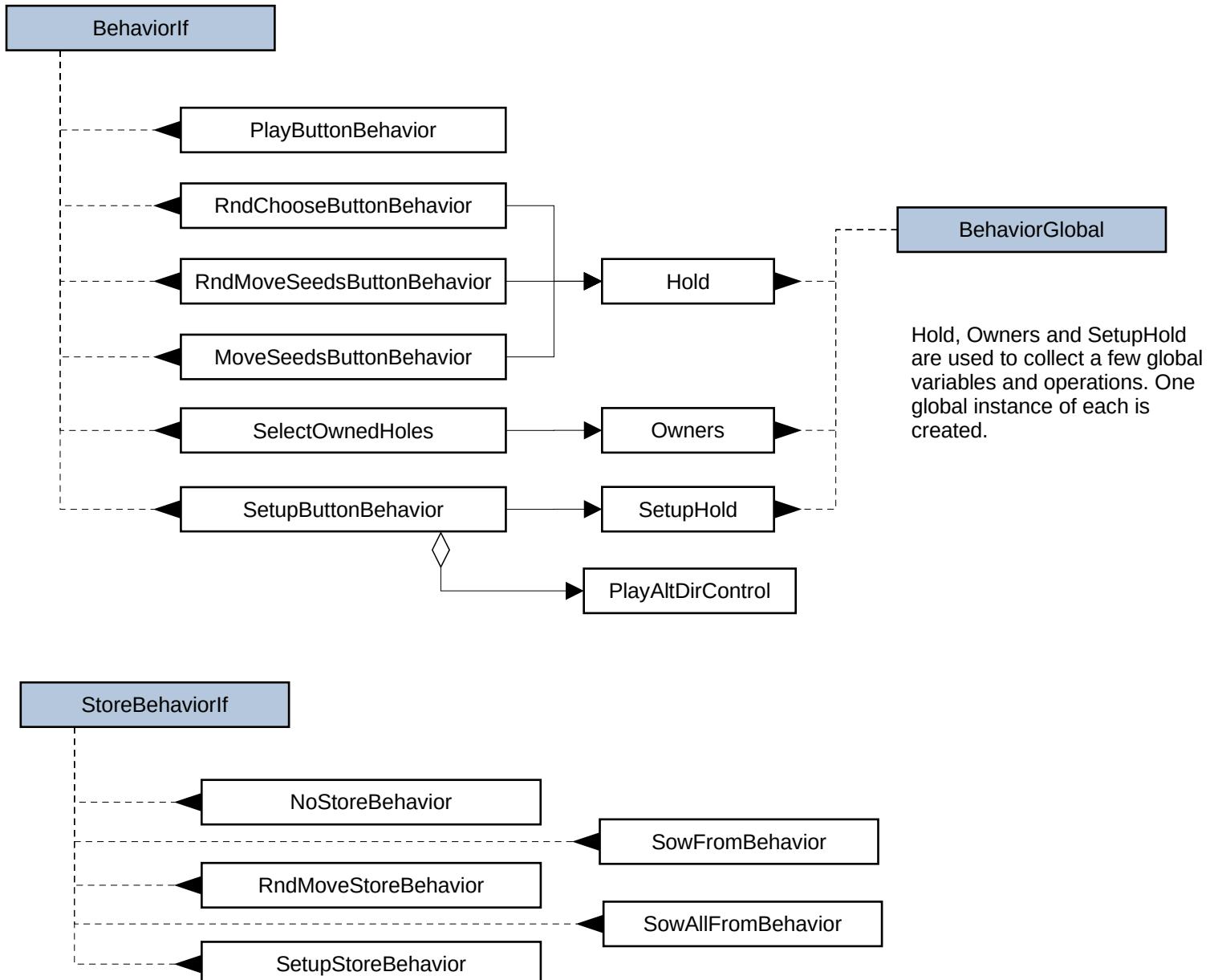


# MancalaUI Classes

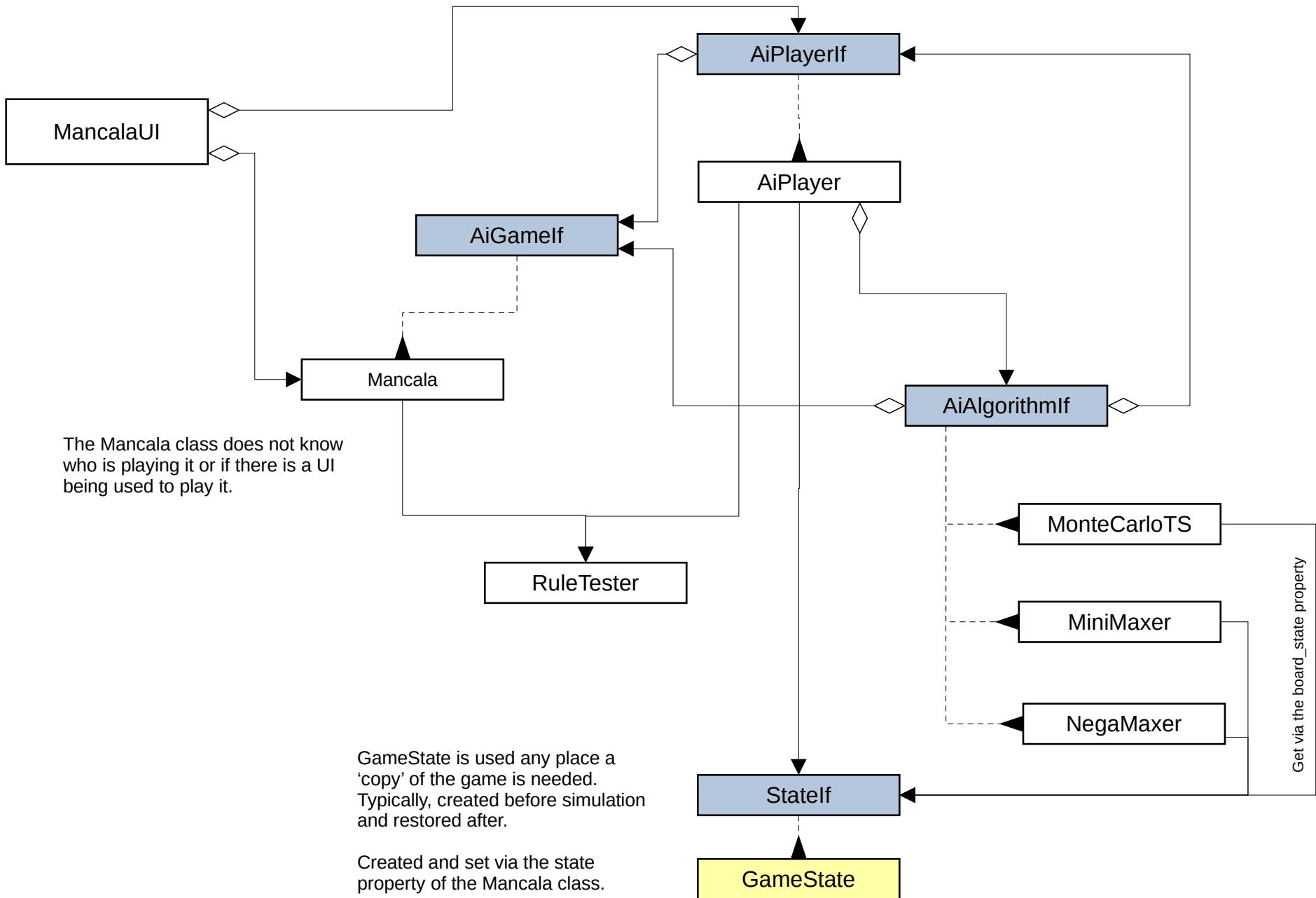
## mancala\_ui.py



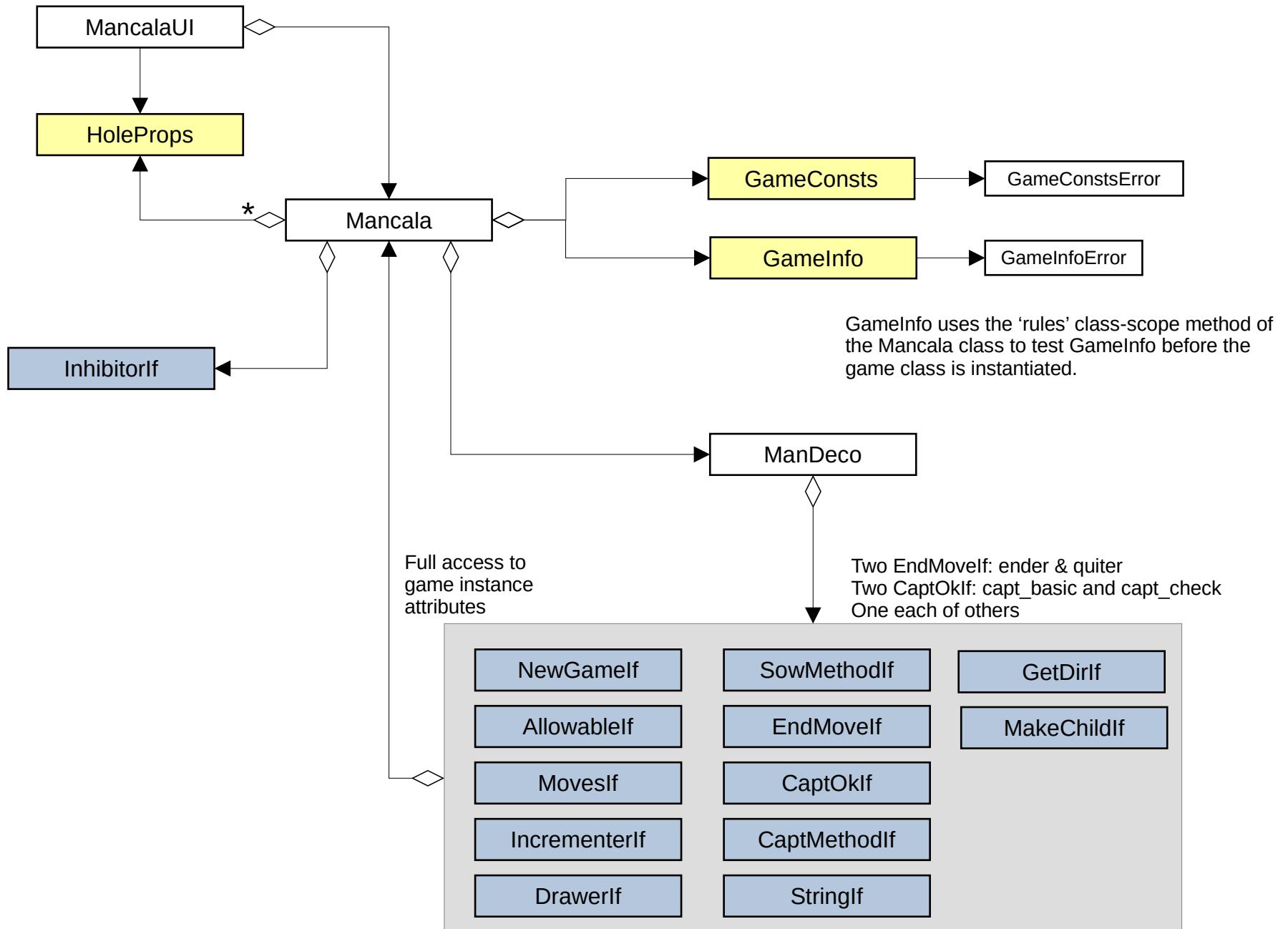
# Behavior Classes for MancalaUI



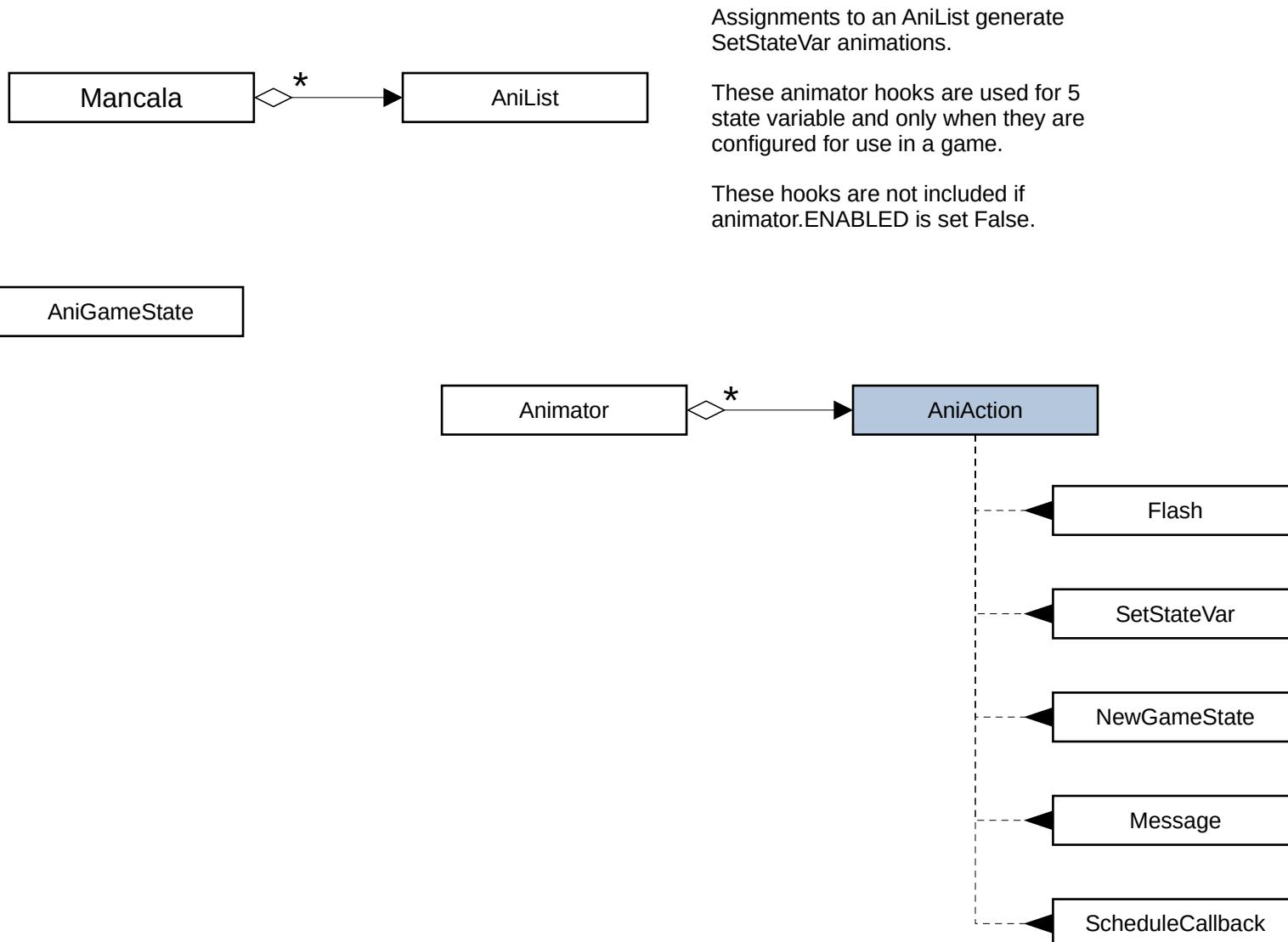
# AIPlayer and AIAlgorithm Integration



# Mancala Classes

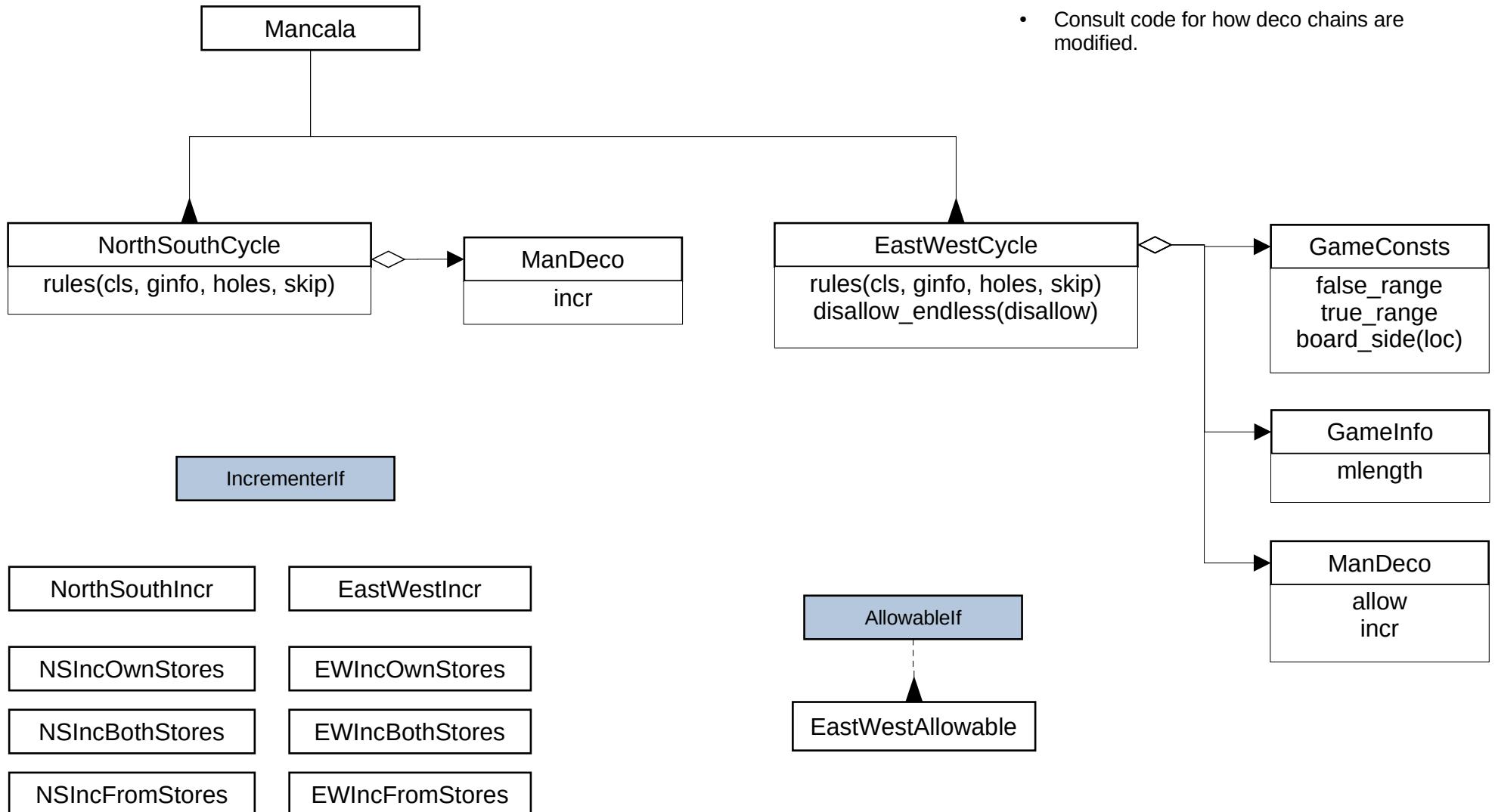


# Animator Classes

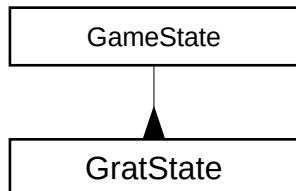
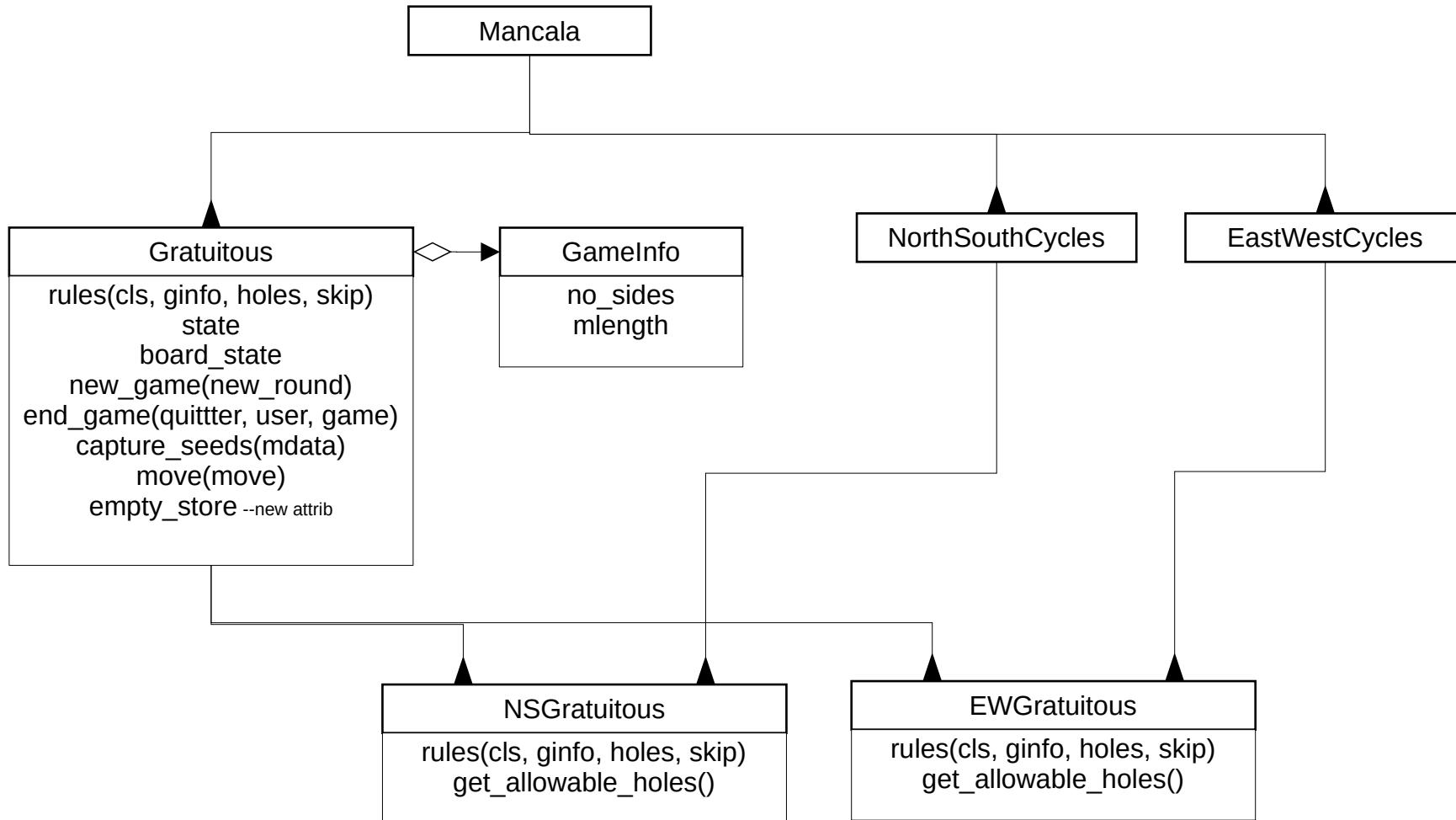


# Two Cycle Game Classes

- Attributes and methods shown are overridden, reassigned or reconfigured.
- Consult code for how deco chains are modified.

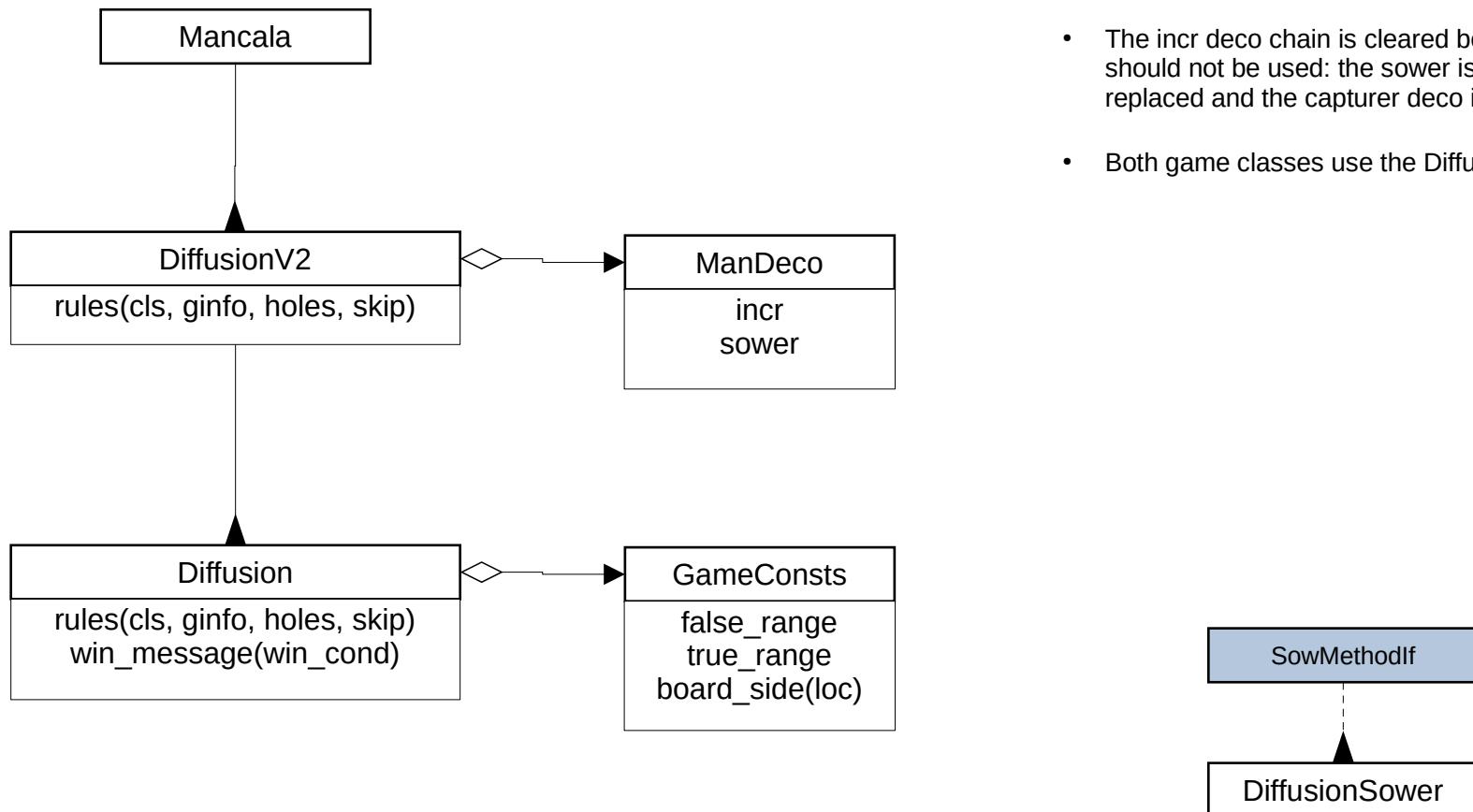


# Gratuitous Game Classes



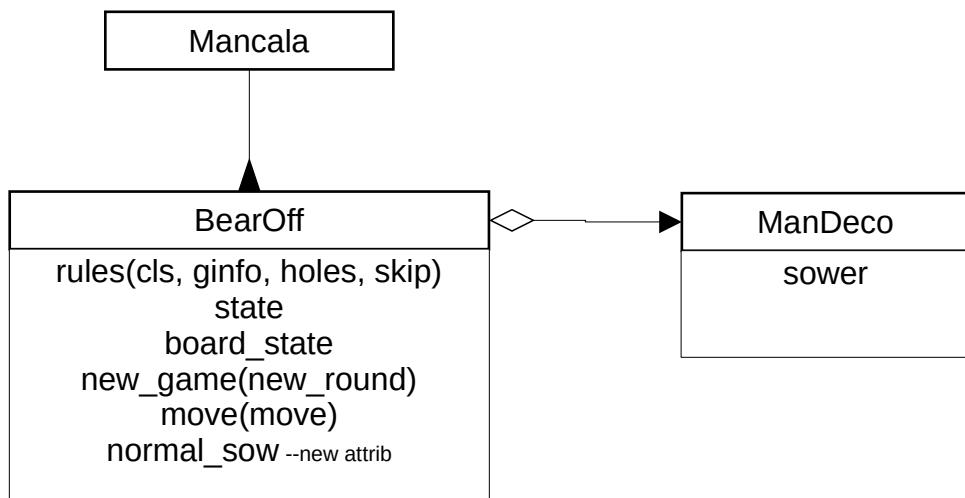
- Attributes and methods shown are overridden, reassigned or reconfigured.
- MRO is **Gratuitous** then **NorthSouthCycles** or **EastWestCycles** then **Mancala**
- **Gratuitous** only calls the allow deco chain when on the first part of turns, not on the place seeds opposite part.

# Diffusion and DiffusionV2 Game Classes

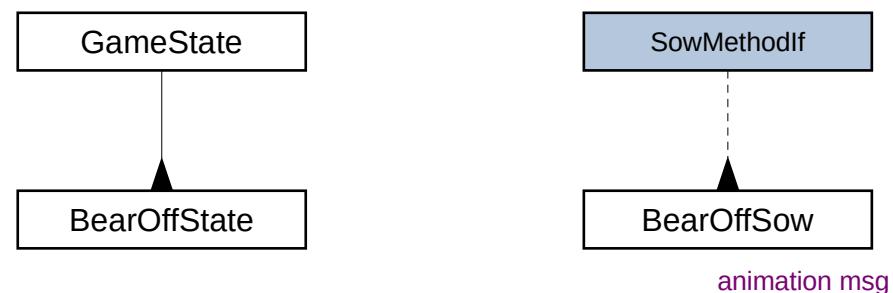


- Attributes and methods shown are overridden, reassigned or reconfigured.
- The `incr` deco chain is cleared because it should not be used: the sower is completely replaced and the capturer deco is `CaptNone`.
- Both game classes use the `DiffusionSower`.

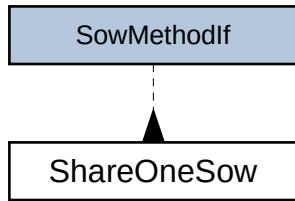
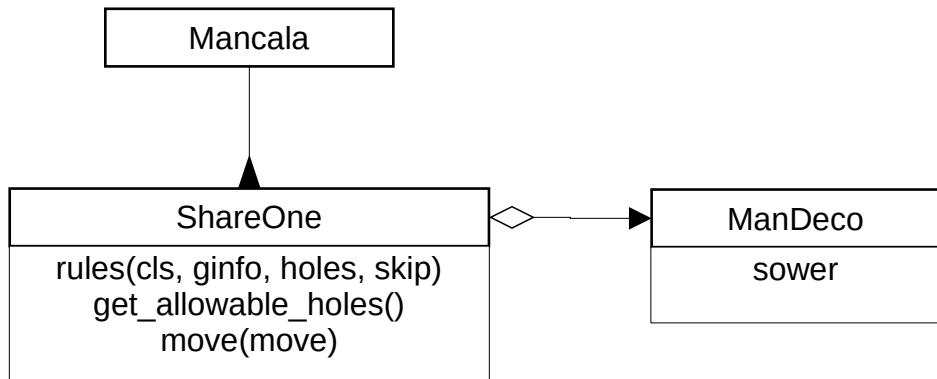
# Bear Off Game Class



- 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.



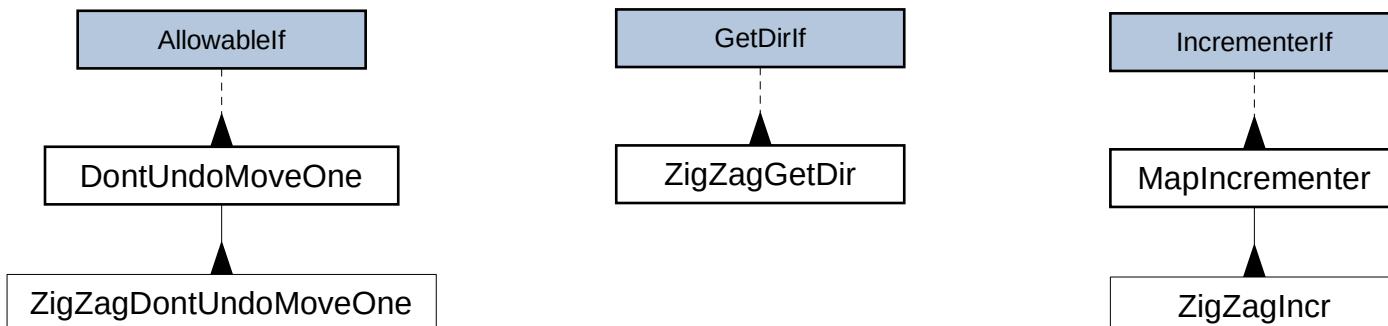
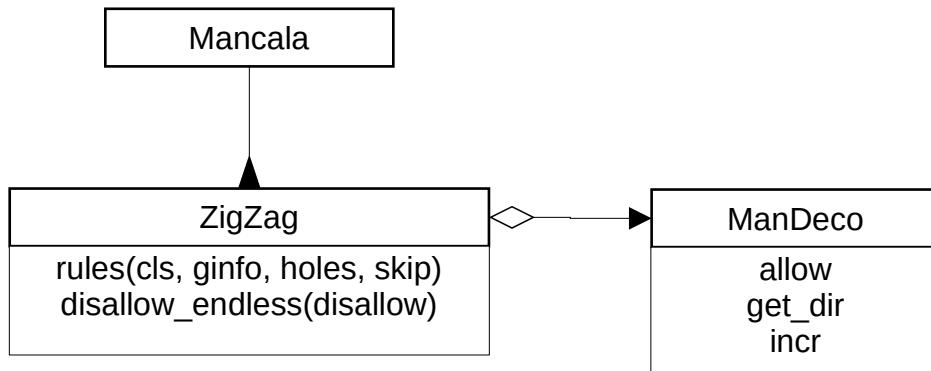
# ShareOne Game Class



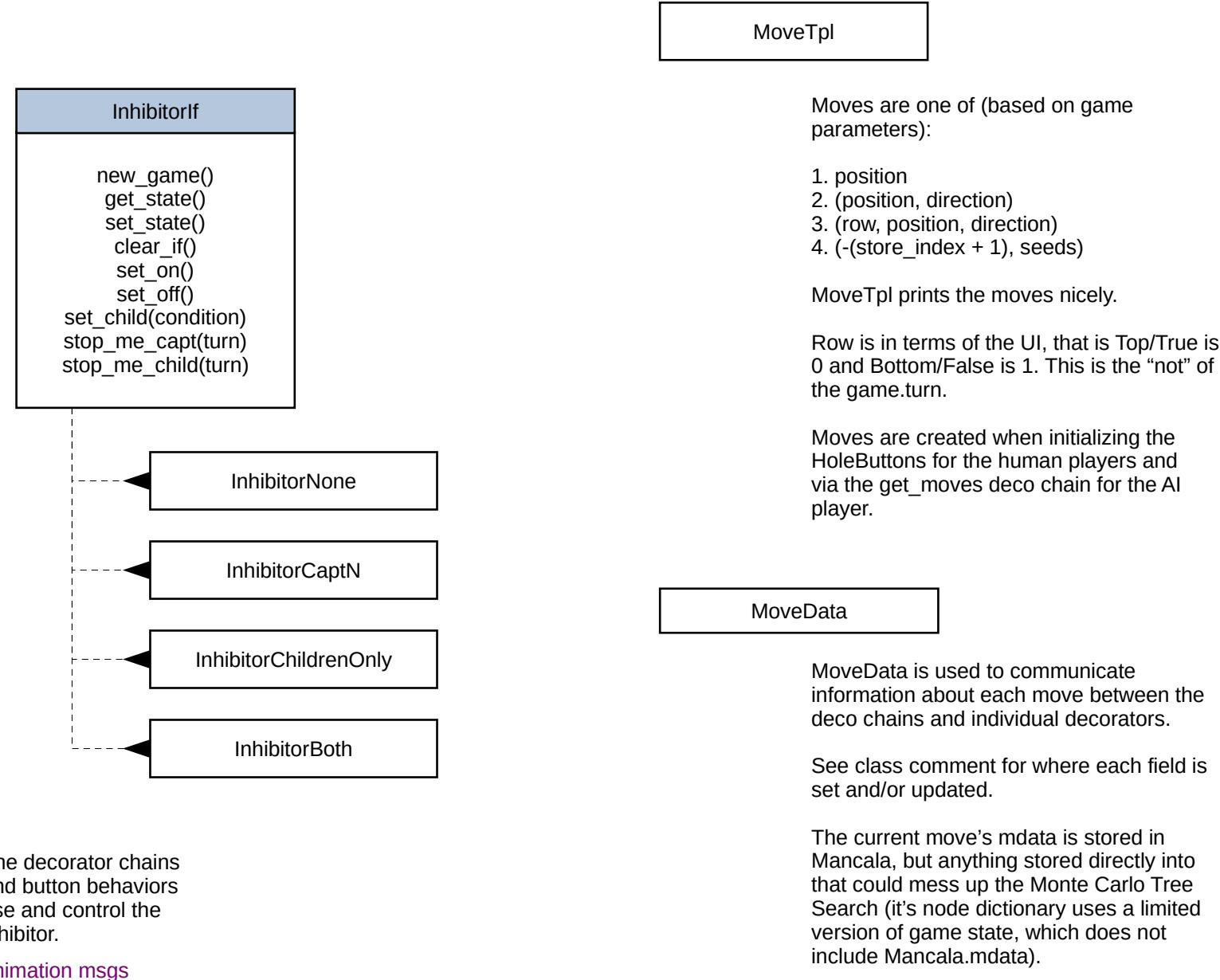
- Attributes and methods shown are over-ridden, reassigned or reconfigured.
- If the move will be a share one move, only holes that are not children with 2 or more seeds are allowable (the allow deco is not used); otherwise, the deco chain is used.
- If the next move is to share one seed and the animator is active, a message is popped up via the move method override.
- ShareOneSow wraps the existing deco chain and performs an alternate sow to share the one seed.

# 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 incrementer should move.
- Consult code for how deco chains are modified.



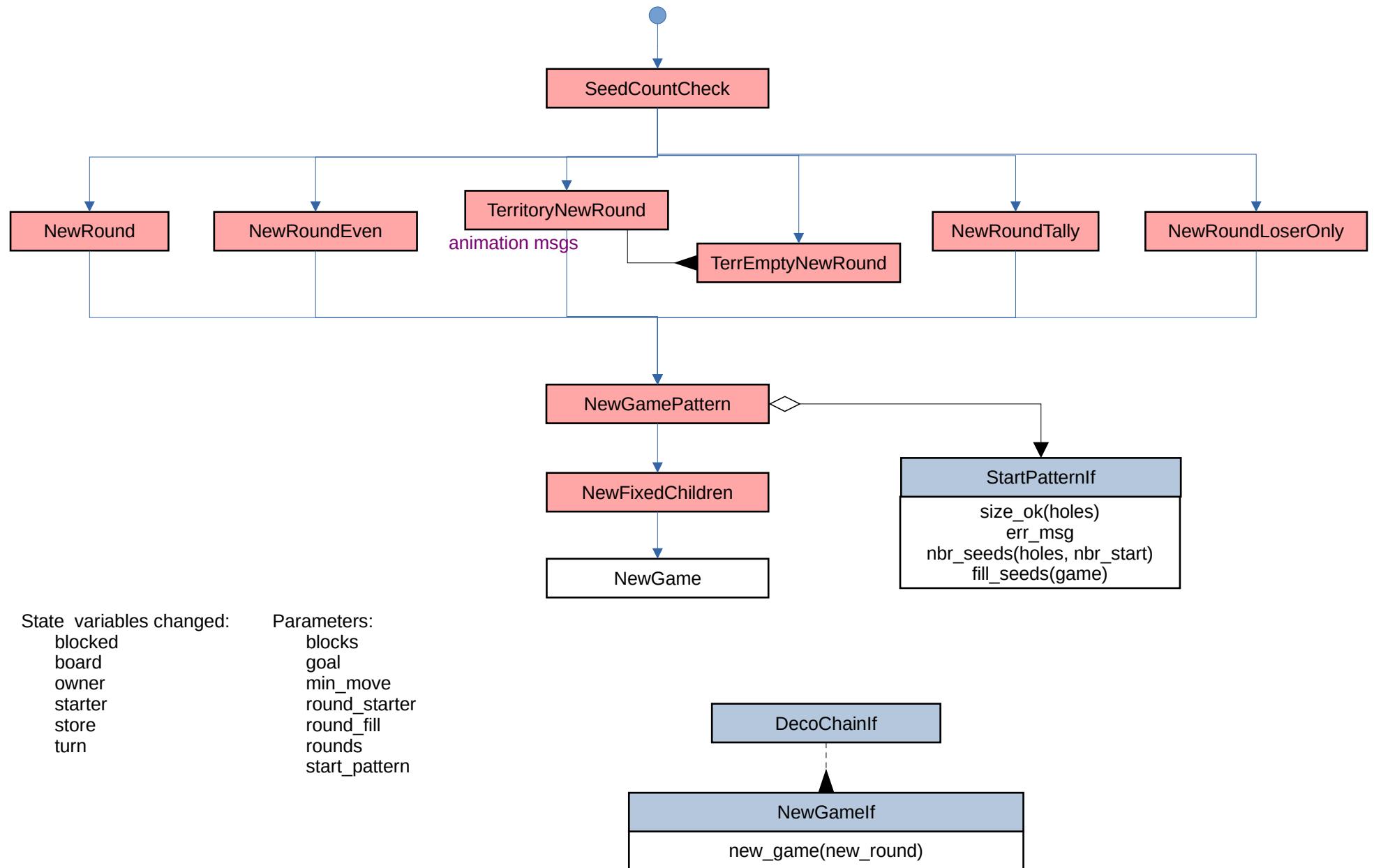
# Important Classes for Moves



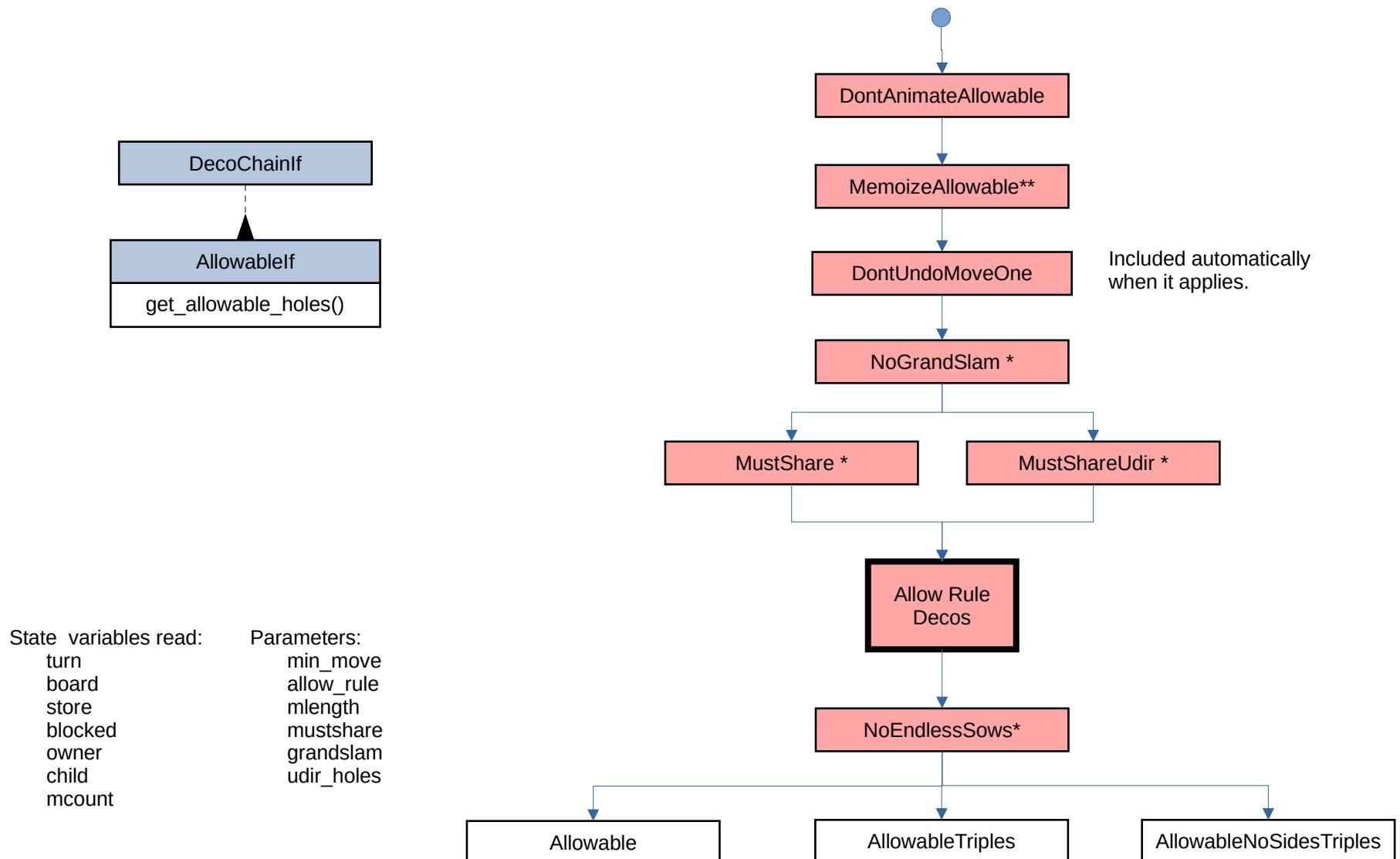
# Decorator Usage

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.

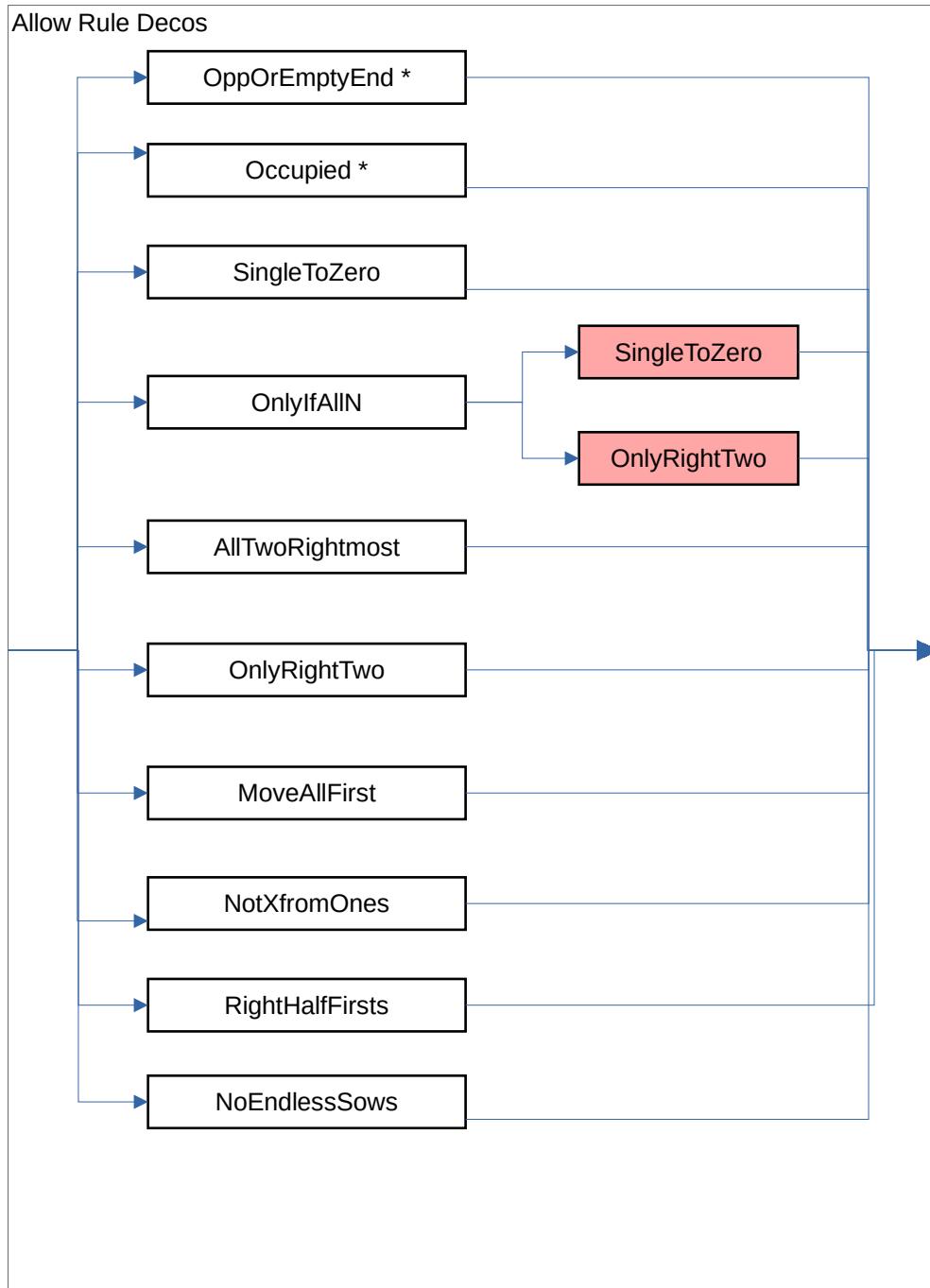
# New Game Decorators and Chain



# Allowables Decorators and Chain



# Allow Rule Decos

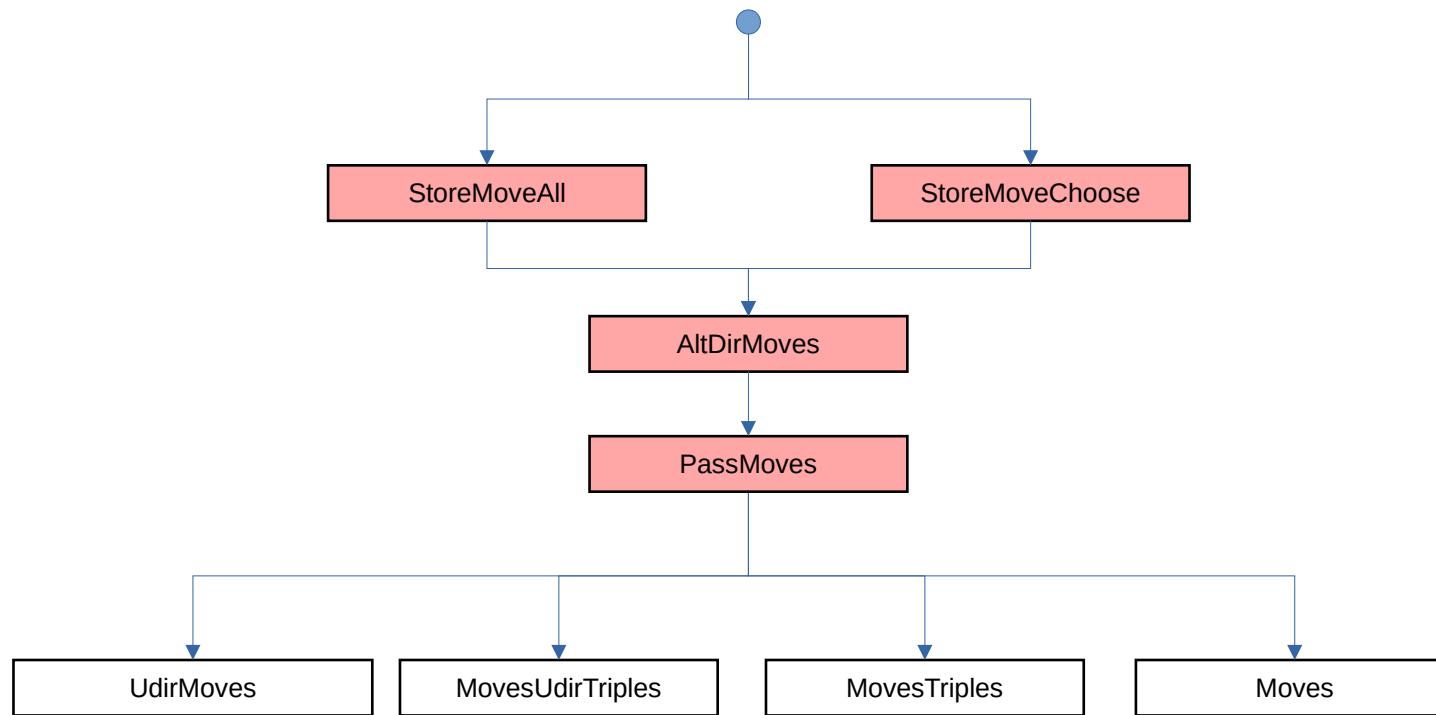


## Notes:

Some allow rule decos are shown more than once for clarity.

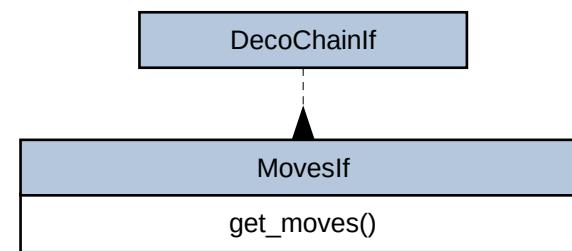
\* Simulates some portion of moves to determine allowables

# Get Moves Decorators and Chain

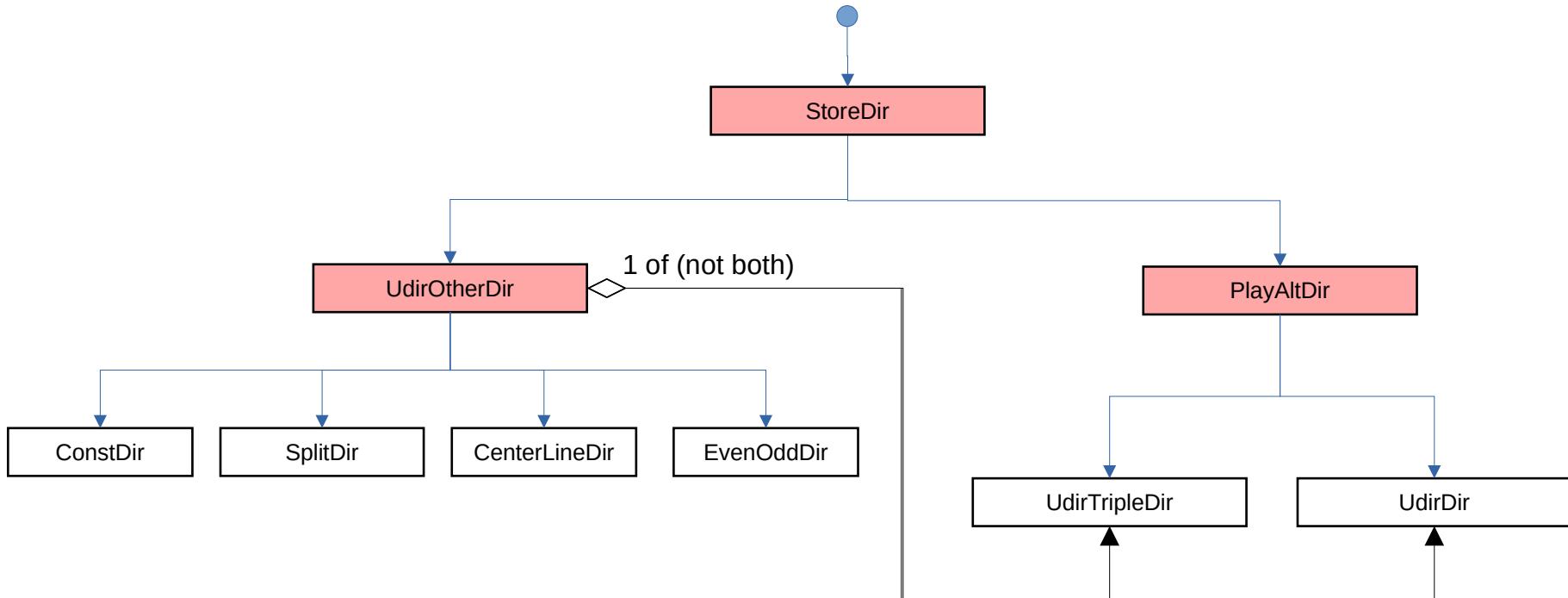


State variables read:  
blocked  
board  
owner  
starter  
store  
turn

Parameters:  
mlength  
mustpass  
sow\_direct  
udir\_holes  
udirect

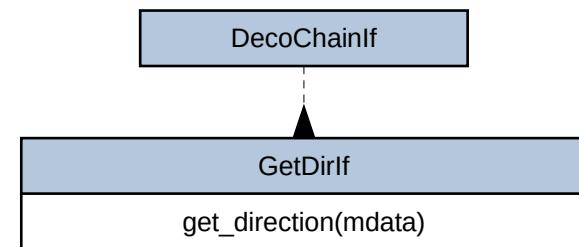


# Get Direction Decorators and Chain

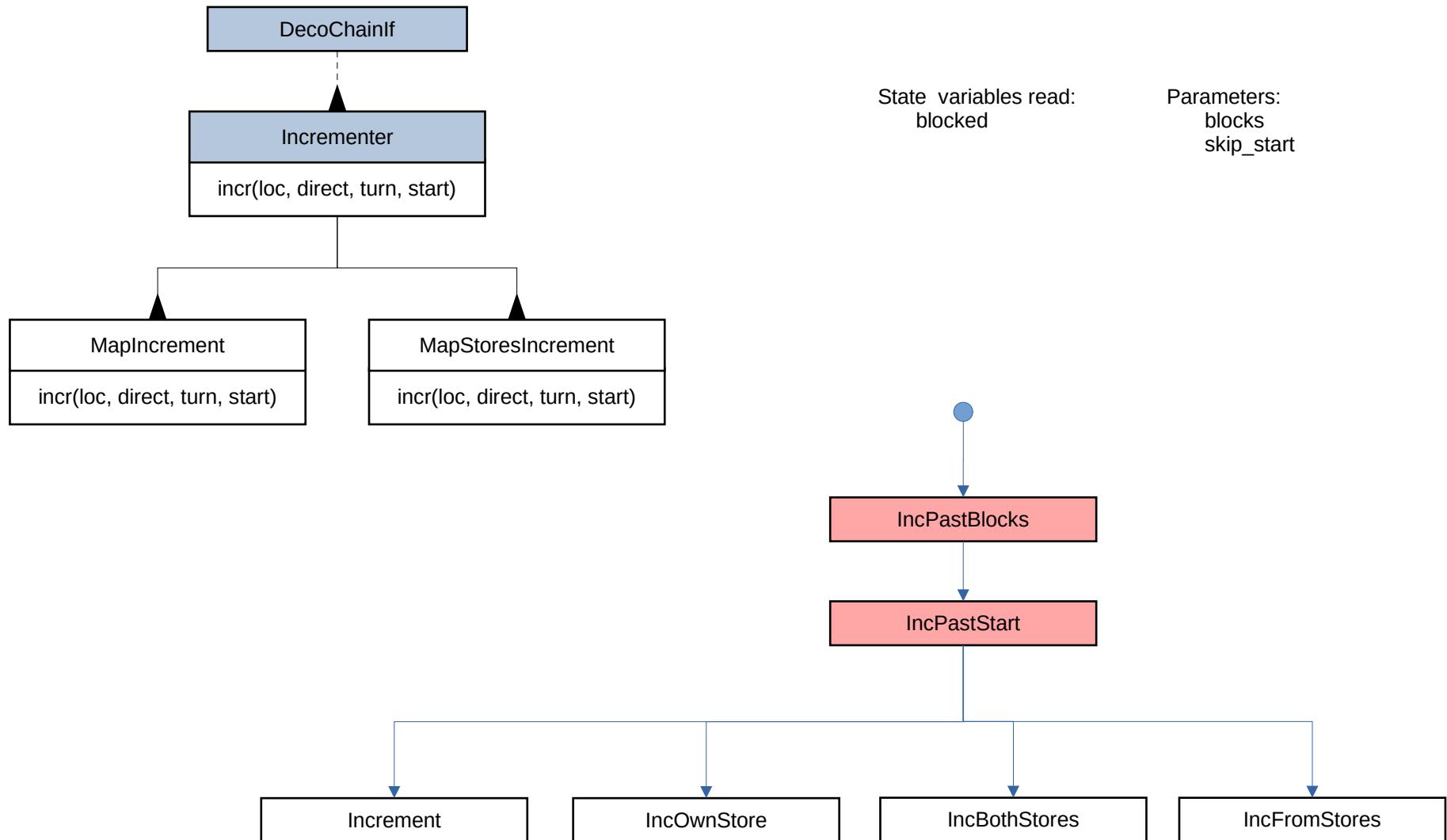


State variables read:  
mcount  
turn

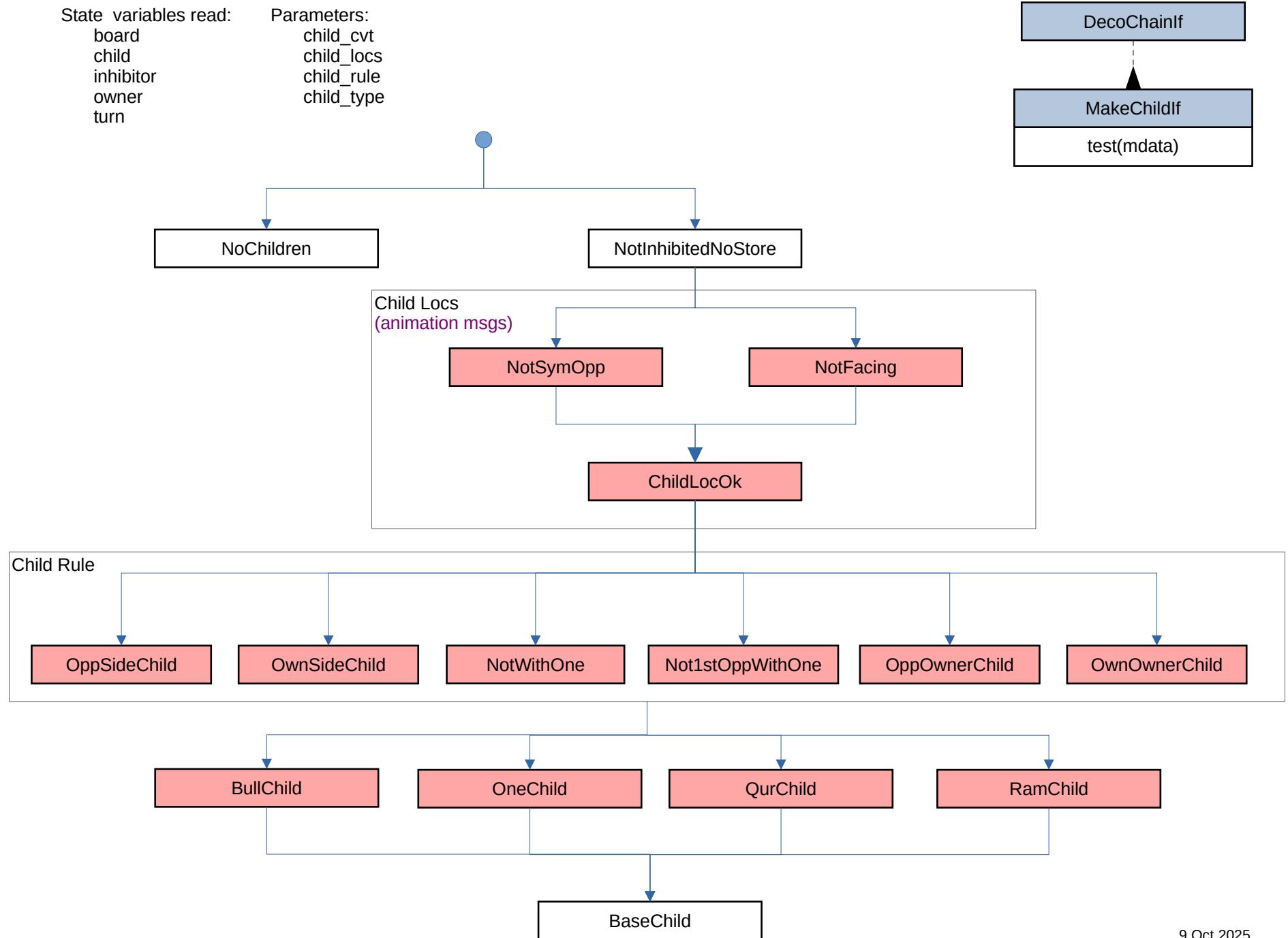
Parameters:  
no\_sides  
sow\_direct  
udir\_holes  
udirect



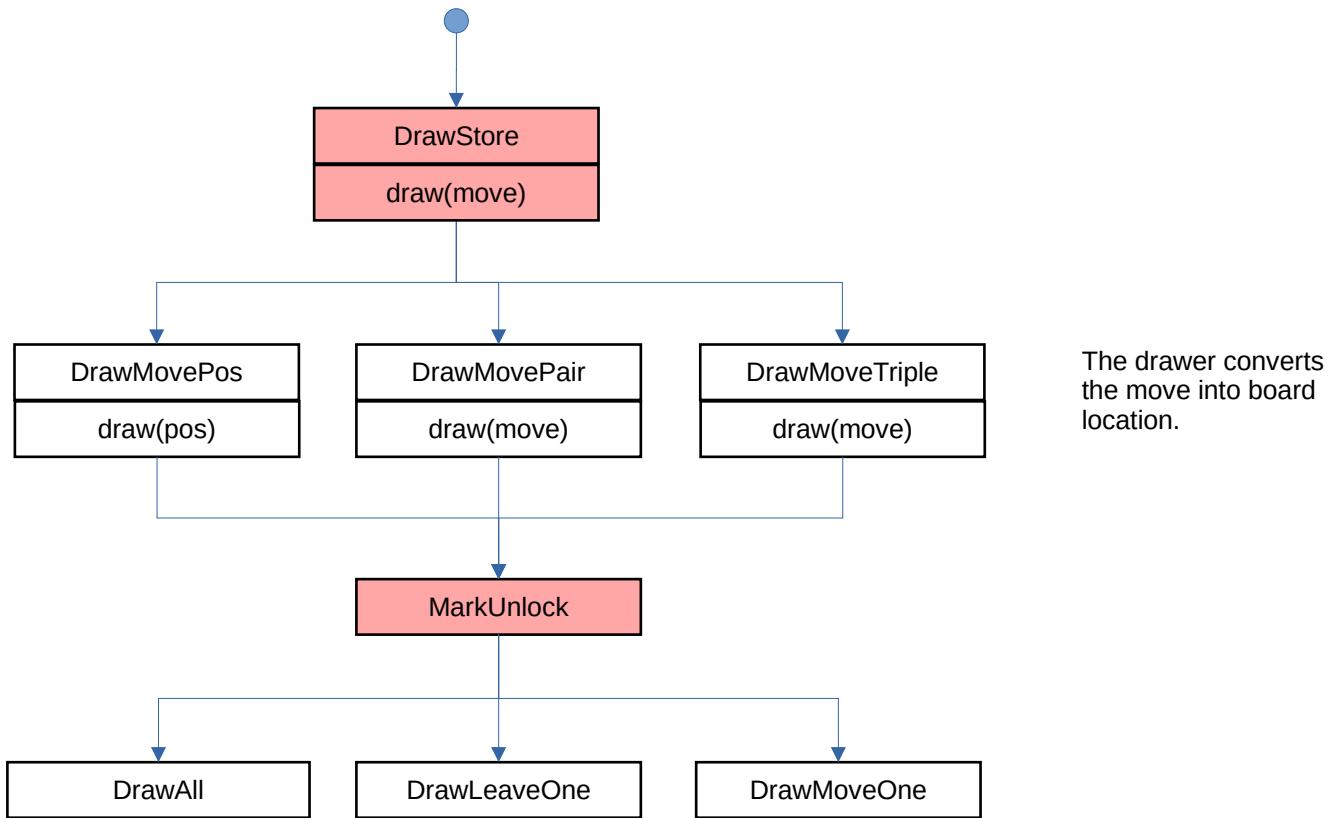
# Incrementer Decorators and Chains



# MakeChild Decorator and Chain

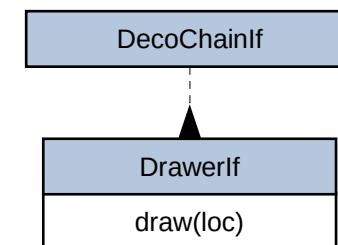


# Draw Decorators and Chain

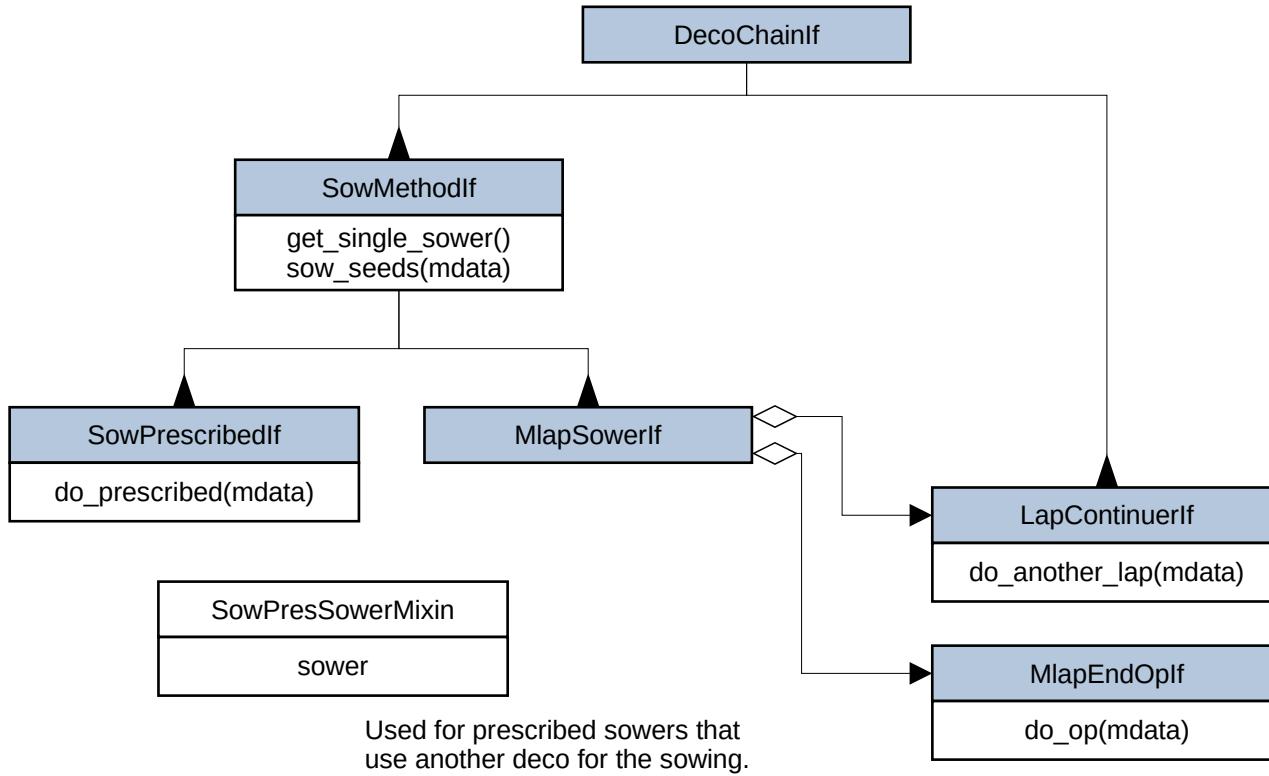


State variables:  
 Read:  
 turn  
 Changed:  
 board  
 unlocked

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



# Sower Decorators



State variables:

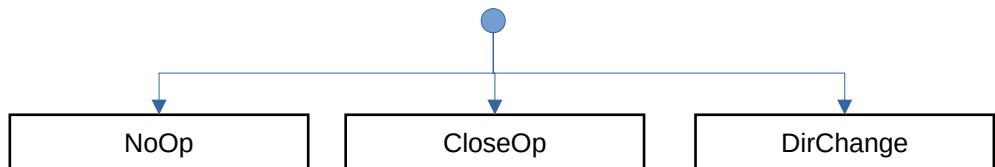
Reads  
inhibitor  
turn  
child  
mcount  
  
Changes  
board  
store  
blocked

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

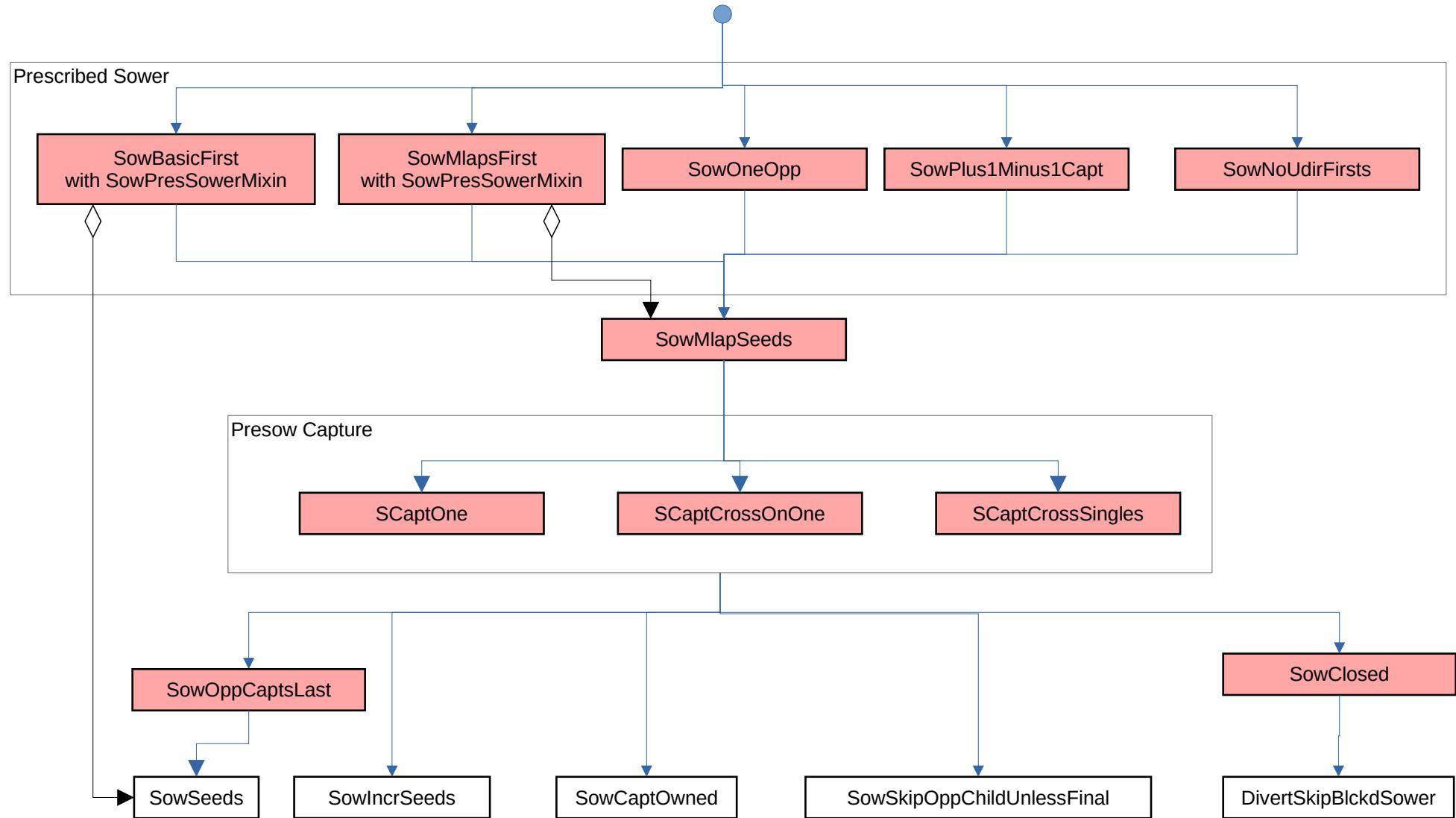
Mlap Op

Not a deco chain.

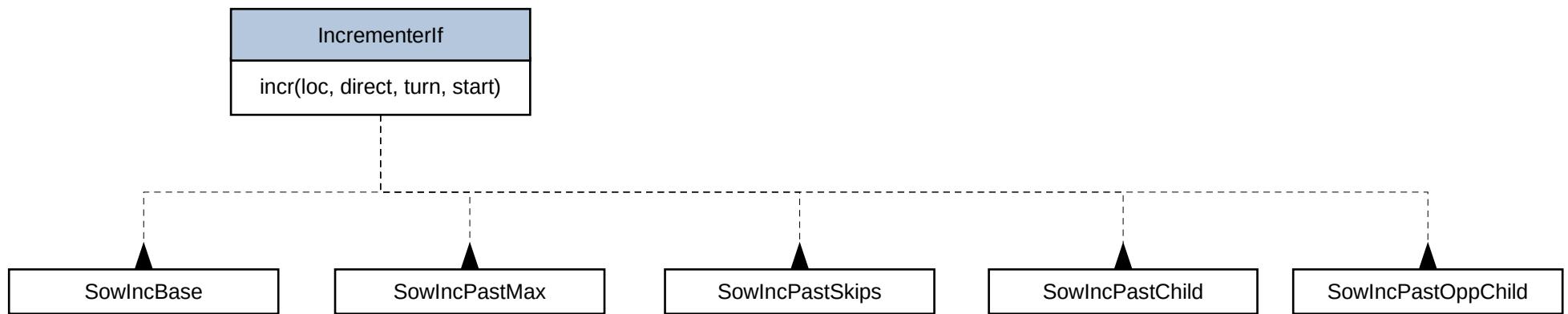


# Sower Deco Chain

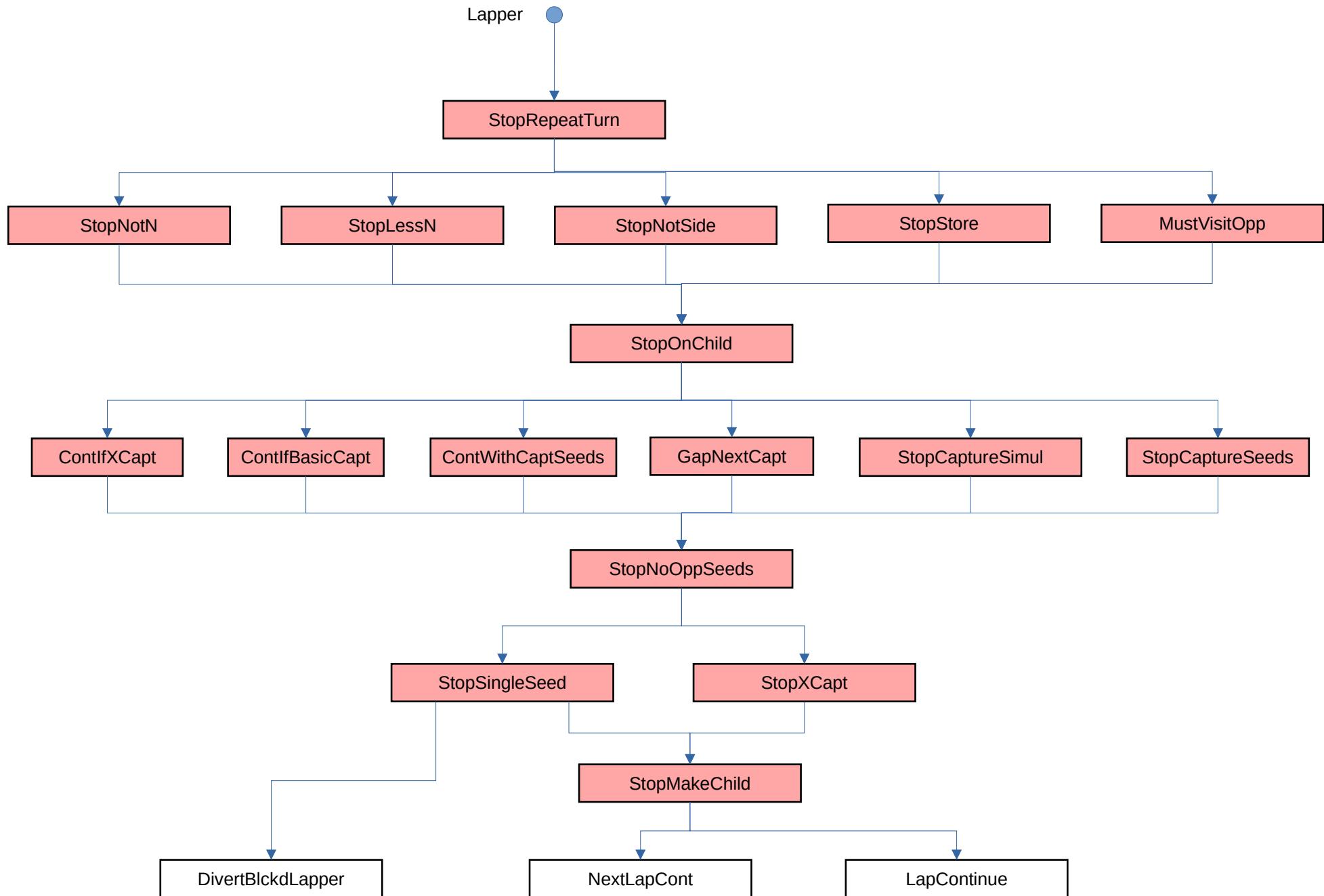
animation msgs



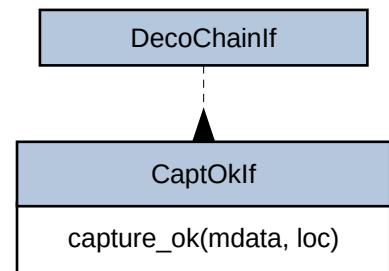
# Incrementer Decos used with SowIncrSeeds



# Lap Continuer Deco Chain and Mlap Operation



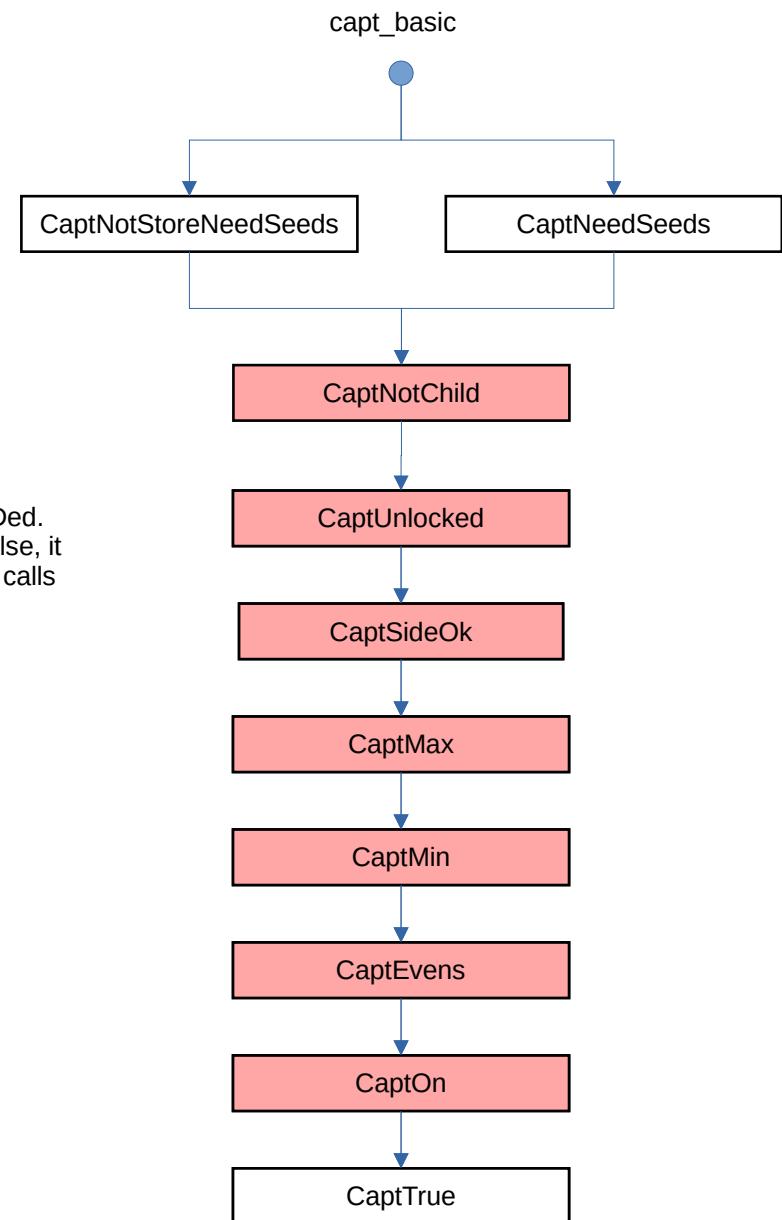
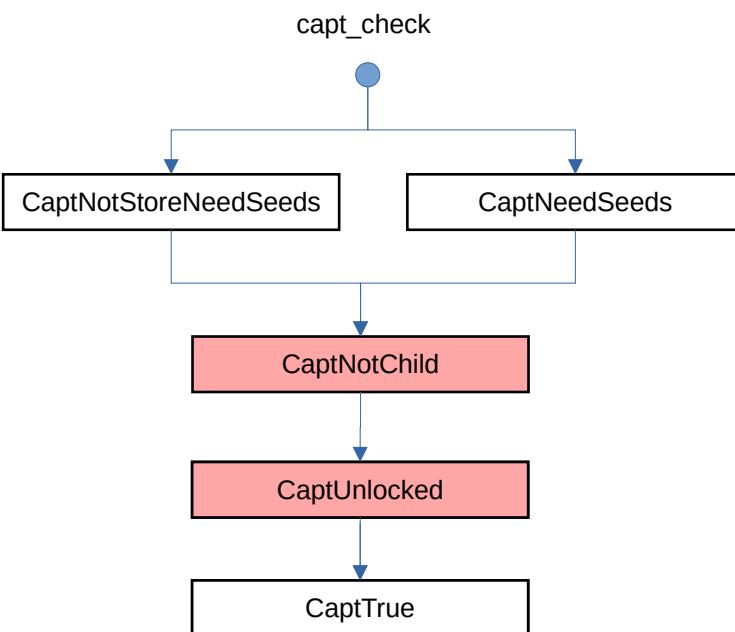
# Capt Ok Decorators and Chains



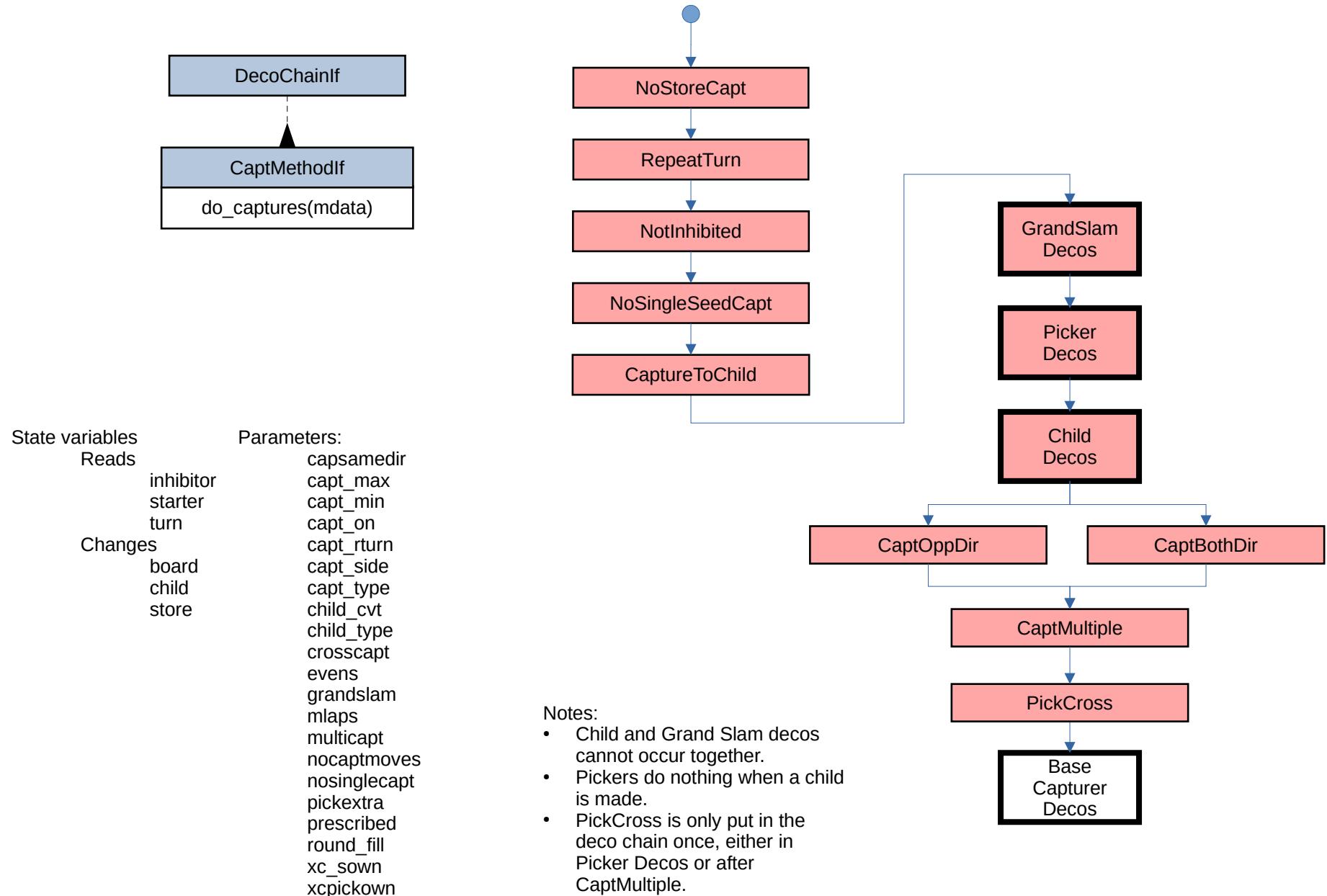
State variables read:  
 board  
 child  
 turn  
 unlocked

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

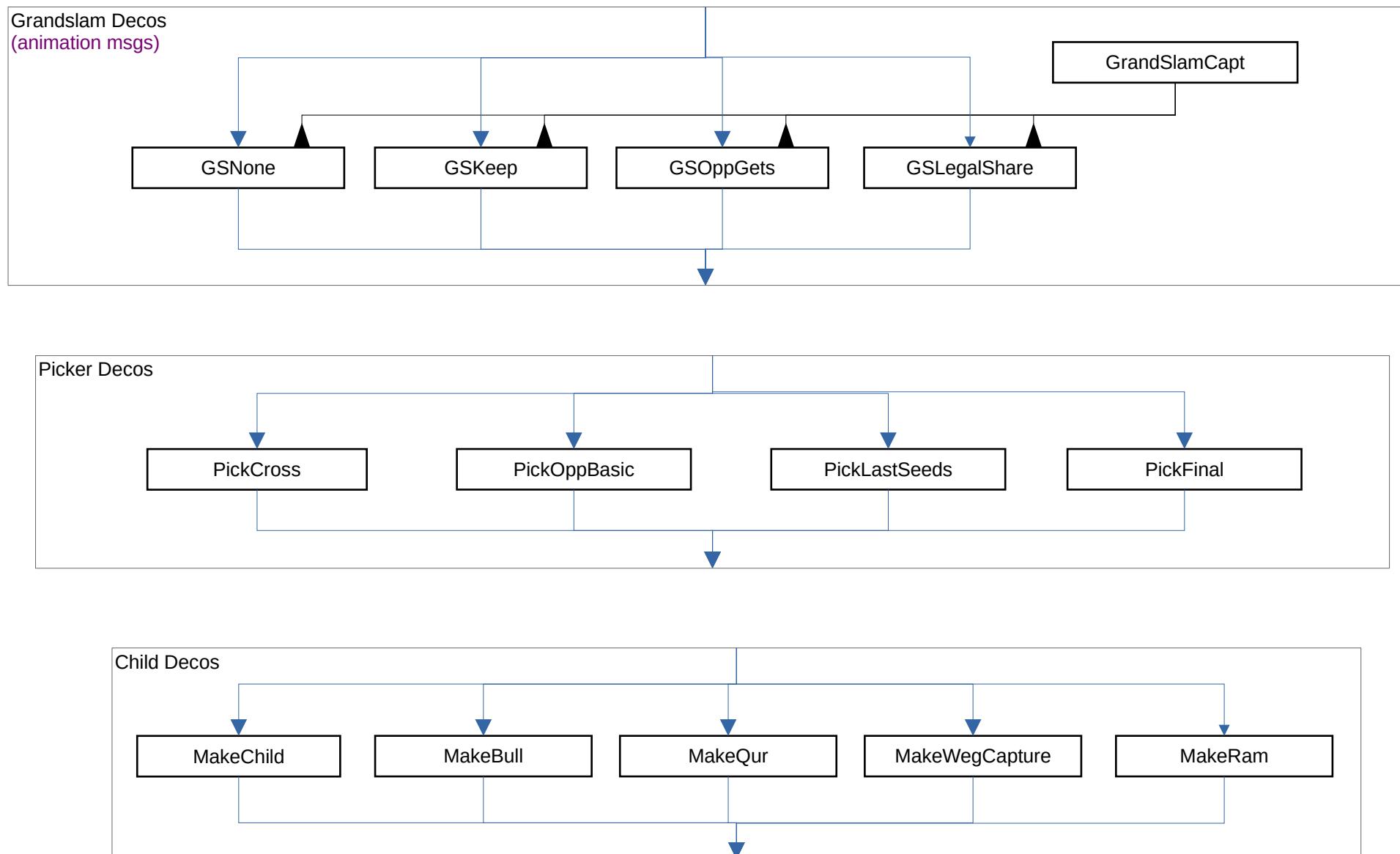
These are effectively ANDed.  
 If any deco condition is false, it returns false, otherwise it calls down the deco chain.



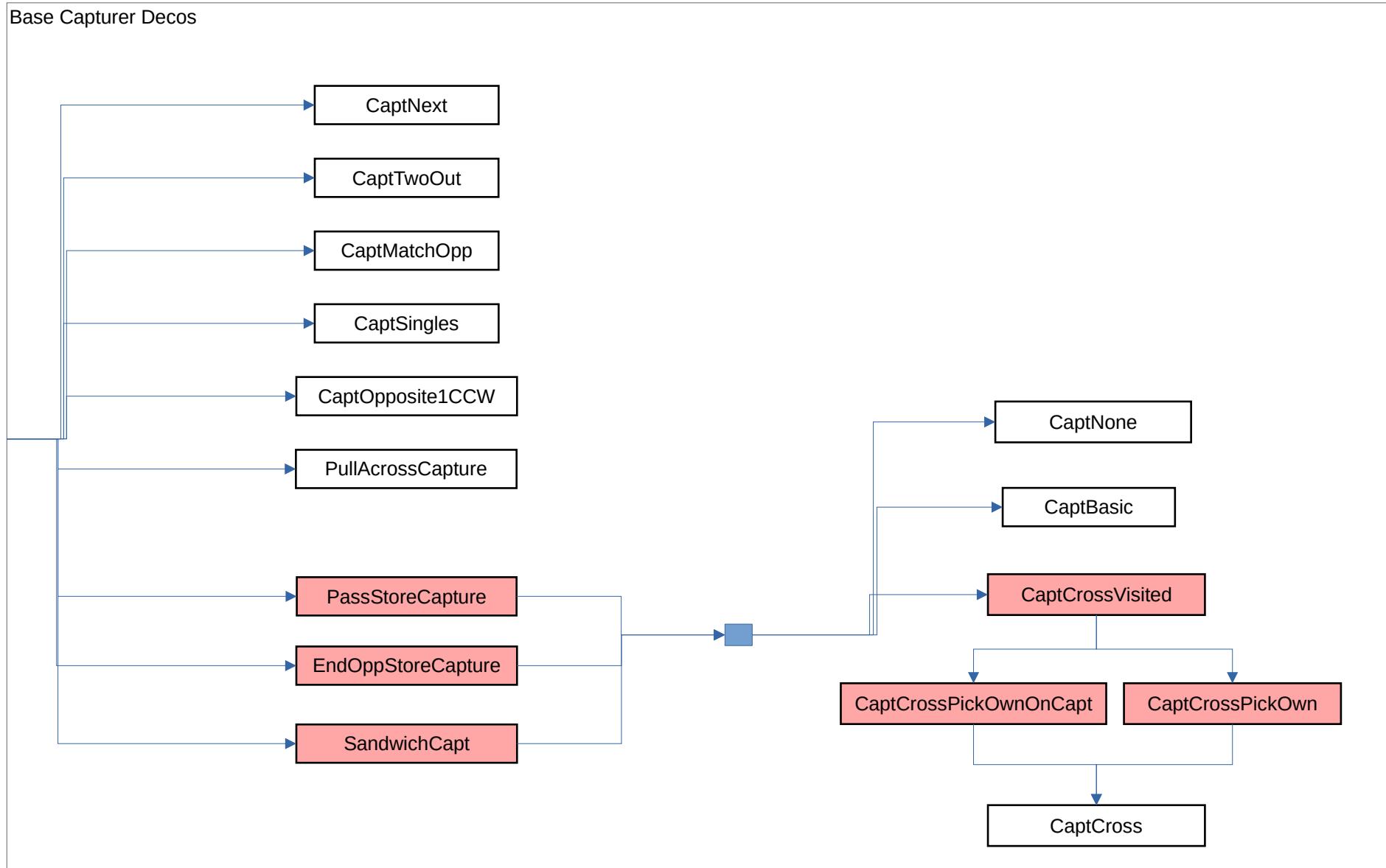
# Capturer Decorators and Chain



# Capturer Deco Chains (1 of 2)



# Capturer Deco Chains (2 of 2)



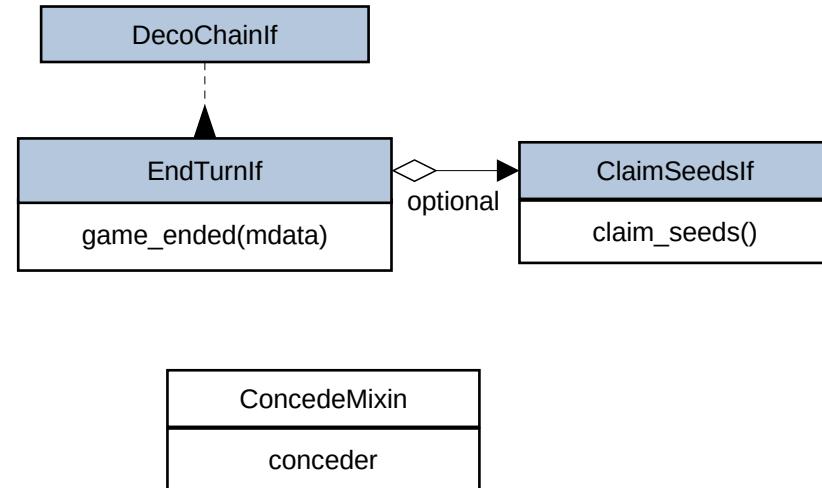
# Ender & Quiter Decorators and Chains

State variables:

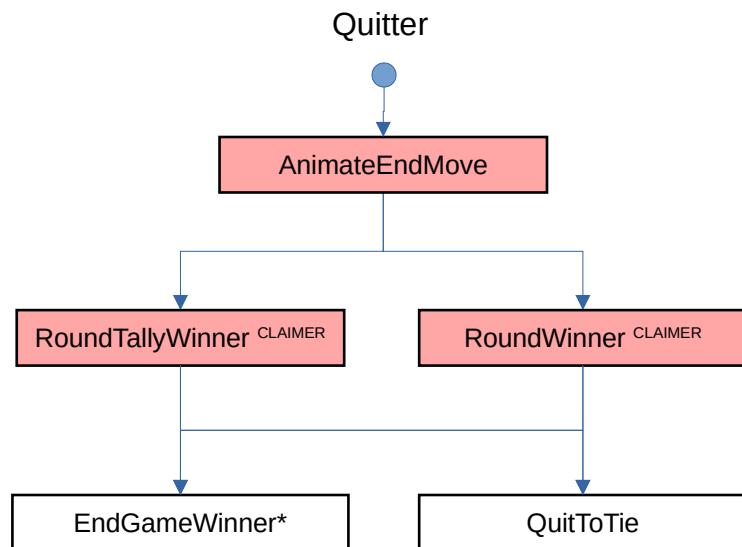
Reads:  
 child  
 owner  
 turn  
 Changes:  
 board  
 store

Parameters:

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



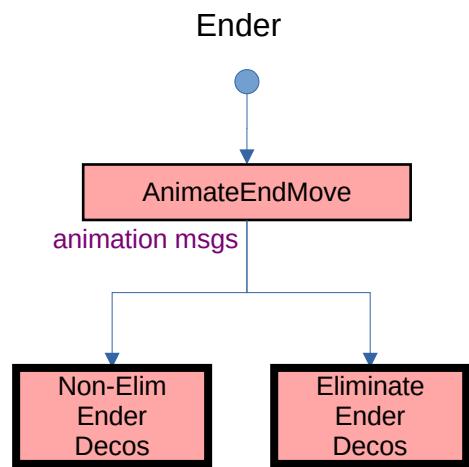
Used for enders that use a different criteria for ending when the user concedes a game.



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 Deco Chain



CLAIMER: counts owned seeds but does not move them:

- ClaimSeeds
- ChildClaimSeeds
- ClaimOwnSeeds
- ClaimBoardSeeds

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

- TakeOwnSeeds
- TakeOnlyChildNStores
- TakeAllUnclaimed

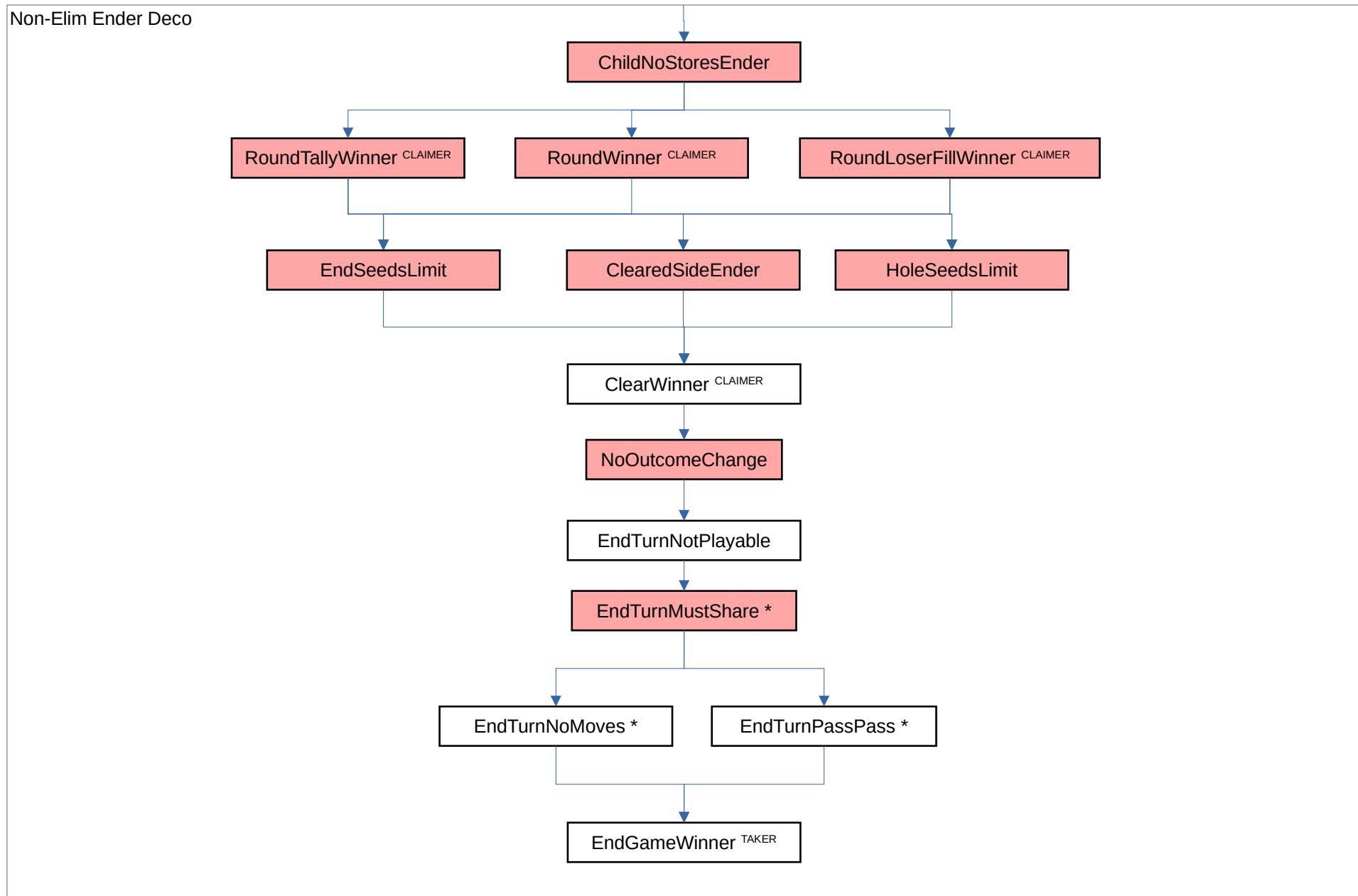
DIVVY: unclaimed seeds are split between players:

- DivvySeedsStores
- DivvySeedsChildOnly

Note:

- \* Uses get\_allowable\_holes

# Non-Eliminate Ender Deco Chain



# Eliminate Ender Deco Chains

