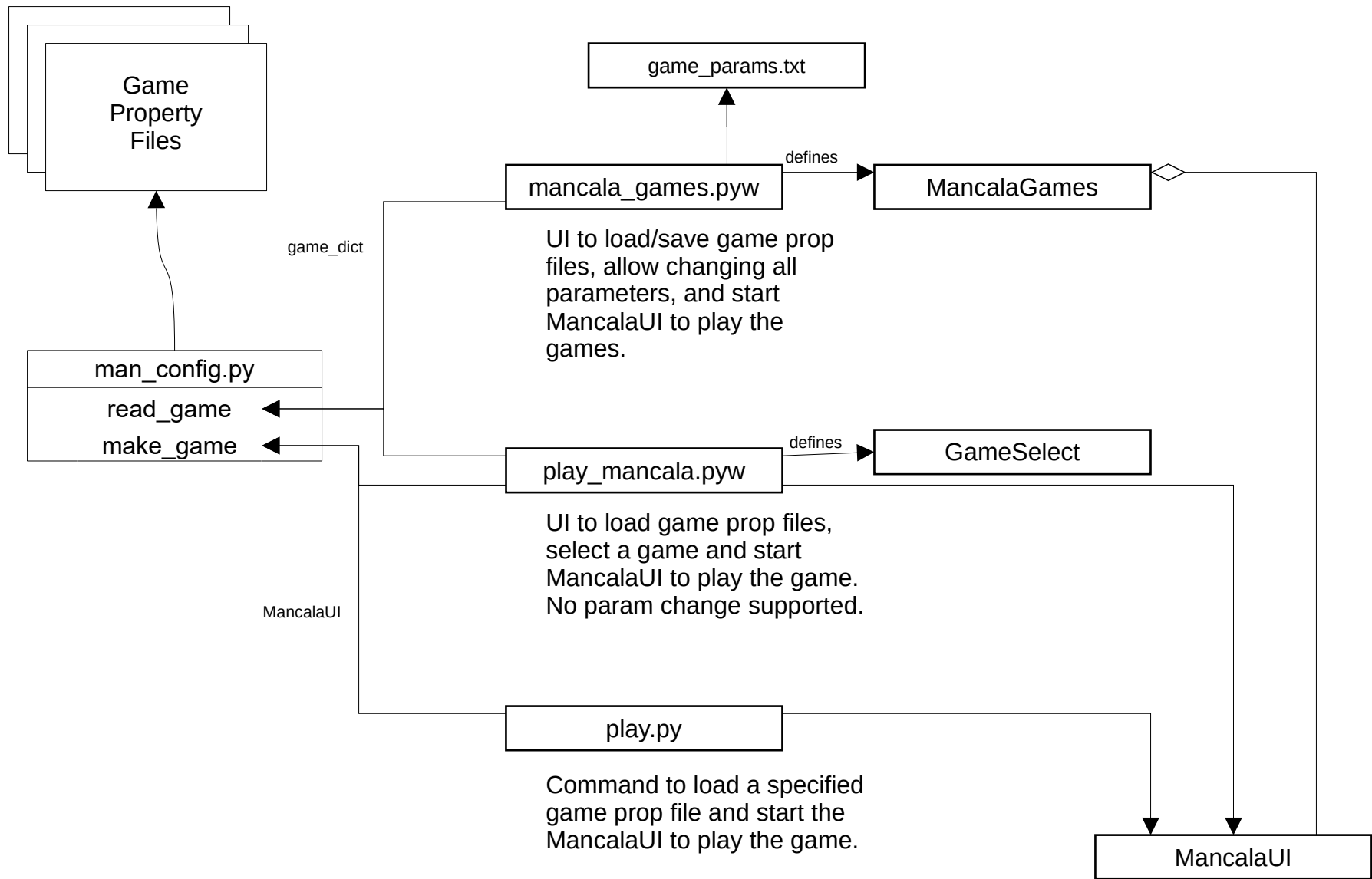
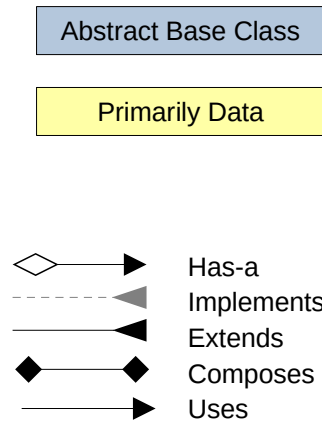


# Mancala Games



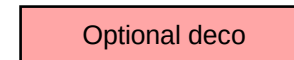
# Notation Conventions

## Class Diagram Conventions

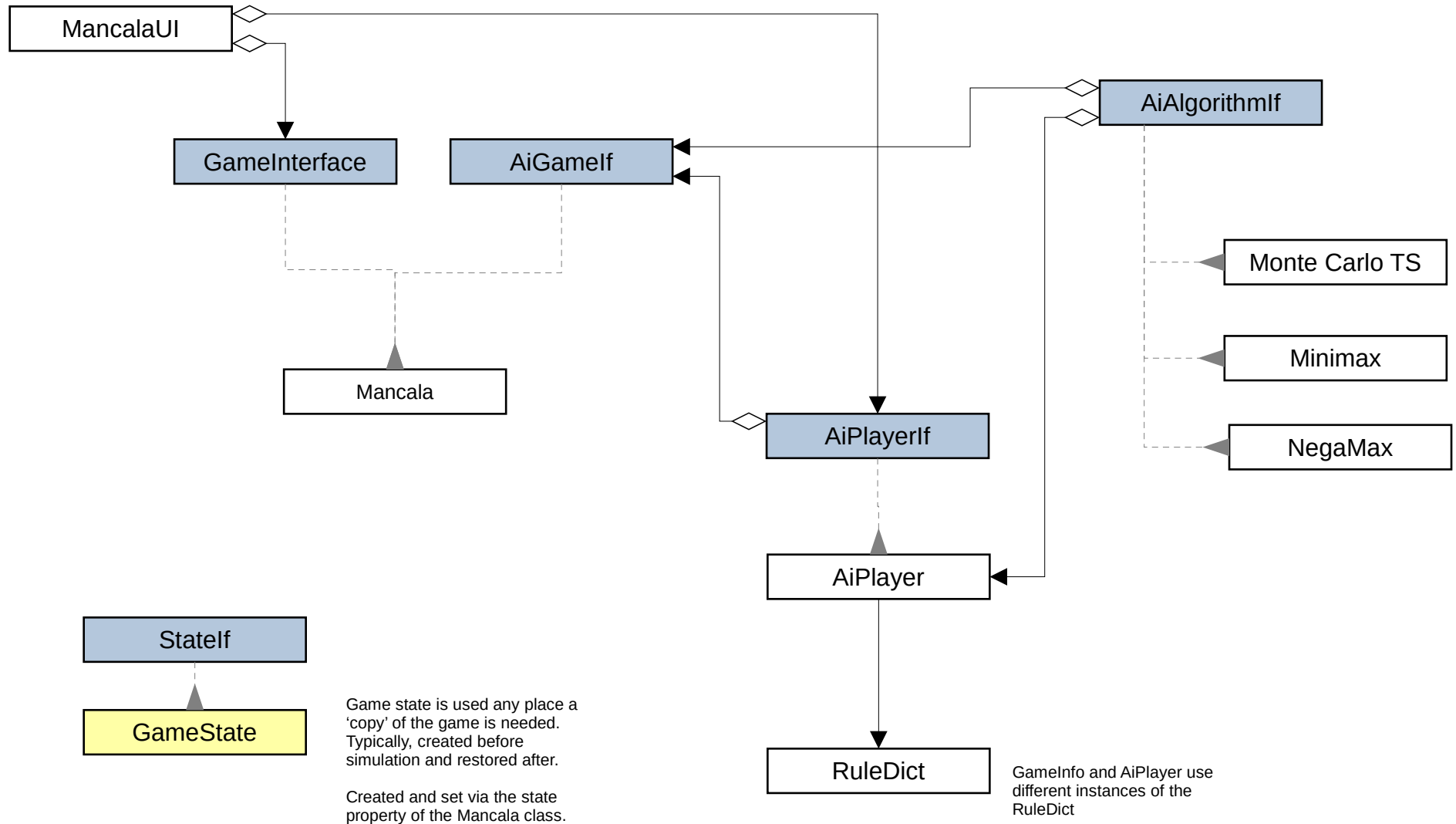


## Deco Chain Conventions

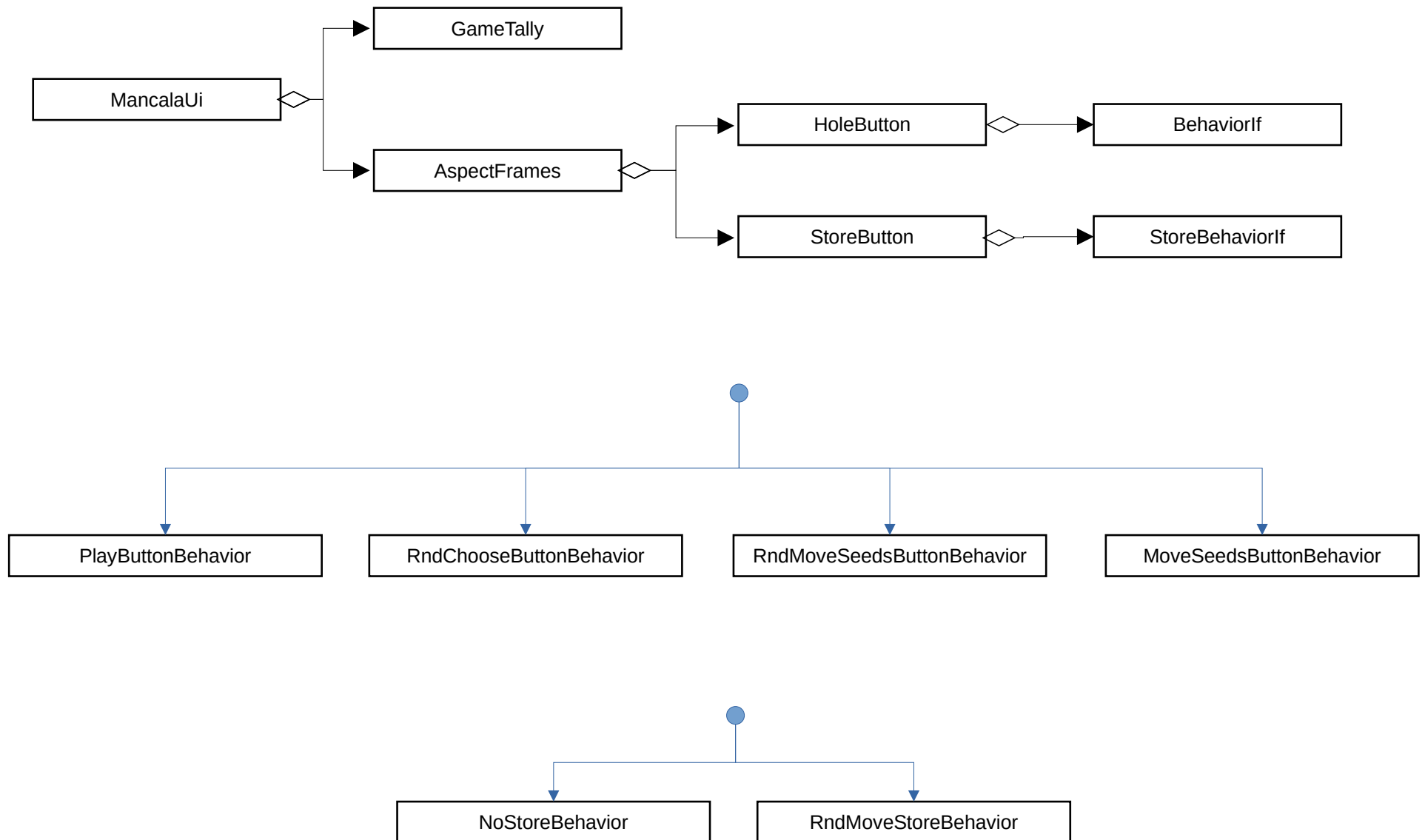
- One path down the deco chain is used.
- Intersecting arrows are decision points.
- Shown in **call order** from start dot (constructed in reverse order). Calls down the deco chain maybe at any point in a deco's processing.
- All paths shown might not be possible (see ginfo\_rules).



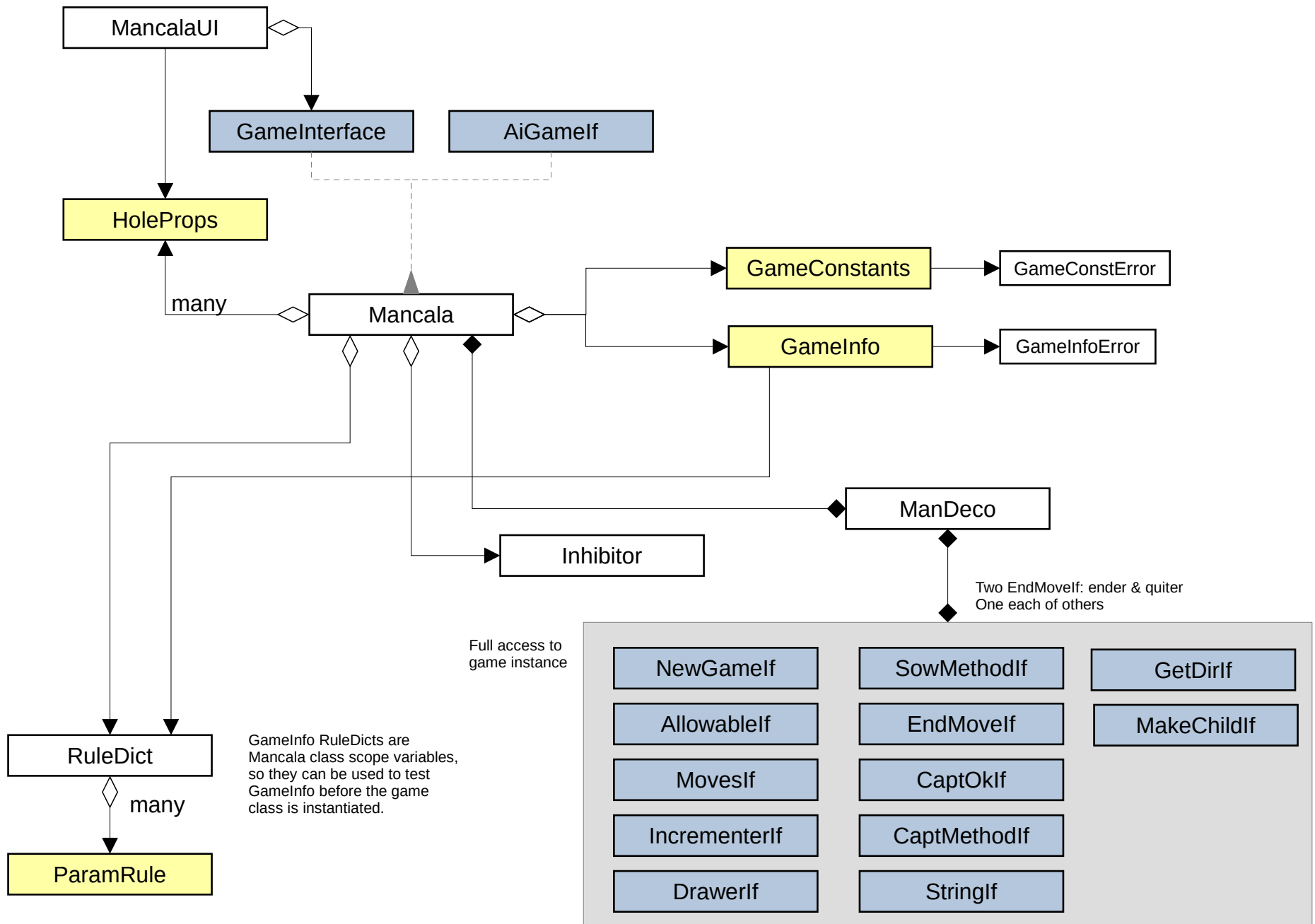
# Mancala, GameState, AIPlayer and AIAlgorithm



# Mancala UI Classes



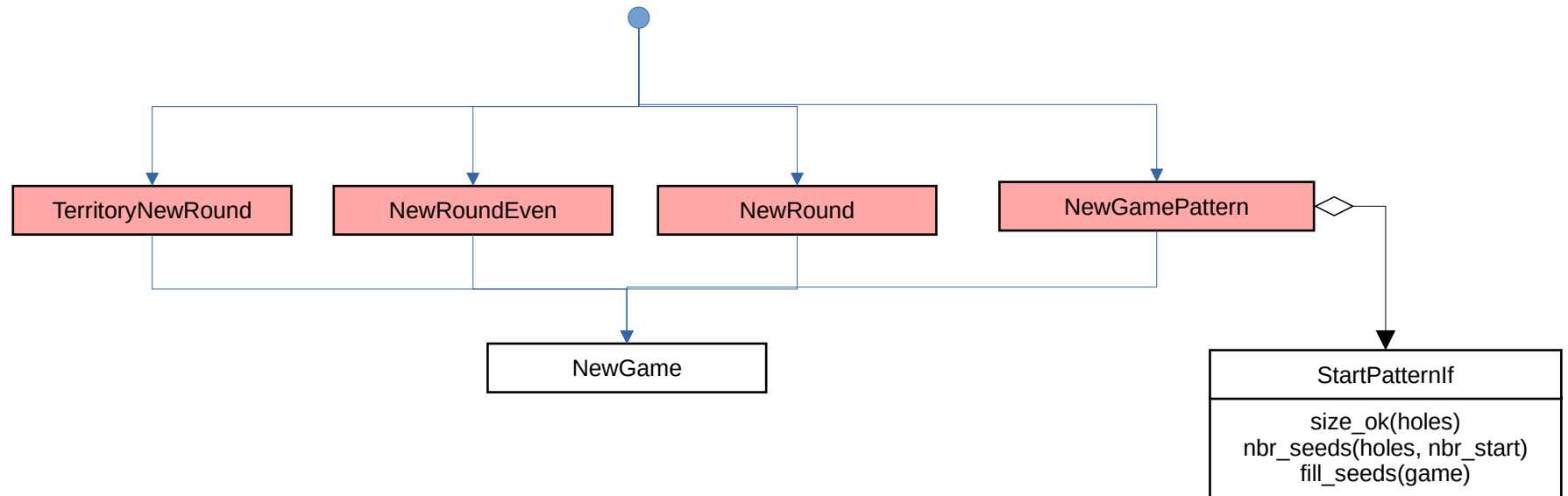
# Mancala Classes



# 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	incr, make_child, inhibitor	Drop the seeds into the board holes.
Capture seeds	capturer & capt_ok	incr, make_child, inhibitor	Perform any captures.
Evaluate end of game	ender		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

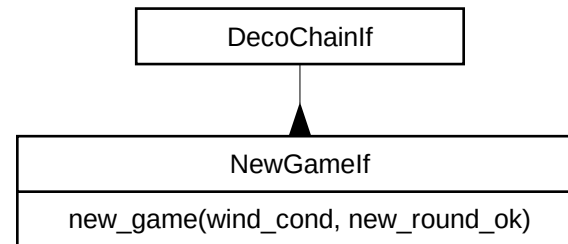


State variables changed:

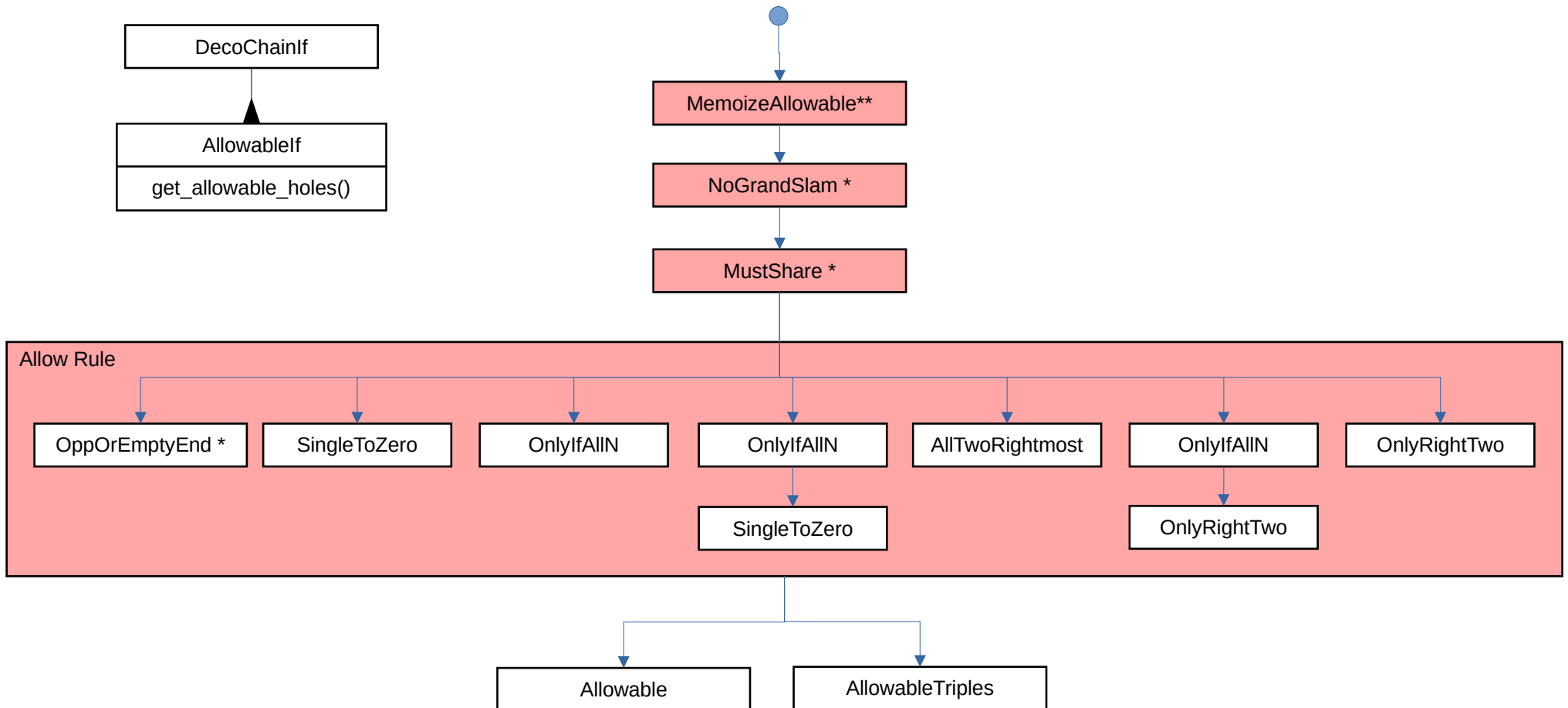
blocked  
board  
owner  
starter  
store  
turn

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

Notes:

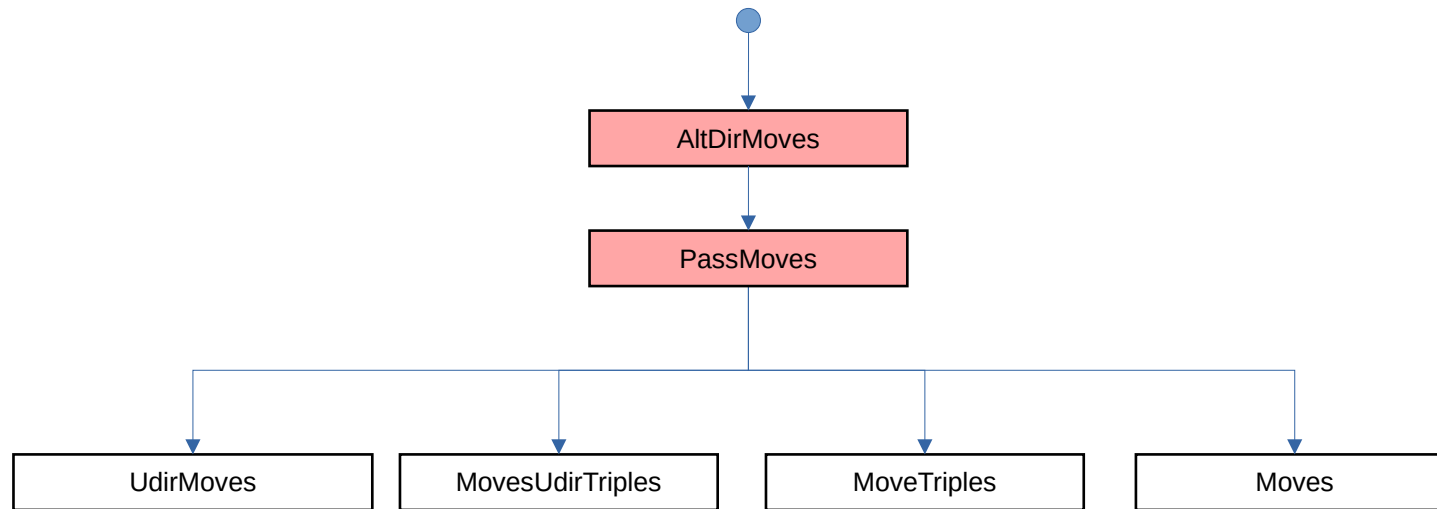
Some allow rule decos are shown more than once for clarity.

\* Simulates some portion of moves to determine allowables

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



# Get Moves Decorators and Chain

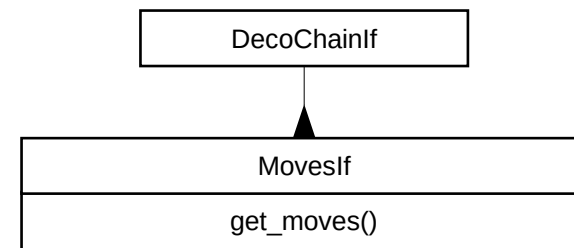


State variables read:

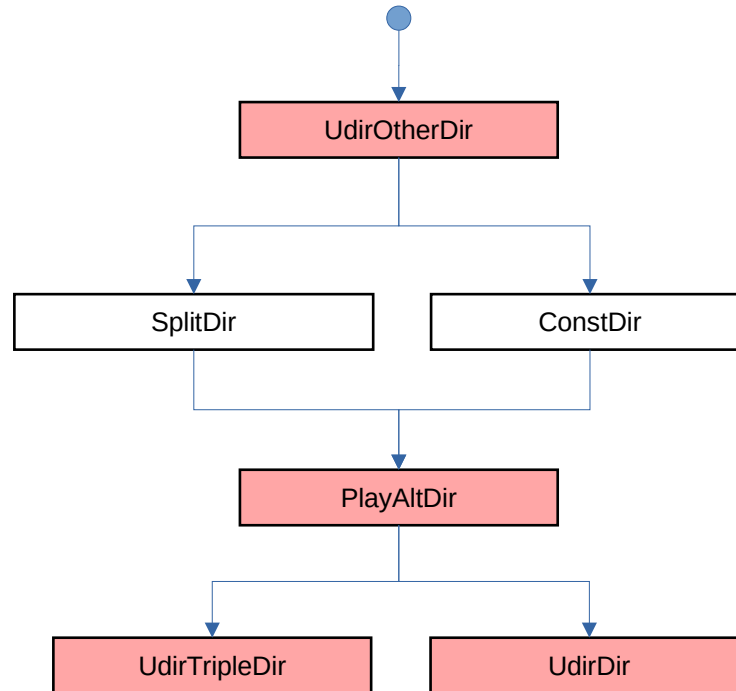
blocked  
board  
owner  
starter  
store  
turn

Parameters:

mlength  
mustpass  
sow\_direct  
udir\_holes  
udirect

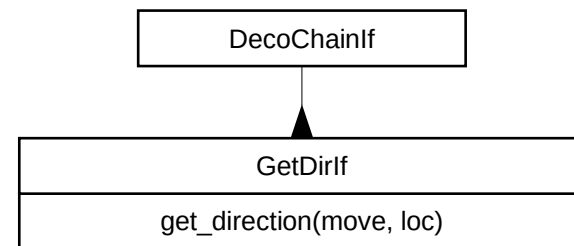


# Get Direction Decorators and Chain

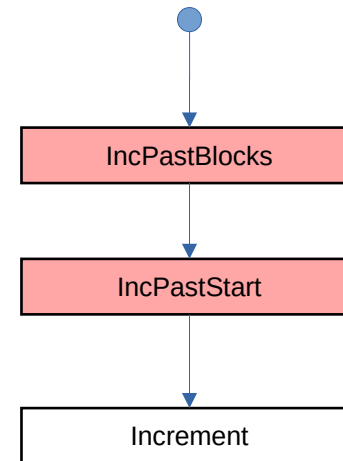
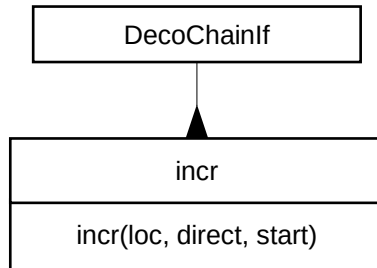


State variables read:  
mcount  
turn

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



# Incrementer Decorators and Chains



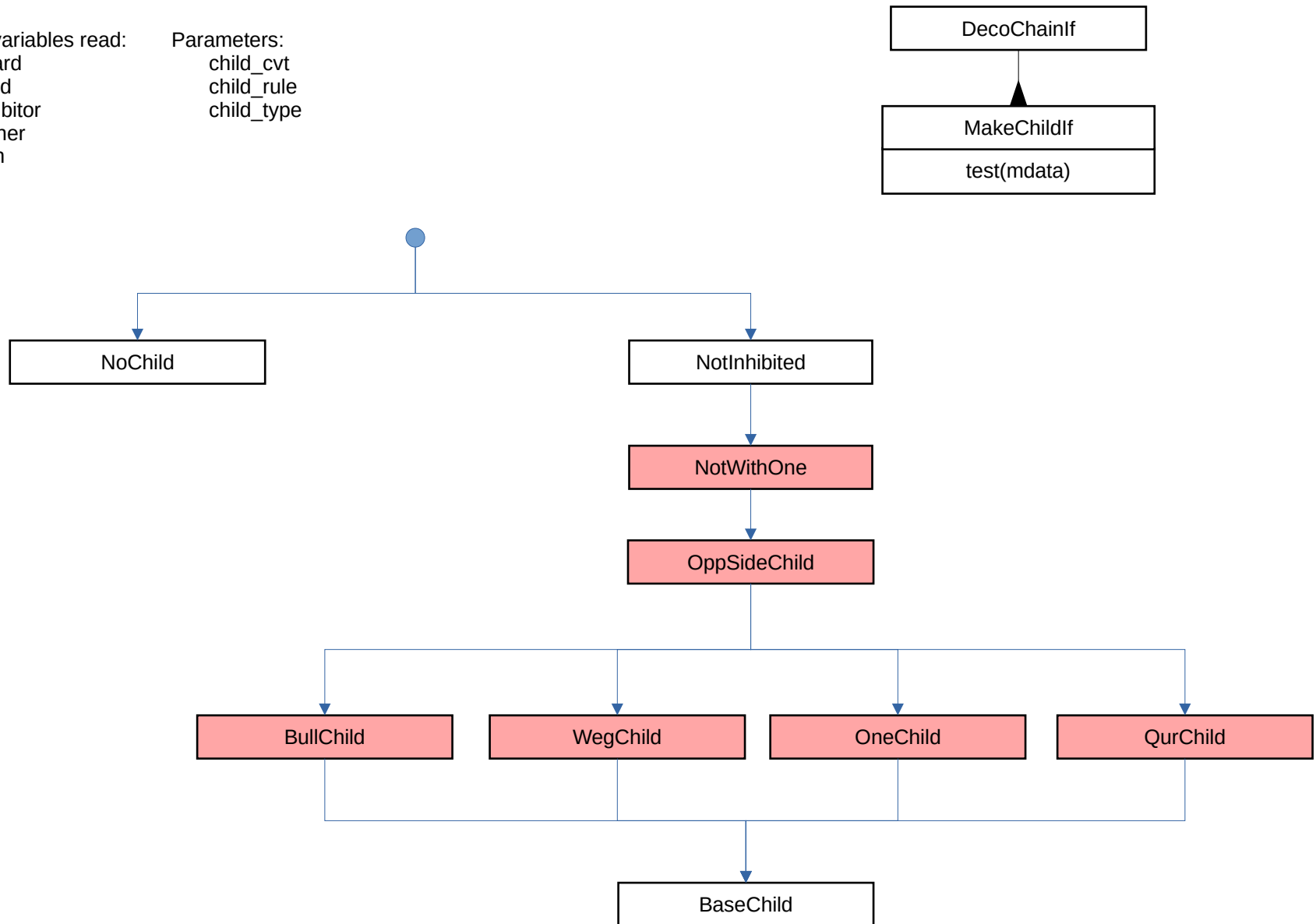
State variables read:  
blocked

Parameters:  
blocks  
skip\_start

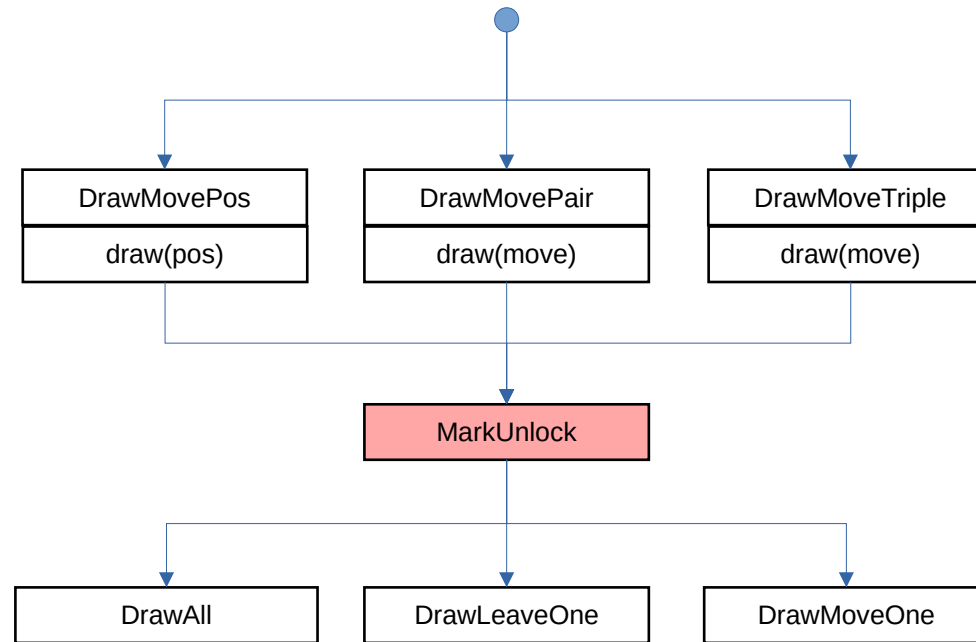
# MakeChild Decorator and Chain

State variables read:  
board  
child  
inhibitor  
owner  
turn

Parameters:  
child\_cvt  
child\_rule  
child\_type



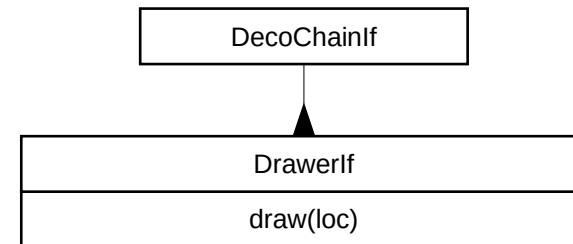
# Draw Decorators and Chain



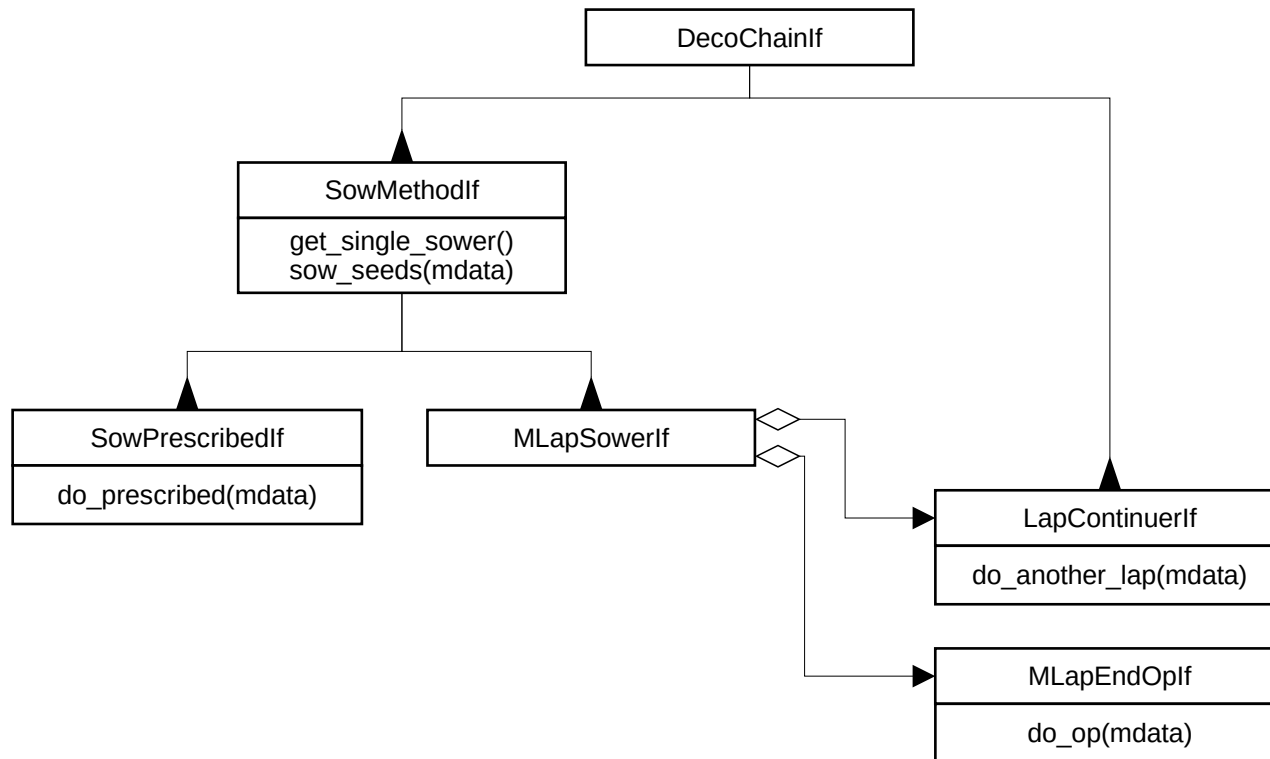
The first drawer converts the move into board location.

State variables:  
Read:  
    turn  
Changed:  
    board  
    unlocked

Parameters:  
    mlength  
    move\_one  
    moveunlock  
    sow\_start



# Sower Decorators



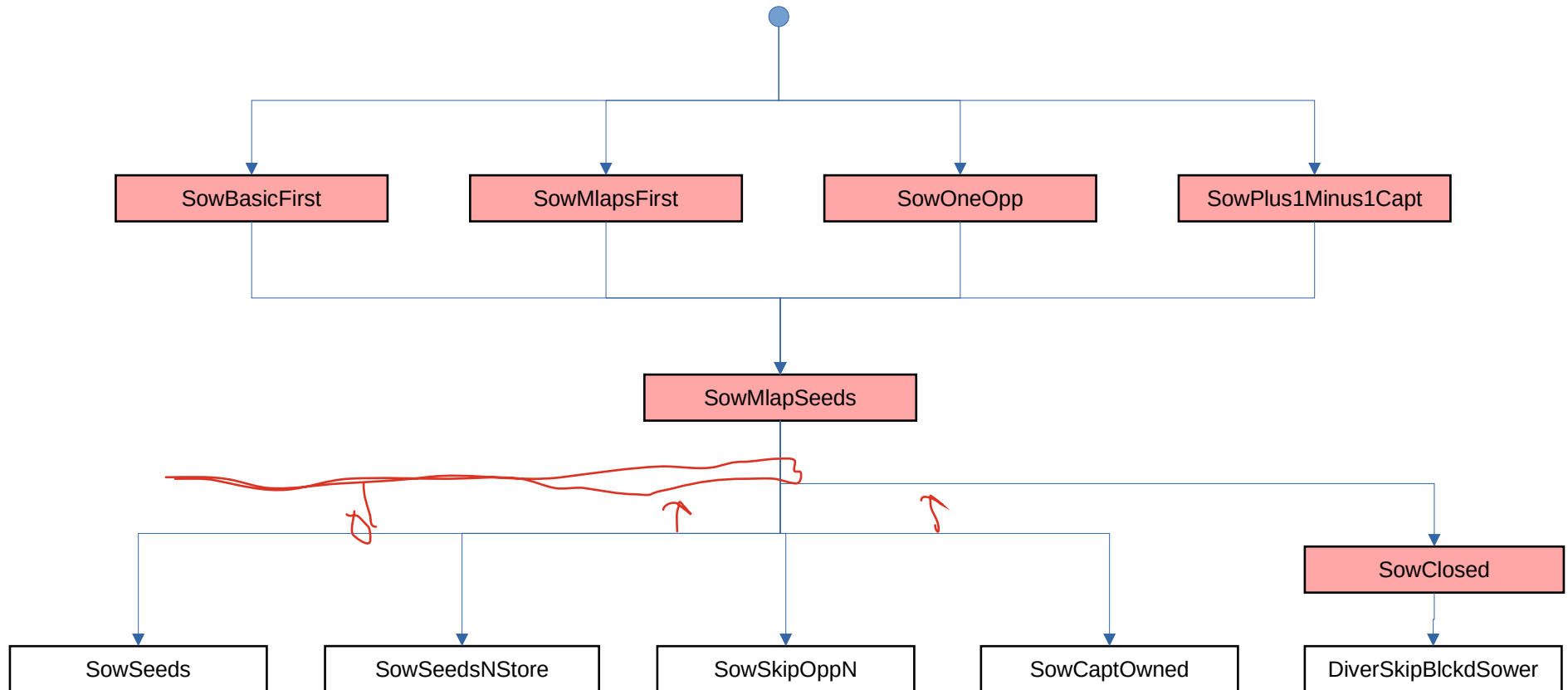
State variables:

Reads  
inhibitor  
turn  
child  
mcount  
Changes  
board  
store  
blocked

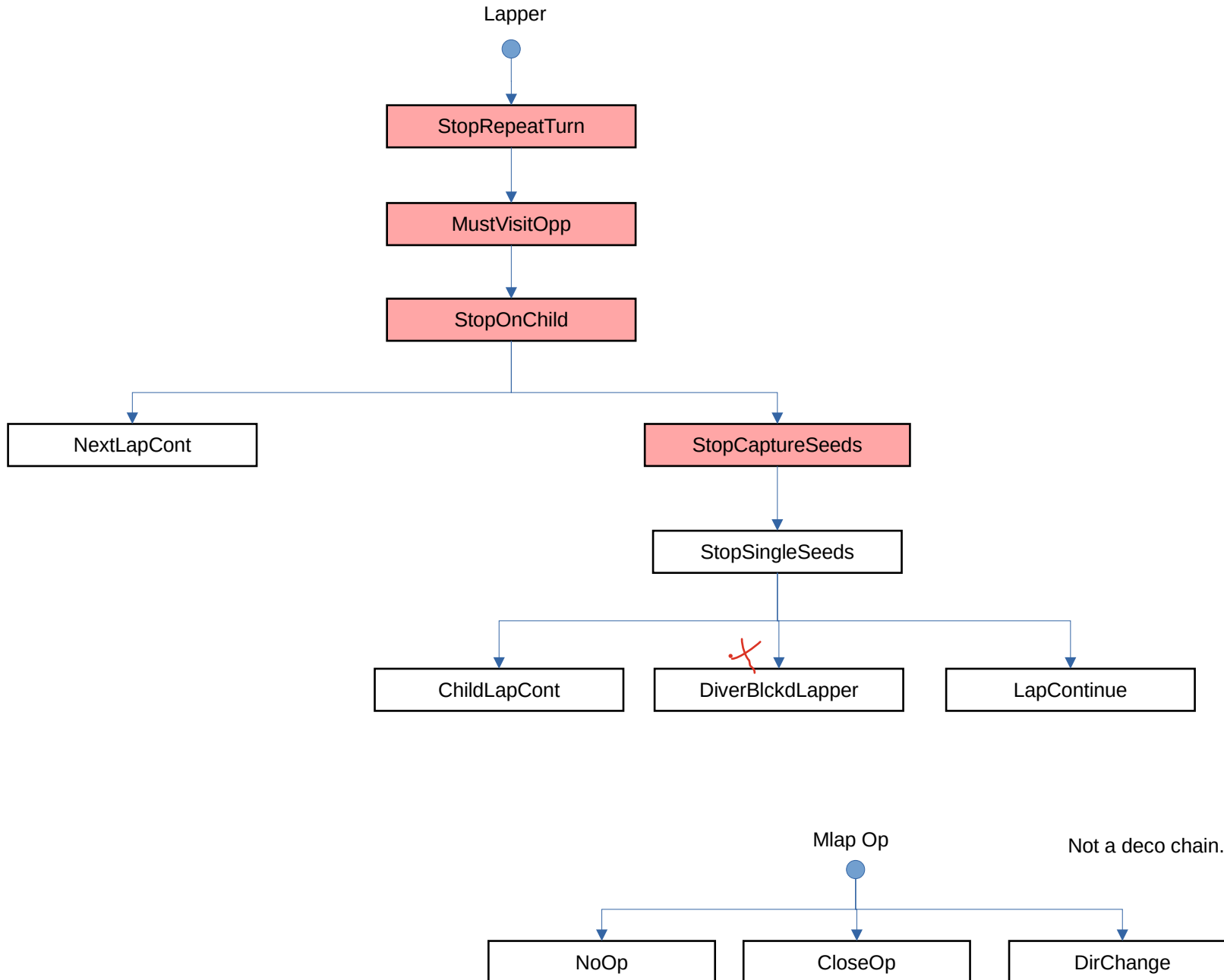
Parameters:

capt\_max  
capt\_min  
capt\_on  
child\_type  
crosscapt  
evens  
goal  
gparam\_one  
mlaps  
prescribed  
sow\_direct  
sow\_own\_store  
sow\_rule  
visit\_opp

# Sower Deco Chain

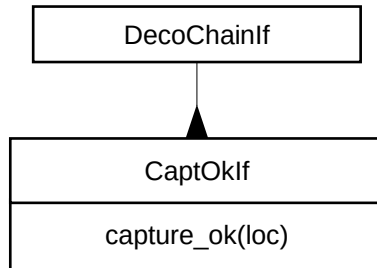


# Lap Continuer Deco Chain and Mlap Operation



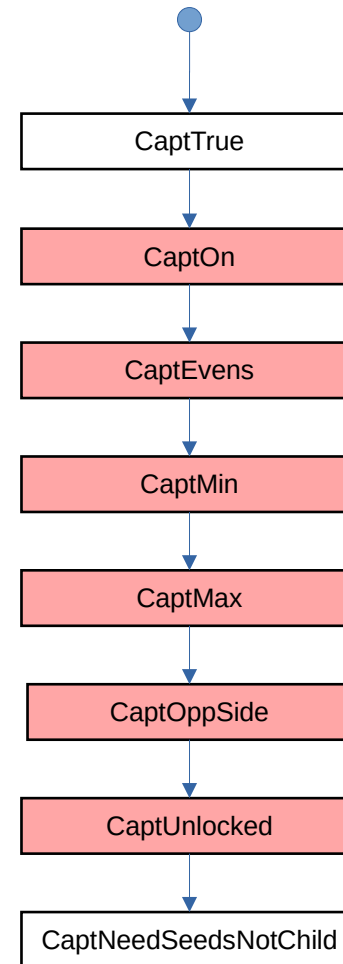


# Capt Ok Decorators and Chains



State variables read:  
board  
child  
turn  
unlocked

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



# Capturer Decorators

State variables

Reads

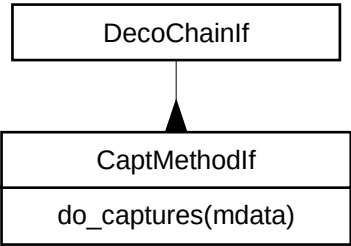
inhibitor  
starter  
turn

Changes

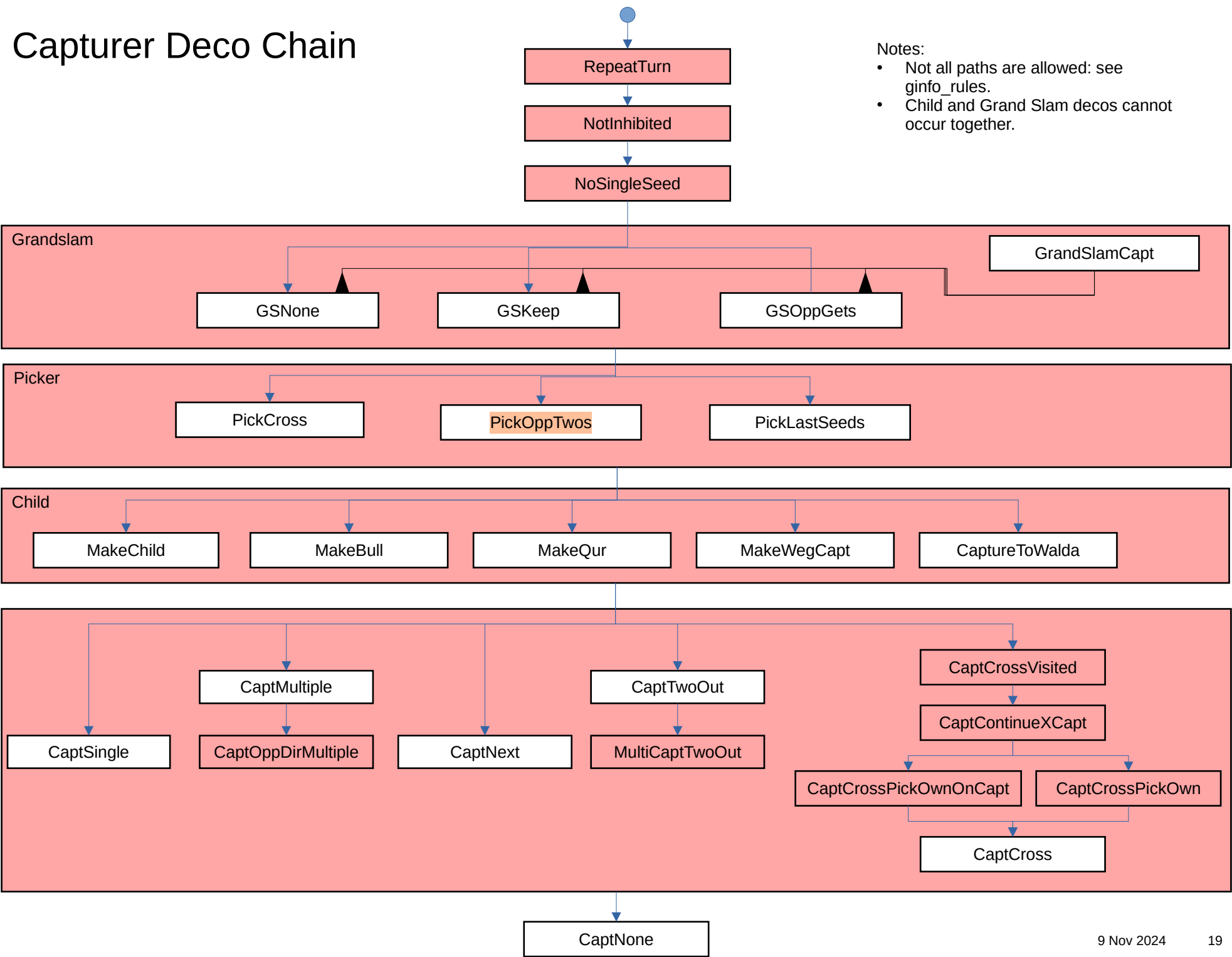
board  
child  
store

Parameters:

capsamedir  
capt\_max  
capt\_min  
capt\_next  
capt\_on  
capt\_rturn  
capttwoout  
child\_cvt  
child\_type  
crosscapt  
evens  
grandslam  
mlaps  
multicapt  
nocaptfirst  
nosinglecapt  
oppsidecapt  
pickextra  
prescribed  
round\_fill  
xc\_sown  
xcpickown



# Capturer Deco Chain



- Notes:
- Not all paths are allowed: see ginfo\_rules.
  - Child and Grand Slam decos cannot occur together.

# Ender & Quitter Decorators and Chains

State variables:

Reads:

child  
owner  
turn

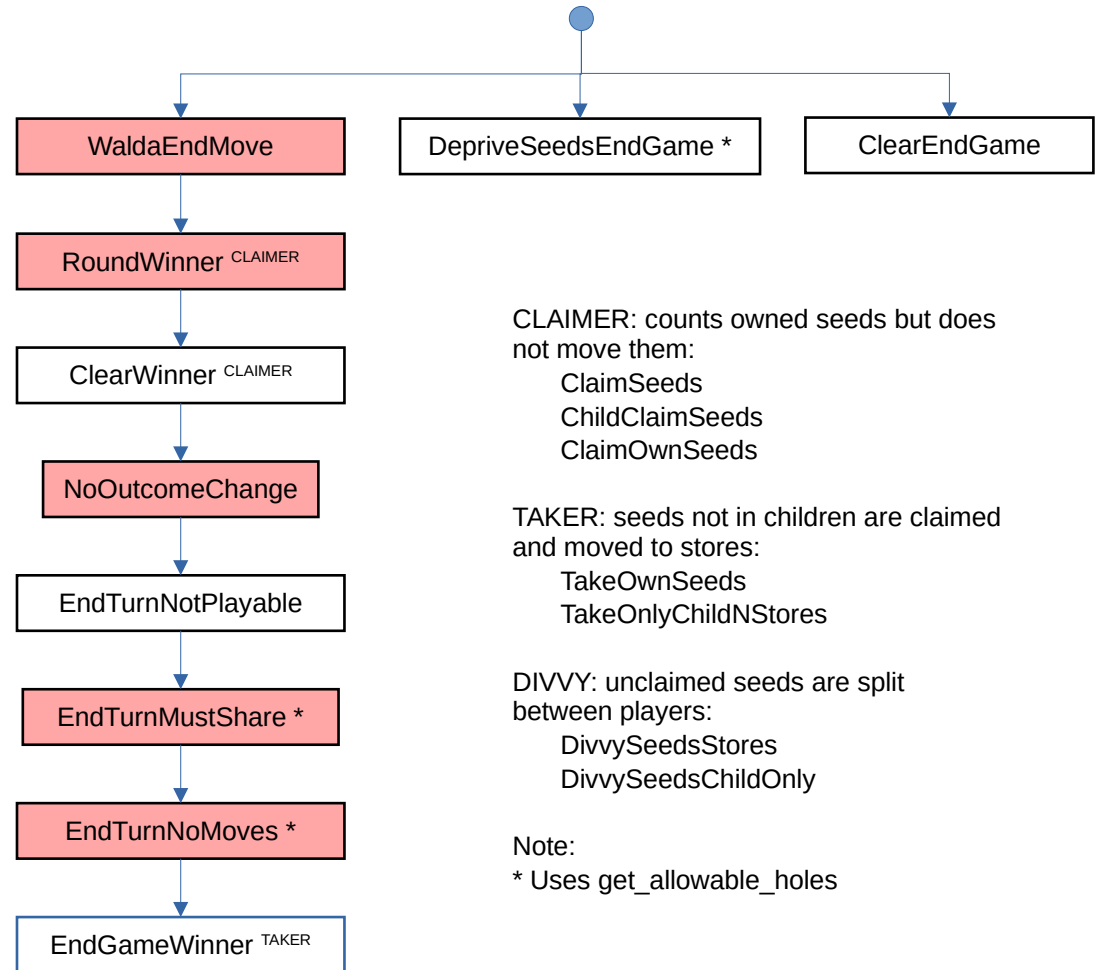
Changes:

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

Ender



DecoChainIf

EndTurnIf

game\_ended(repeat\_turn,  
ended=False)

optional

ClaimSeedsIf

claim\_seeds()

Quitter

