Hive Rules

Game

Starting with white, players alternate turns performing a single **action** (**pass**, **place** or **move**) until a Queen Bee is completely surrounded. The game ends in a draw if both Queen Bees are surrounded in the same turn, otherwise the player whose Queen Bee is surrounded loses the game. The game may also end in a draw if the players have exactly repeated the same position three times, or if it is mutually agreed upon.

Passing

A player may **pass** if and only if he can neither **place** nore **move**.

Placing

A player may **place** a **bug** provided that the following rules are respected:
- the first white **bug** is placed in any **cell**; it cannot be the Queen Bee
- the first black **bug** is placed in any **adjacent cell**; it cannot be the Queen Bee
- subsequent **bug** placements must satisfy the following conditions:
  - the new **bug** must be placed in an **empty cell adjacent** to the **hive**
  - the new **bug** must not be **adjacent** to a **cell** of the opponent's **color**
 - the Queen Bee must be placed at the latest during the fourth turn of a player

Moving

A player may **move** a **bug** provided that the following rules are respected:
- his Queen Bee has already been placed
- he's using the movement ability (see below) or the **power** of one of his **bugs**

Basic Movements

A **step** takes a **bug** from a source **cell** S to an **adjacent** destination **cell** D. This movement goes between two bordering **cells**, L and R, which are the only **cells adjacent** to both S and D.
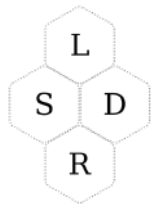
A **crawl** is a purely horizontal movement. It must satisfy the following conditions:
- the **bug**'s **level** is equal to D's **height**
  (otherwise the movement is not horizontal)
- either L's **height** or R's **height** is less than or equal to the **bug**'s **level**
  (otherwise the **bug** is blocked by the gate formed by L and R)
- either the **bug**'s **level** or L's **height** or R's **height** is strictly greater than zero
  (otherwise the **bug** looses contact with the **hive** while sliding)

A **climb** is the combination of a purely vertical movement (during which the **bug**'s **level** increases to be equal to the destination **cell**'s **height**) and then a **crawl**.

A **fall** is the combination of a **crawl** (during which the **bug** stays at the same **level**) and then a purely vertical movement (during which the **bug**'s **level** decreases to be equal to the destination **cell**'s **height**).

Movement Abilities

● Ant: one or more *crawls*
● Beetle: one *step*
● Grasshopper: one *jump* in a straight line, over one or more *occupied cells*, into an *empty cell*
● Ladybug: one *climb*, then one *crawl* or *climb*, then one *fall* into an *empty cell*
● Mosquito: it can copy the movement ability of an *adjacent bug* which is not *covered*
　　○ if on the *ground*: it can behave like any non-Mosquito *bug* atop an *adjacent stack* (if it is only adjacent to a Mosquito then it cannot move)
　　○ if not on the *ground*: it behaves like a Beetle
● Pillbug: it can either move itself or move another *bug* (which must be *adjacent* and on the *ground*)
　　○ if moving itself: one *crawl*
　　○ if moving another *bug*: one *climb* onto itself, then one *fall* into an *empty cell*
● Queen Bee: one *crawl*
● Spider: exactly three *crawls*

Restrictions

● a *covered bug* cannot *move* and it cannot use its *power*
● a *pinned bug* cannot *move* but it can use its *power*
● a *resting bug* cannot *move* and it cannot use its *power*
● *no backtracking*: during a sequence of *steps*, the moving *bug* cannot enter a *cell* it has already visited; notably, it cannot end the sequence in its starting *cell* (i.e. a null *move* is not allowed)

Glossary

● *action*: what a player can do during his turn (can be *place*, *move* or *pass*)
● *adjacent*: two *cells* are *adjacent* if they share a common side (a *cell* has six *adjacent cells*)
● *bug*: a game piece
● *cell*: a location in the virtual hexagonal grid on which the game is played (can be *empty* or *occupied*)
● *climb*: an ascending *step* during which the *bug* goes to a higher *level*
● *color*: the *color* of a non-empty *cell* or *stack* is the *color* of its topmost *bug*
● *covered*: a *bug* is *covered* if it has one or more *bugs* on top of it
● *crawl*: an horizontal *step* during which the *bug* stays at the same *level*
● *empty*: a *cell* or *stack* is *empty* if it does not contain any *bugs*
● *fall*: a descending *step* during which the *bug* goes to a lower *level*
● *ground*: the playing surface (a *bug* on the *ground* is at *level* zero)
● *height*: the number of *bugs* in a *stack* (an *empty stack* has a *height* of zero)
● *hive*: all the *bugs* already in play
● *jump*: a type of *move* in which the *bug* goes directly from one *cell* to another one (without *steps*)
● *level*: the position of a *bug* in its *stack* counted as the number of *bugs* underneath it
● *move*: the *action* of moving a *bug* within the *hive* (can be a sequence of *steps* or a *jump*)
● *occupied*: a *cell* is *occupied* if it contains one or more *bugs*
● *pass*: the *action* of not doing anything during a player's turn
● *pinned*: a *bug* is *pinned* if it is located at an articulation point (i.e. if removing it from the *hive* would split the *hive* into multiple disconnected parts)
● *place*: the *action* of putting a new *bug* in play (i.e. from the player's *reserve* to the *hive*)
● *power*: a *bug*'s special ability (for Mosquito and Pillbug)
● *reserve*: all the *bugs* that are not yet in play (each player has his own *reserve*)
● *resting*: a *bug* that has moved (or has been moved) during a turn will be *resting* during the next turn
● *stack*: a group of zero or more *bugs* occupying the same *cell*
● *step*: the atomic motion of a *bug* from one *cell* to an *adjacent cell* during a *move* (can be *crawl*, *climb* or *fall*)