MLL-ego: Linear Logic as a Lego Game

Olivier.Laurent@ens-lyon.fr

Only rectangular bricks and plates are used. They have different sizes and colors. Some of the bricks have holes:

Considered models are all rectangular 2D constructions (5 of them below):
A position in the game is given by multiple packages of Lego models. The initial position is just one package containing one model.

A splitter is a particular kind of model having a plate at the top and a plate at the bottom (both having the same color), and whose width is the total width of the model:

A move consists in the choice of one package (called the active package) and in the application of one on the following three operations in the active package (the other packages are not modified):

1. **Breaking:**
   - select a model in the active package,
   - break it vertically between to blocks (possibly a block and a plate, or two plates) whose width is the total width of the model,
   - put back the two obtained models in the active package.

2. **Blank removal:**
   - remove a blank block (or plate) from the active package (it should not be attached to any other block or plate),
   - the removed block completely leaves the game (it is not put in another package),
   - this move is allowed only if it does not make the active package empty.

3. **Splitter activation:**
   - select a splitter in the active package and put it in your hand,
   - remove the top and bottom plates (they completely leave the game),
   - count how many models you get in your hand (say $k$), they are called the splitted models,
   - split the active package into $k$ packages (some of them possibly empty),
   - put one of the splitted models into each of the obtained new packages.

The player is playing a move after another until he cannot apply any move. The play is a win if each package contains exactly two blocks (no plates) of the same color (which are not connected together nor to any other block): one with hole(s) and the other one without any hole (no matter the size of the two blocks). Otherwise it is a loose... try again from the initial position!