MAT 364 Homework 5 Fall 2020

due date: Wednesday, December 2

1. Find at least 20 *nonzero*, (ie. not *equal* to zero) Amazons positions meeting the following criteria:
   (a) no two positions are equal (they must have different canonical forms)
   (b) each position has exactly one piece of each color (black and white)
   (c) each position has at most three blank squares
   (d) each position is connected (if we remove the pieces, every square is reachable from every other square)
   (e) you must find at least two positions from each row of the table below

   For each position in the list provide each of the following:
   (a) a drawing of the board position
   (b) the canonical form of the game tree
   (c) steps showing how you arrived at the canonical form

   Note: If the original game tree (without redundant branches) is already in canonical form, then there is no need to provide any justification or steps. If the tree is more complicated, then at least one justification should be provided for each of the types of pruning that occur in reducing the tree to its canonical form: 1) dominated options, or 2) reversible options. So, for instance, if there is only one step from the initial tree to the canonical form, and it eliminates one dominated option, then only provide the justification of that. If there are more dominated options to eliminate then those justifications can be skipped. Same applies to reversible options. None of this means that you can stop before the canonical form is achieved, it is simply to reduce the detailed explanations required for this homework.

   The following are values of positions that can occur:

1	-1	2	-2	3	-3	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{4}$	$-\frac{1}{4}$
$*$	± 1	± 2	$\pm\frac{1}{2}$	$1\|*$	$*\|-1$	$2\|0$	$0\|-2$	$1\|0$	$0\|-1$
$1\|-2$	$2\|-1$	$1\|1$	$-1\|-1$	$\frac{1}{2}\|*$	$*\|-\frac{1}{2}$	$\frac{1}{2}\|0$	$0\|-\frac{1}{2}$	$\uparrow = 0\|*$	$\downarrow = *\|0$
$*\|-2$	$2\|*$	$\{2\|0, *\}$	$\{0, *\|-2\}$	$\{\frac{1}{2}, \pm 1\|-2\}$	$\{2\|-\frac{1}{2}, \pm 1\}$				