Giovanni Filomeno (K12315325) and Daniele Bielli (K12340304)

1. First step: Puzzle 2x2

% Initial State

tile1_pos2_0 &

tile2_pos4_0 &

tile3_pos3_0 &

empty_pos1_0 &

% Final State

tile1_pos1_2 &

tile2_pos2_2 &

tile3_pos3_2 &

empty_pos4_2 &

% Movements

(mv_0_1_2_1 -> (tile2_pos4_1 & tile3_pos3_1 & tile1_pos1_1 & !tile1_pos2_1 & empty_pos2_1 & !empty_pos1_1)) &

(mv_1_1_1_2 -> (mv_0_1_2_1 & tile3_pos3_2 & tile2_pos4_2 & tile1_pos2_2 & !tile1_pos1_2 & empty_pos1_2 & !empty_pos2_2)) &

(mv_1_2_4_2 -> (mv_0_1_2_1 & tile1_pos1_2 & tile3_pos3_2 & tile2_pos2_2 & !tile2_pos4_2 & empty_pos4_2 & !empty_pos2_2)) &

(mv_0_3_3_1 -> (tile1_pos2_1 & tile2_pos4_1 & tile3_pos1_1 & !tile3_pos3_1 & empty_pos3_1 & !empty_pos1_1)) &

(mv_1_3_1_3 -> (mv_0_3_3_1 & tile1_pos2_2 & tile2_pos4_2 & tile3_pos3_2 & !tile3_pos1_2 & empty_pos1_2 & !empty_pos3_2)) &

(mv_1_2_4_3 -> (mv_0_3_3_1 & tile3_pos1_2 & tile1_pos2_2 & tile2_pos3_2 & !tile2_pos4_2 & empty_pos4_2 & !empty_pos3_2)) &

% Movement constraints

((mv_0_1_2_1 & !mv_0_3_3_1) & ((mv_1_1_1_2 | mv_1_2_4_2) & !(mv_1_3_1_3 | mv_1_2_4_3))) |

((!mv_0_1_2_1 & mv_0_3_3_1) & ((mv_1_3_1_3 | mv_1_2_4_3) & !(mv_1_1_1_2 | mv_1_2_4_2))) &

% Frame axioms

((tile1_pos2_0 & !tile1_pos2_1 & tile2_pos1_1) -> (mv_0_1_2_1)) &

((tile3_pos3_0 & !tile3_pos3_1 & tile3_pos1_1) -> (mv_0_3_3_1)) &

((mv_0_1_2_1) -> (tile1_pos1_1 & !tile1_pos2_1 & empty_pos2_1 & !empty_pos1_1)) &

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((mv_0_3_3_1) -> (tile3_pos1_1 & !tile3_pos3_1 & empty_pos3_1 & !empty_pos1_1)) &

((mv_1_1_1_2 | mv_1_2_4_2) -> ((tile2_pos2_2 | tile1_pos2_2) & !tile2_pos4_2 & !tile1_pos1_2 & empty_pos4_2 & !empty_pos2_2)) &

((mv_1_3_1_3 | mv_1_2_4_3) -> ((tile3_pos3_2 | tile2_pos3_2) & !tile3_pos1_2 & !tile2_pos4_2 & empty_pos4_2 & !empty_pos3_2))