Contracted 1-Tunnel within the Movement Union

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Theorem 1 *A Robot R consisting of two 2x2 contracted Modules M_a, M_b cannot perform a 1-Tunnel move within the union of the movement. Assuming that units cannot switch which module they belong to.*

1	2		
3	4		
5	6	9	10
7	8	11	12

a_1	a_2
a_3	a_4
b_1	b_2
b_3	b_4

Definition 0.1 *An $INSIDE$ unit space is a unit space belonging to the set $\{2, 4, 6, 9, 10\}$*

Definition 0.2 *An $OUTSIDE$ unit space is a unit space belonging to the set $\{1, 3, 5, 7, 8, 11, 12\}$*

Lemma 0.3 *A movement of this type requires moving a unit in an $INSIDE$ unit space to an $OUTSIDE$ unit space or vis-versa.*

Proof 0.4 *Before the movement, M_a has two units $a_1, a_2 \in OUTSIDE$, and two units, $a_3, a_4 \in INSIDE$. M_b has 3 units $b_1, b_3, b_4 \in OUTSIDE$ and 1 unit, $b_2 \in INSIDE$.*

It follows that to stay in the union of the movement, all units must be either $INSIDE$ or $OUTSIDE$. i.e. $UNITS = INSIDE \cup OUTSIDE$, and $INSIDE \cap OUTSIDE = \emptyset$

Lemma 0.5