A Appendix

In this section, we illustrate examples of instantiations of the different predicates used thanks to the following examples of trajectories :

— **Trajectory 1** :

W8	N3	E7	S2
W11	N5	E6	S10
W9	N12	E0	S13

— **Trajectory 2** :

W8	N3	E7	S13
S14	W9	N5	E6
S2	W11	N12	E0

Predicates where time is an instant

For the most part, these are predicates related to an observation or an action that takes place at a specific time.

— $willTakeTrickWithDominant(card, player, time)$: the player $player$ plays a card $card$ which is $dominant\_h\_t$ at time $time$. The player will thus take the current trick.

— $action(card, time)$: the card $card$ which is played by the current player (north or south) at time $time$.

— $playSmallestCard(card, player, time)$: the player $player$ plays his smallest card $card$ at time $time$.

— $declarerPlays(card, player, time)$: a declarer player (north or south) $player$ plays $card$ in the current trick at time $time$.

— $playSmallCard(card, player, time)$: the player $player$ plays a card $card$ which is a small card (2 to 10) at time $time$.

Predicates where the time is an interval

These are predicates that are true in a given time interval and false outside.

— $dominant\_h(card, player, [inf, sup])$: a card $card$ is $dominant\_h$ if it is in the hand of a player $player$ and is greater than all the cards in the hands of the other players in the time interval $[inf, sup]$.
In trajectory 2, we have the following instanciations : $dominant\_h(13, south, [1, 2])$.
$dominant\_h(14, south, [1, 3])$. ...

— $dominant\_h\_t(card, player, [inf, sup])$: a card $card$ of a player $player$ is $dominant\_h\_t$ if at all times in the interval $[inf, sup]$, $player$ has not yet played in the current trick or $player$ has played $card$ in the current trick, and $card$ is greater than all the cards in the hands of the players who have not played in the current trick and greater than the cards that have been played in the current trick.

— $nextDominant\_h(card, player, [inf, sup])$: a card $card$ is $nextDominant\_h$ if it is not dominated by the cards that are $dominant\_h$. In the trajectory 2, we have the following instanciations :
$nextDominant\_h(12, north, [1, 3])$.
$nextDominant\_h(11, west, [4, 5])$.
$nextDominant\_h(10, south, [6, 6])$.
$nextDominant\_h(4, north, [7, 7])$.

— $lastThreat\_h(card1, pp, card2, [inf, sup])$: true if the card $card2$ is the only card in the hands of the opponents greater than the card $card1$ in the hand of a player of the partner pair pp in the time interval $[inf, sup]$.
In the trajectory 1, we have the following instanciations : $lastThreat\_h(10, dec, 11, [1, 2])$.
$lastThreat\_h(4, dec, 9, [4, 4])$.

— $nbSmallCards(dn, player, [inf, sup])$: the number of cards dn which are small cards, in the hand of the player $player$ in the time interval $[inf, sup]$.

— $nbHonors(dn, player, [inf, sup])$: the number of cards dn which are honors, in the hand of the player $player$ in the time interval $[inf, sup]$.

— $minCardHand(card, player, [inf, sup])$: the smallest card in the hand of the player $player$ is the card $card$ in the time interval $[inf, sup]$.

— $maxCardHand(card, player, [inf, sup])$: the biggest card in the hand of the player $player$ is the card $card$ in the time interval $[inf, sup]$.

The different types

These are the types of the arguments of the predicates and their possible instantiations.

— $card$: the cards numbered from 2 to 14.

— $player$: the players *north, south, east, west*

— pp : pair of partners : $decl$ (north/south) or def (east/west)

— inf : integer, lower bound of the truth interval of the predicate.

— sup : integer, upper bound of the truth interval of the predicate.

— $time$: integer, number of the timestamp cut by the actions of the declarer.

— dn : integer, number of cards.