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A simple logic of the hide and seek game

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We discuss a simple logic to describe one of our favourite games from childhood, hide and seek, and show how a simple addition of an equality constant to describe the winning condition of the seeker makes our logic undecidable. There are certain decidable fragments of first-order logic which behave in a similar fashion with respect to such a language extension, and we add a new modal variant to that class. We discuss the relative expressive power of the proposed logic in comparison to the standard modal counterparts. We prove that the model checking problem for the resulting logic is P-complete. In addition, by exploring the connection with related product logics, we gain more insight towards having a better understanding of the subtleties of the proposed framework. This is joint work with Dazhu Li, Sujata Ghosh and Yaxin Tu.