



**Maastricht University**

*Department of Knowledge Engineering*

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# ***Mathematics and Markov Chains***

Frank Thuijsman



# Knowledge Engineering

An introductory movie can be viewed [here](#) (3 min)



# An Intelligence Test

This problem can be solved by pre-school children in 5-10 minutes, by programmers - in 1 hour, by people with higher education... well, check it yourself! :)

$$8809=6$$

$$7111=0$$

$$2172=0$$

$$6666=4$$

$$1111=0$$

$$3213=0$$

$$7662=2$$

$$9313=1$$

$$0000=4$$

$$2222=0$$

$$3333=0$$

$$5555=0$$

$$8193=3$$

$$8096=5$$

$$7777=0$$

$$9999=4$$

$$7756=1$$

$$6855=3$$

$$9881=5$$

$$5531=0$$

$$2581=???$$

# Operations Research

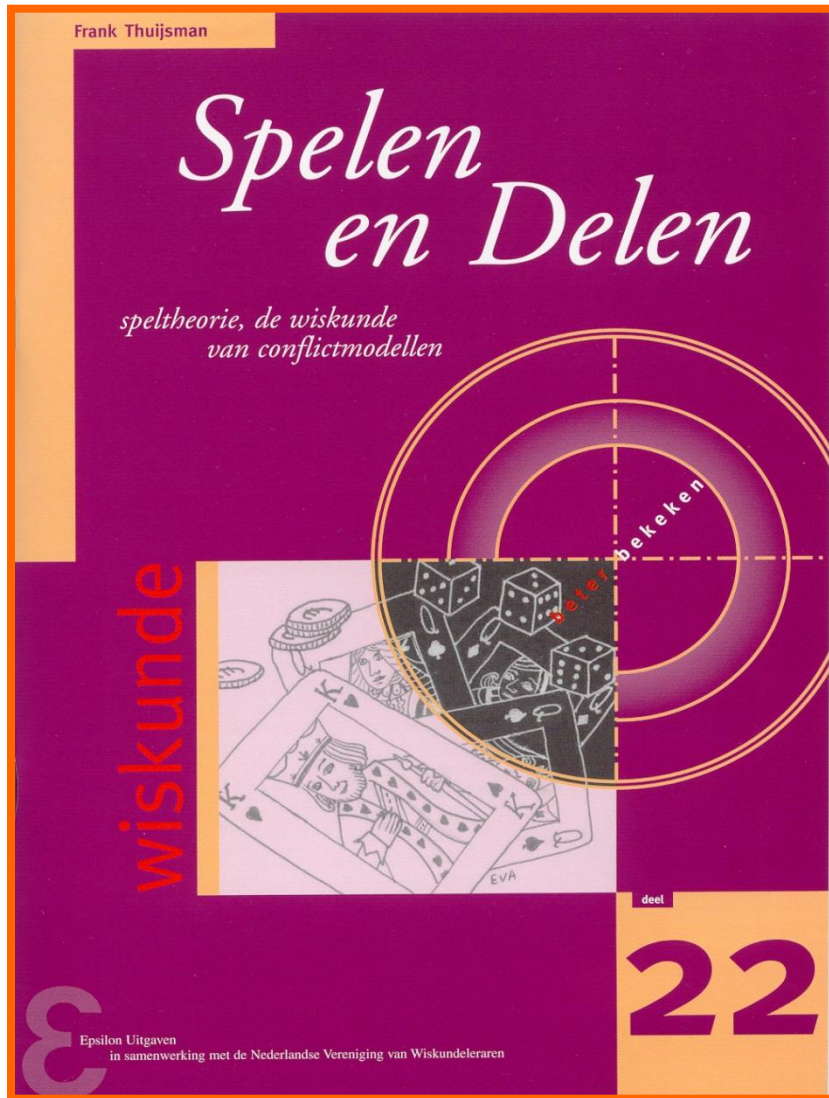
## The Science of Better



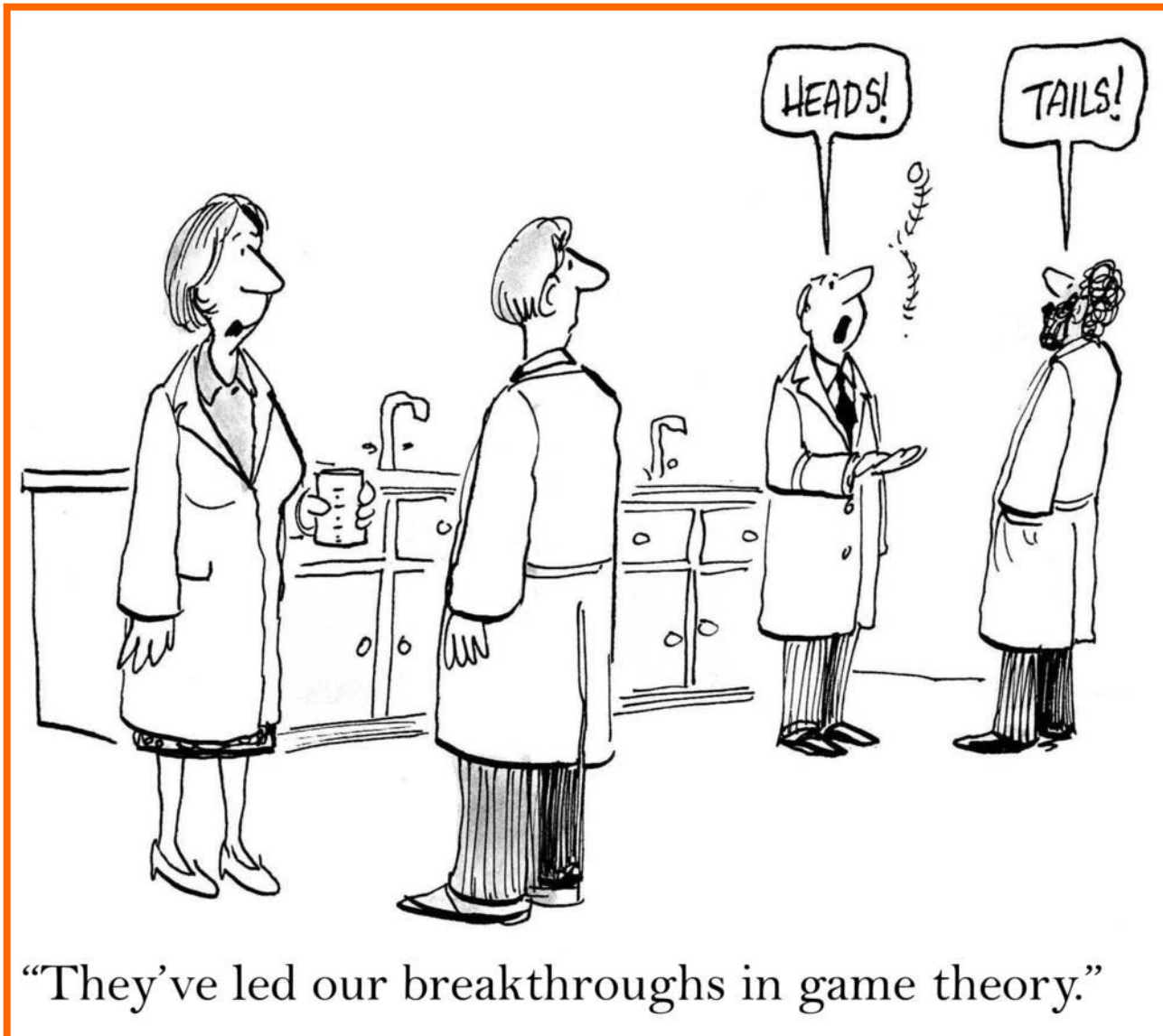
# An almost Prisoner's Dilemma



[Movie 1](#)  
[Movie 2](#)  
[Movie 3](#)

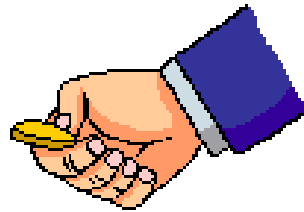


**Frank Thuijsman: *Spelen en Delen*, Epsilon Uitgaven, 2005**



“They’ve led our breakthroughs in game theory.”

# Introduction to Markov Chains



H-T-H-H-H-T-H-T-T-T-H-T-H-T-T-T-T-H-H-T

What is the expected number of coin flips until we see T-H-H-T for the first time?



# Many Thanks for Your Attention!

