A Few Games

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Today

Make friends

Have fun

Start to see that everything is a game

Today

Play several games

Realize their connection to numbers, programs & propositions

Learn where the game theoretical approach came from

Philosophize about the game-theoretical approach

Fantasize about the future of the study of games

Game 1: Games for Programming

Game 2: Numbers & Games

Game 3: Ehrenfeucht–Fraïssé Games

Some Historic Notes & Where to Learn More

Current: Research in AI, DB theory & PL, Crypto, Complexity…

Foundation: (Finite) Model Theory

Fun: Numbers and games (John Conway, Don Knuth)

Origin: Game theoretical semantics (Jaako Hintikka)

Historical: Language games (Wittgenstein)

Prehistory: Aristotelian Dialectic

Why Do We Care Pt. 1: Important Research

Strategy Synthesis for Linear Arithmetic Games

Synthesizing Coupling Proofs of Differential Privacy

Two-Variable Logic on Data Trees and XML Reasoning

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Game AI

(See resources for details)

Why Do We Care Pt. 2: A Different Perspective

EF games: a different perspective helps us **understand** expressibility proofs

Program verification: 2 different perspectives **simultaneously** tries to prove the program correct / incorrect

Number games: a different perspective yields different proof methods & understanding of transfinite numbers, & leads to discovery of **a new kind of numbers**

Why Do We Care Pt. 2: A Different Perspective

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It is often useful to focus one's study by viewing an individual thing, or a group of things, as though it exists in isolation. However, the ability to **rigorously change our point of view**, **seeing our object of study in a different context**, often yields unexpected insights. Moreover, this ability to change perspective is indispensable for **effectively communicating with and learning from** others.

Why Do We Care Pt. 2: A Different Perspective

It is the **relationships between things**, rather than the things in and by themselves, that are responsible for generating the rich variety of phenomena we observe in the **physical, informational, and mathematical worlds**.

- David Spivak, Category Theory for the Sciences