

**From *Rock, Paper, Scissors*
to *Street Fighter II*:
Proof by Construction**
Yotam I. Gingold

Matching Pennies





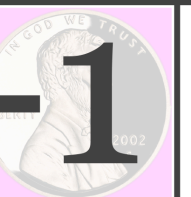









Game Theory

Optimal strategy is choosing randomly. On average, outcome is a draw.

you

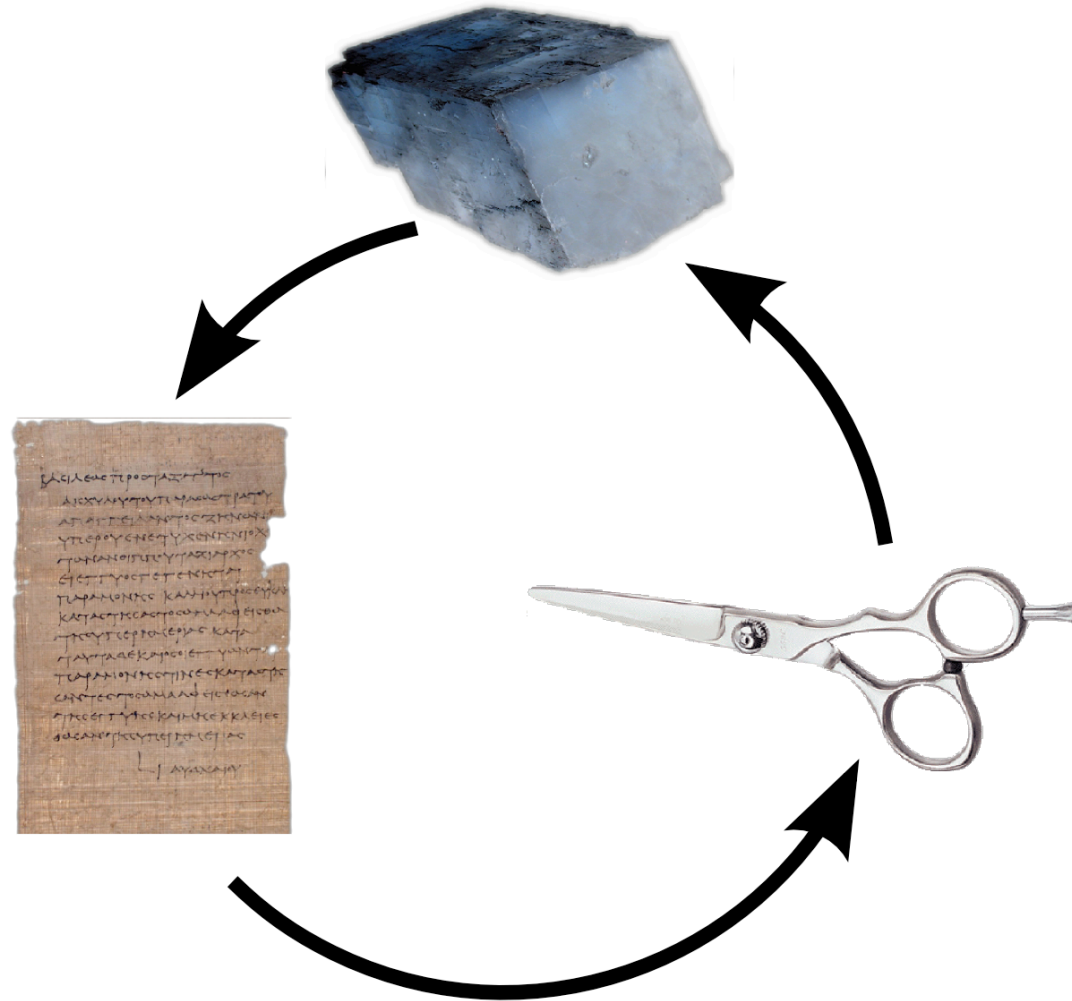
me

		
	 1 ,  -1	 -1 ,  1
	 -1 ,  1	 1 ,  -1

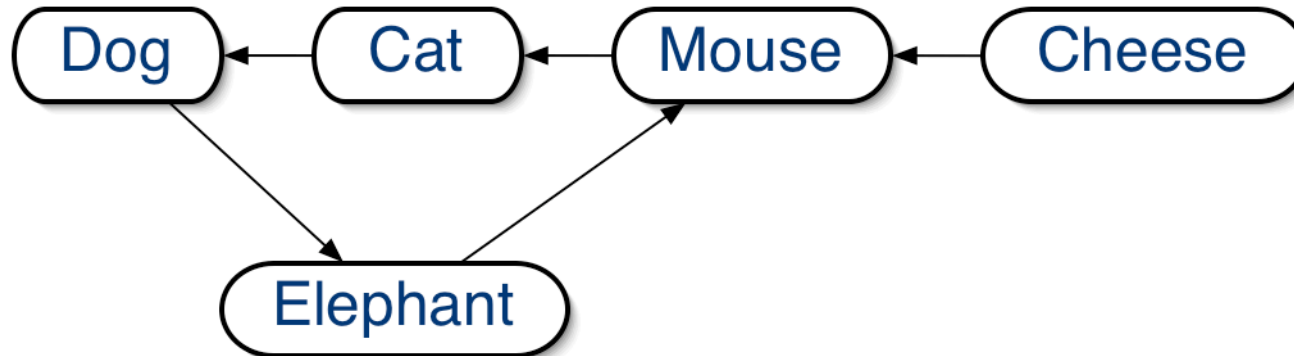
The class of RPS-style games

A competitive series of decisions with no long-term advantage accumulation and access at every decision to a set of moves that include trumps of opponents' moves

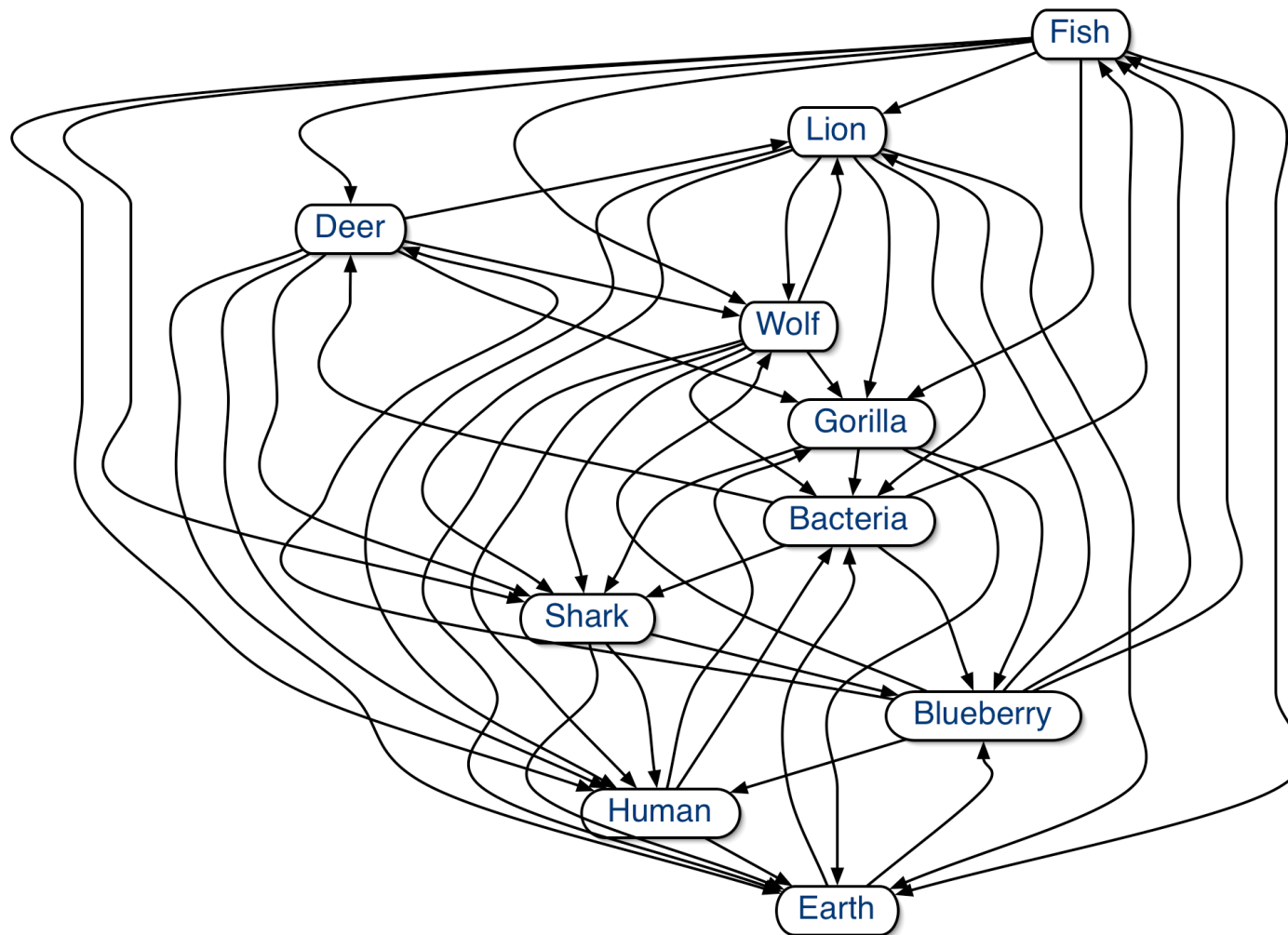
Choices Graph



Choices Graph



Sinks have no trump



Poker



Credit: Kevin Labianco

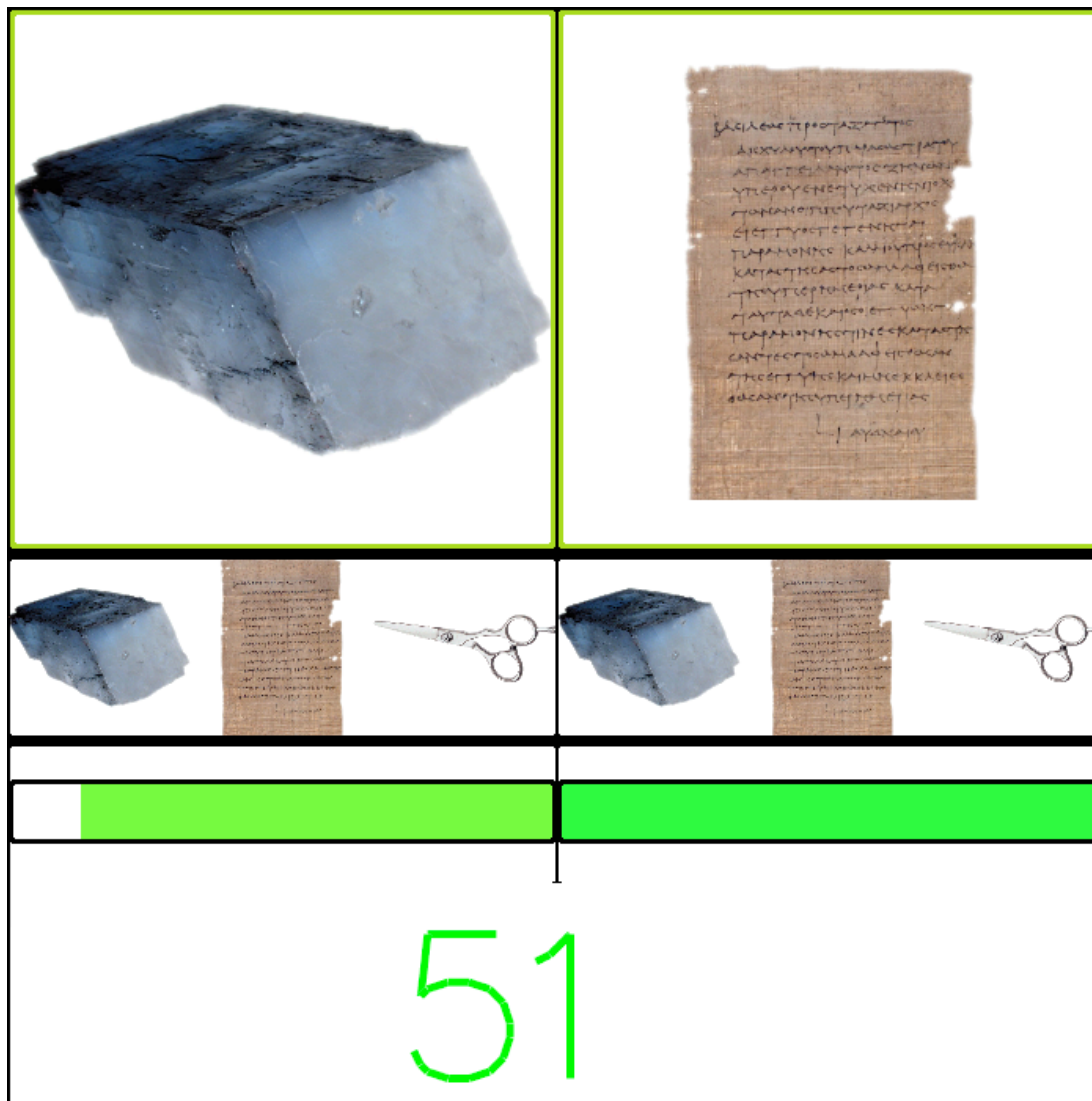
Long-term strategy games

Advantage accumulation



Credit: Simon Pais

Variations



Street Fighter II



The Dojo / Kung Fu movies



Credit: myo_sim

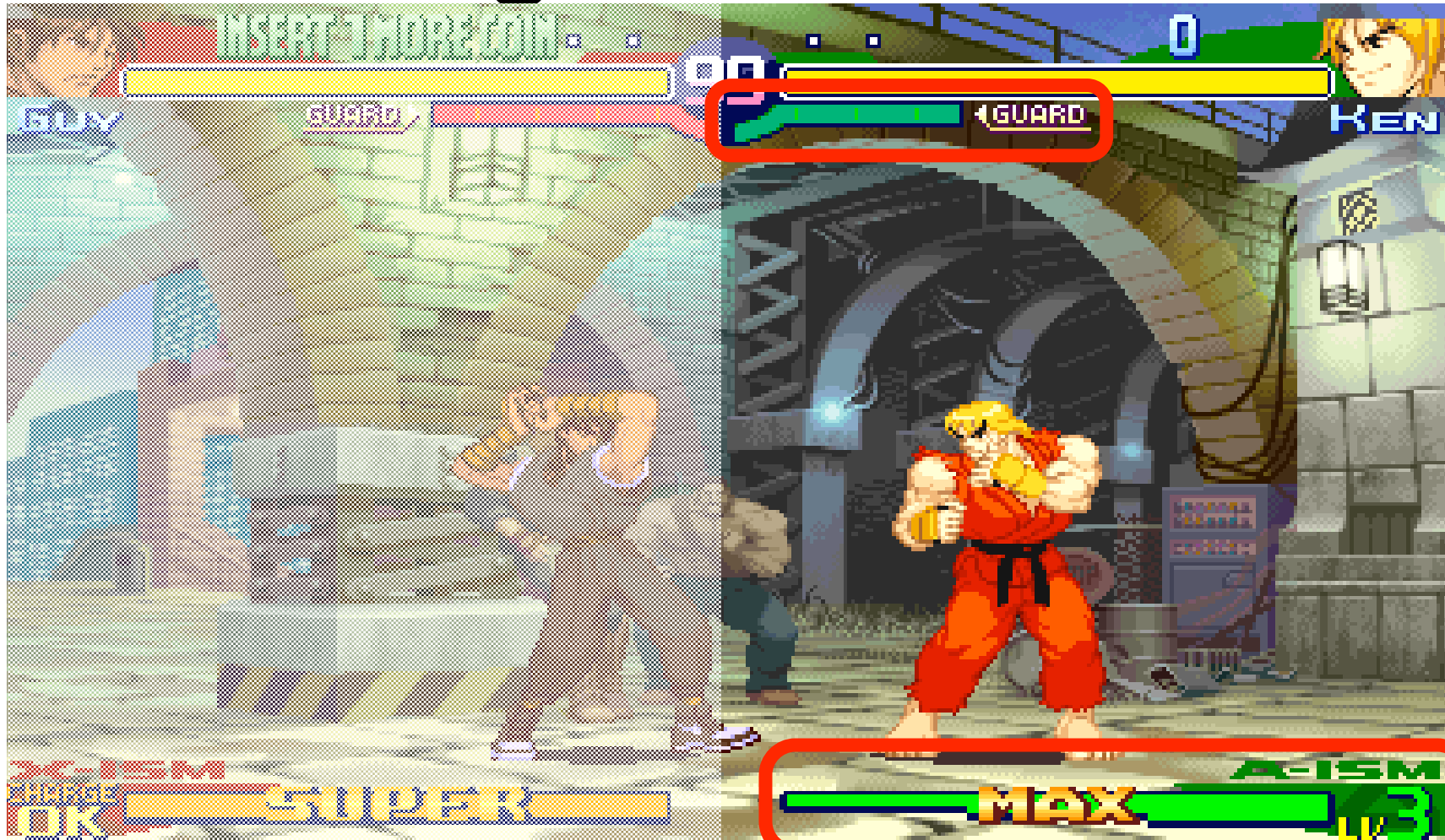
Button mashing

Randomly choosing throws



Credit: Advanced Media, Inc.

Street Fighter II variants

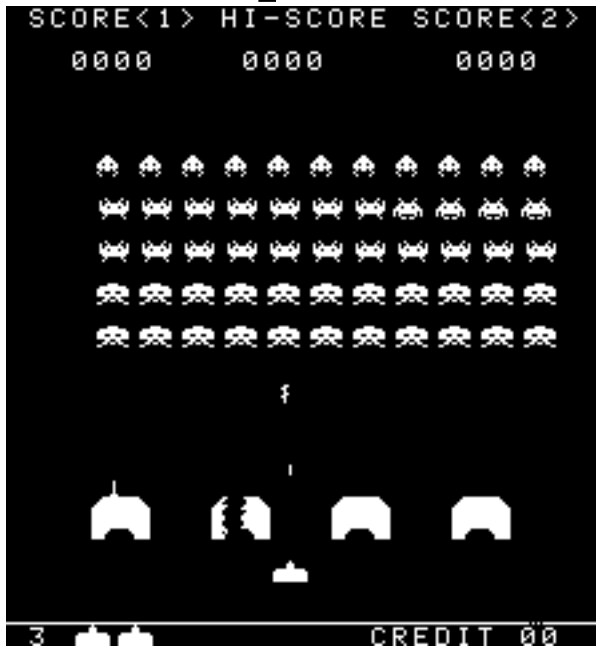


Future Work

Choice graph for Street Fighter II

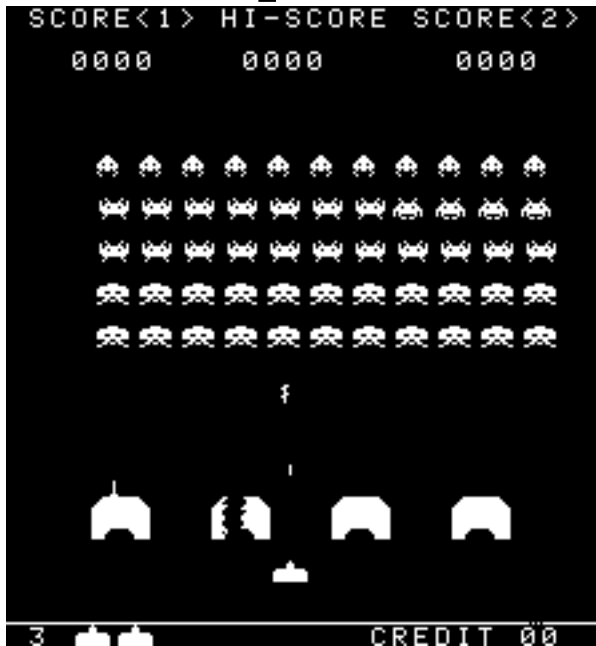
Constructive analysis on other
game types

Space Invaders and Doom



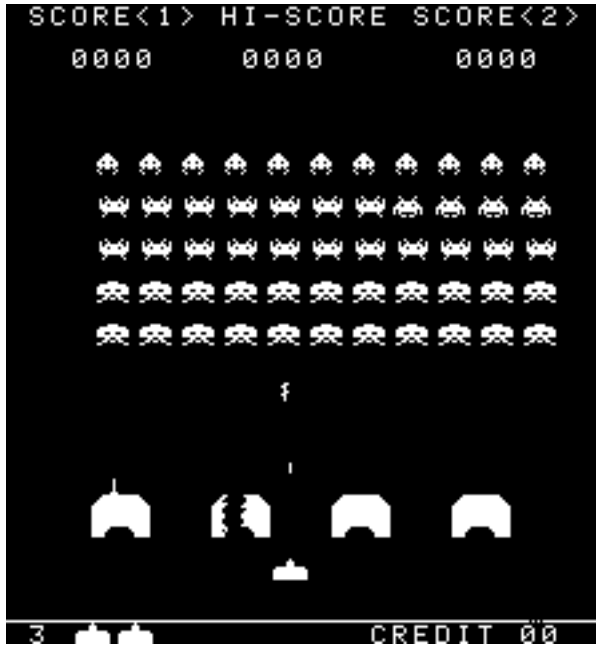
Space Invaders

Space Invaders and Doom



Space Invaders
Asteroids
Centipede

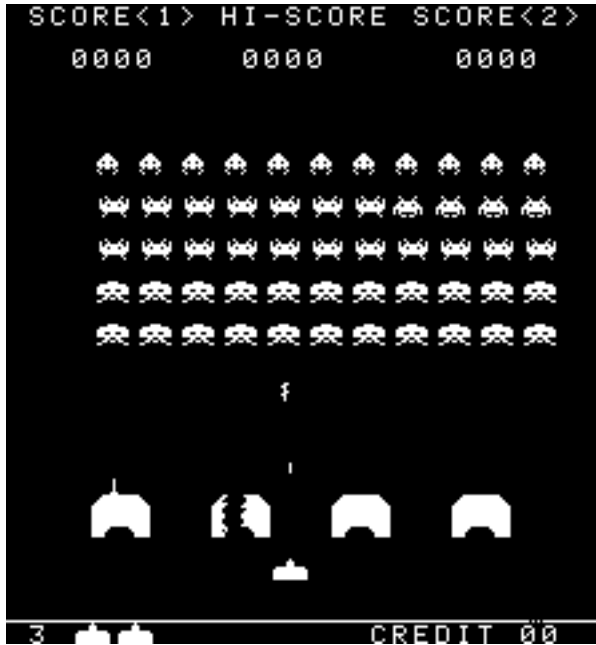
Space Invaders and Doom



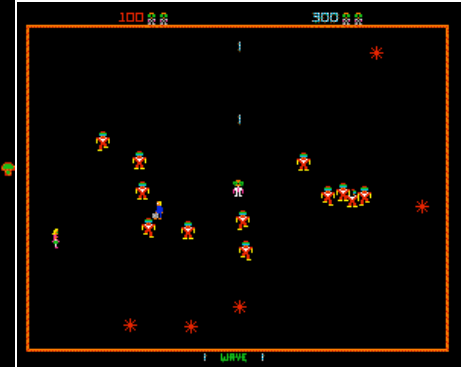
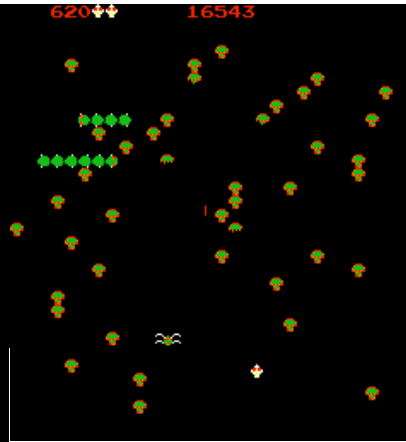
Space Invaders
Asteroids
Centipede
Robotron 2084
Crystal Quest
Contra



Space Invaders and Doom



Space Invaders
Asteroids
Centipede
Robotron 2084
Crystal Quest
Contra
Doom



Acknowledgements

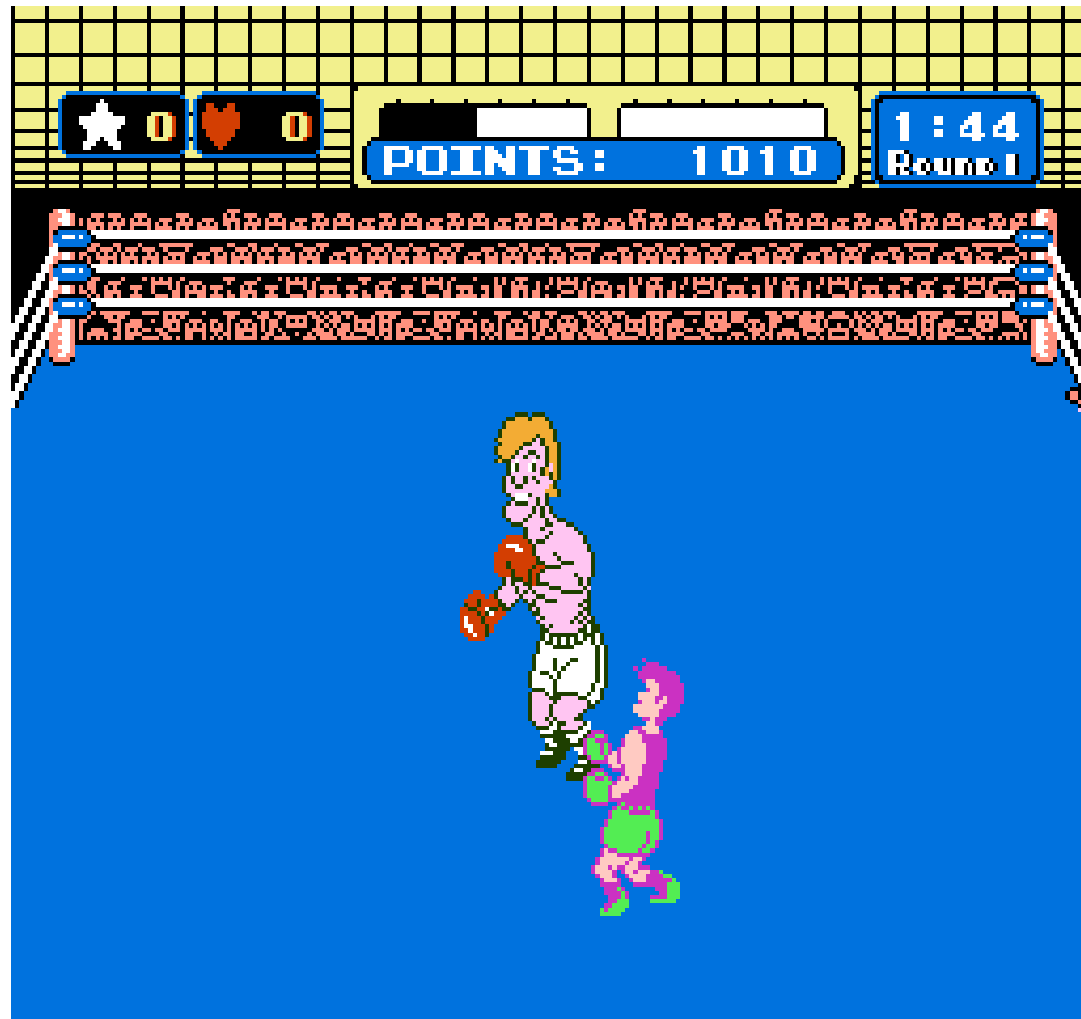
Casey Muller, NYU colleagues, the
anonymous reviewers, and
Adobe

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Mike Tyson's Punch-Out



Variations

