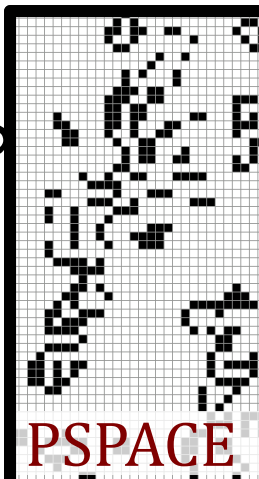


Complexity of Games & Puzzles

unbounded



PSPACE



PSPACE



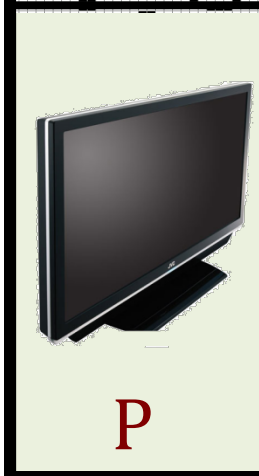
EXPTIME



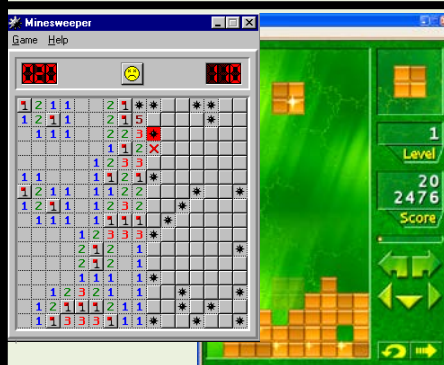
Rengo Kriegspiel?

Undecidable

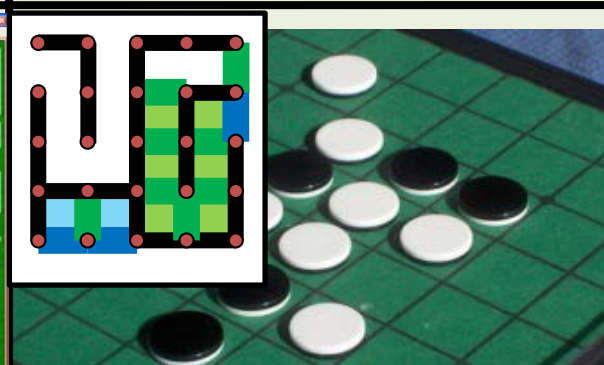
bounded



P



NP



PSPACE



bridge?

NEXPTIME

0 players
(simulation)

1 player
(puzzle)

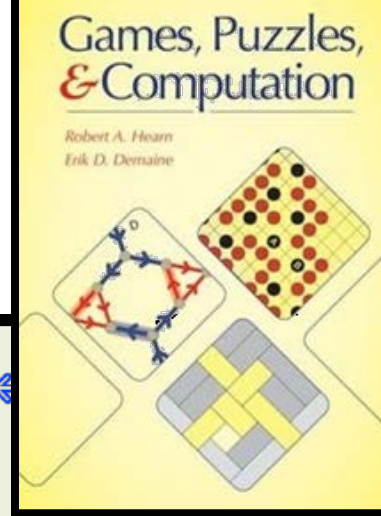
2 players
(game)

team,
imperfect info

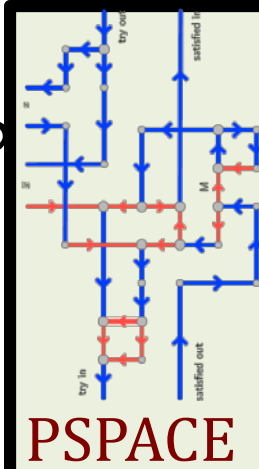


Constraint Logic

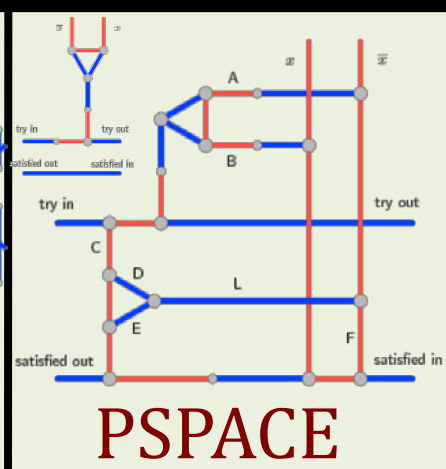
[Hearn & Demaine 2009]



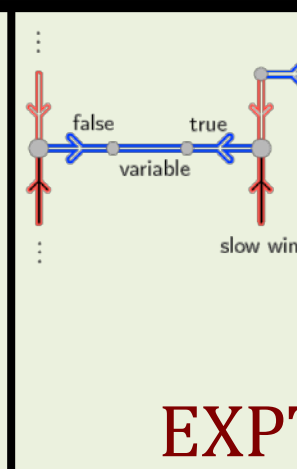
unbounded



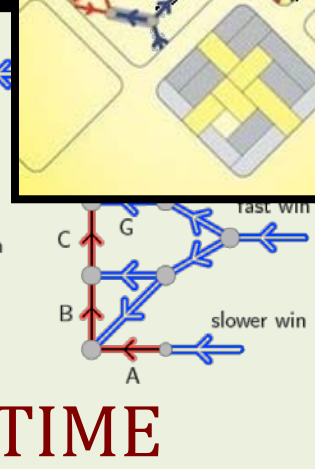
PSPACE



PSPACE

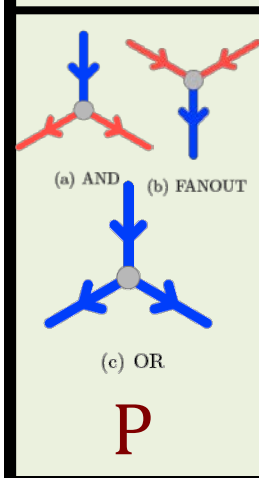


EXPTIME

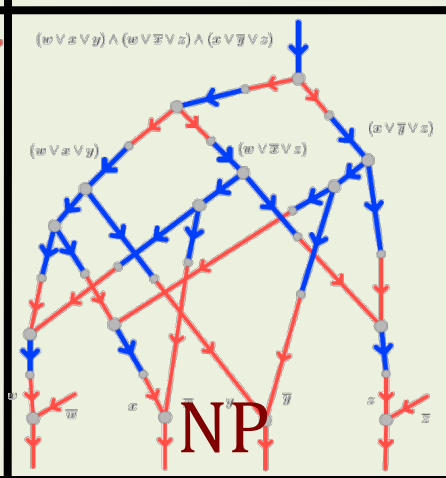


Undecidable

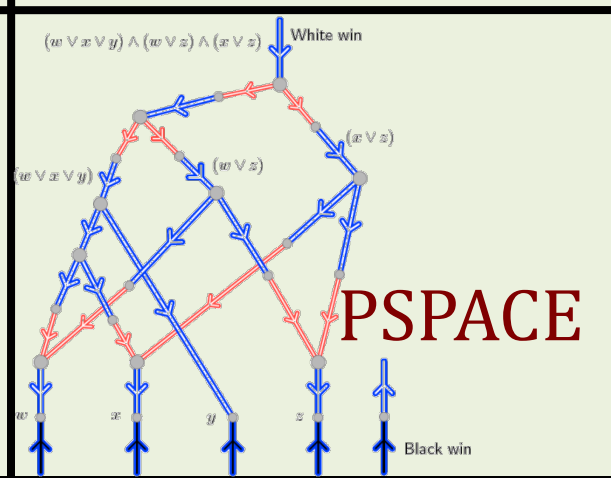
bounded



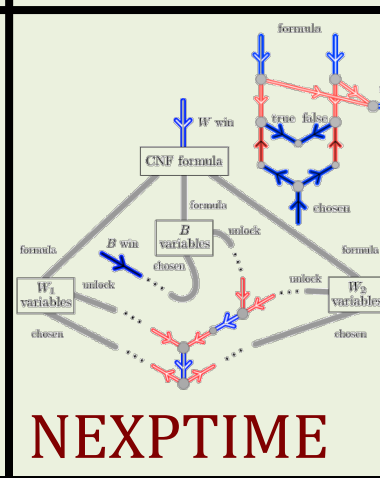
P



NP



PSPACE



NEXPTIME

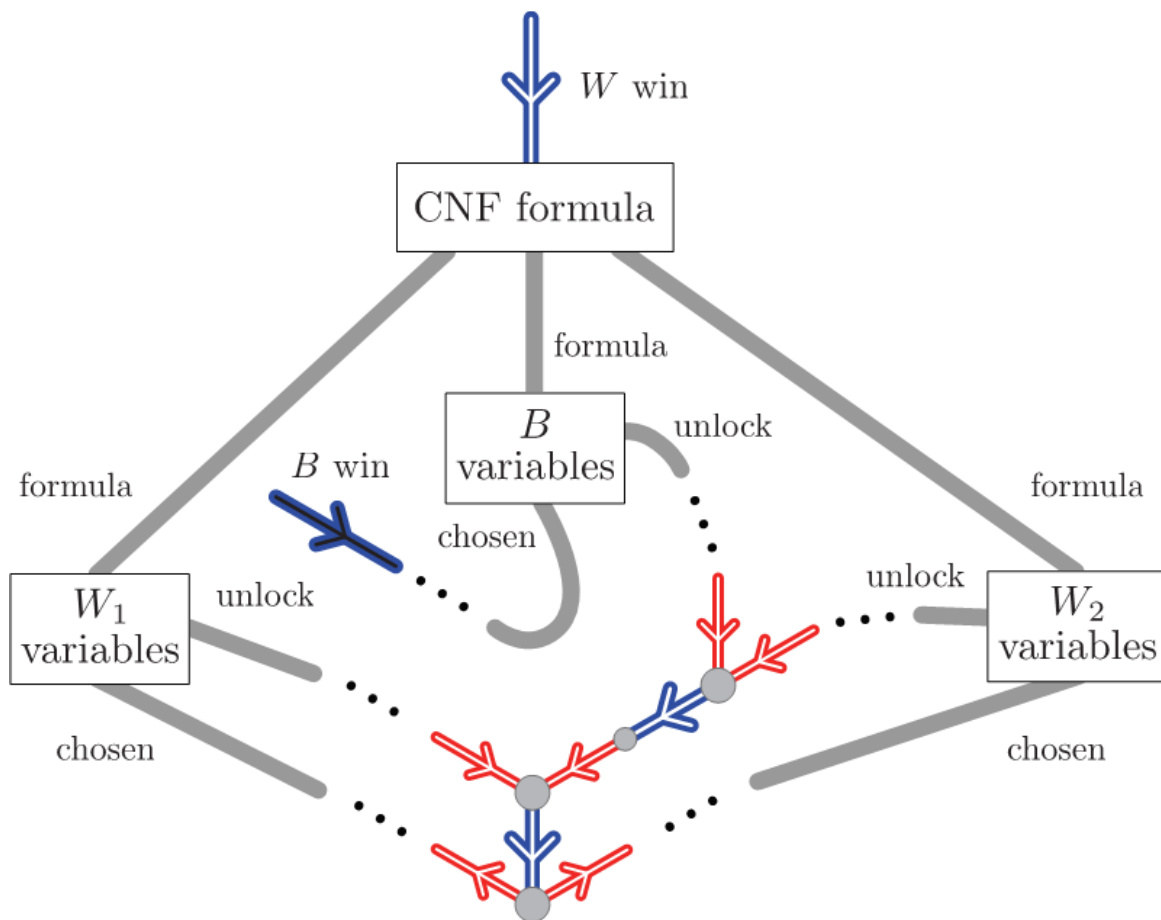
0 players
(simulation)

1 player
(puzzle)

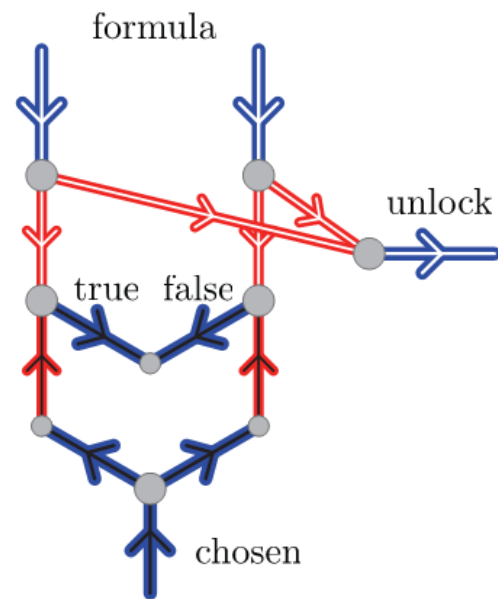
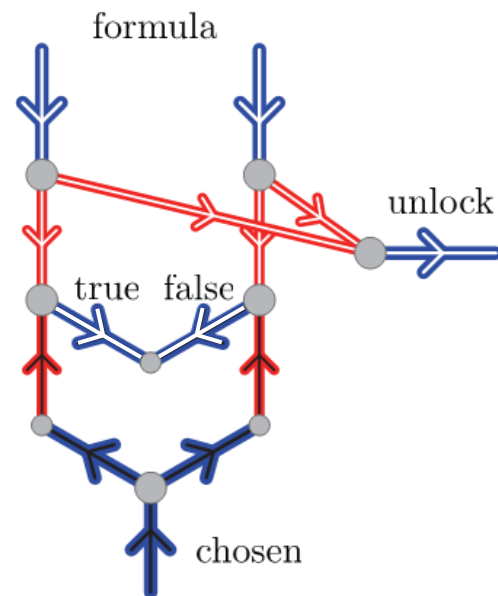
2 players
(game)

team,
imperfect info

Bounded TPCL is NEXPTIME-complete

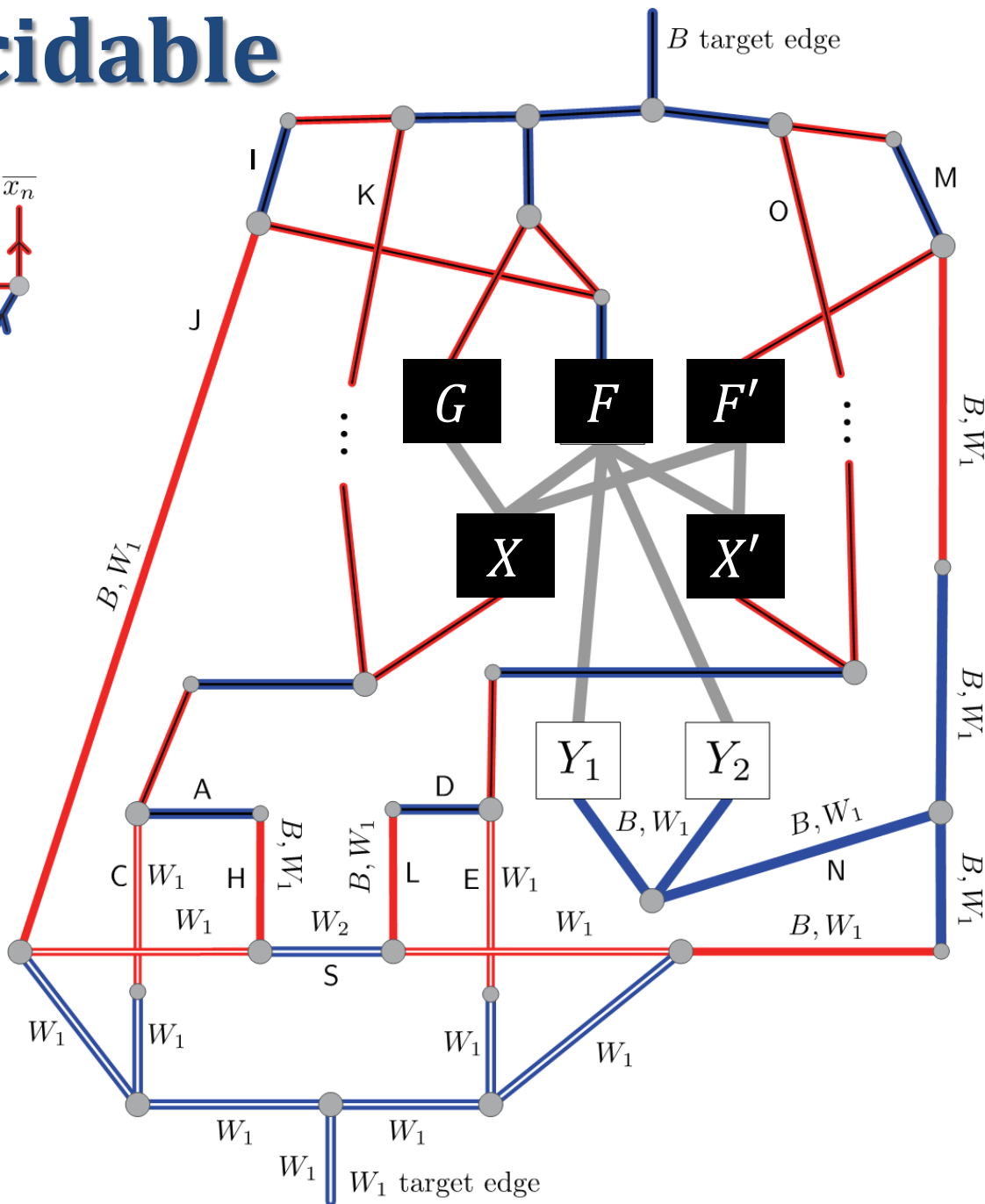
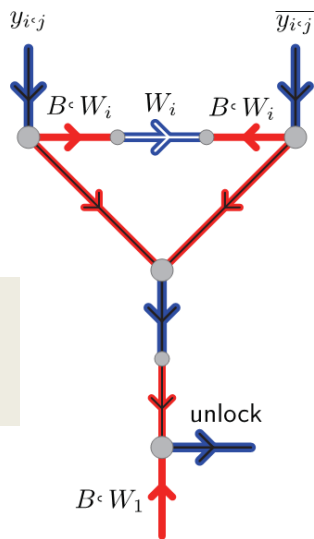
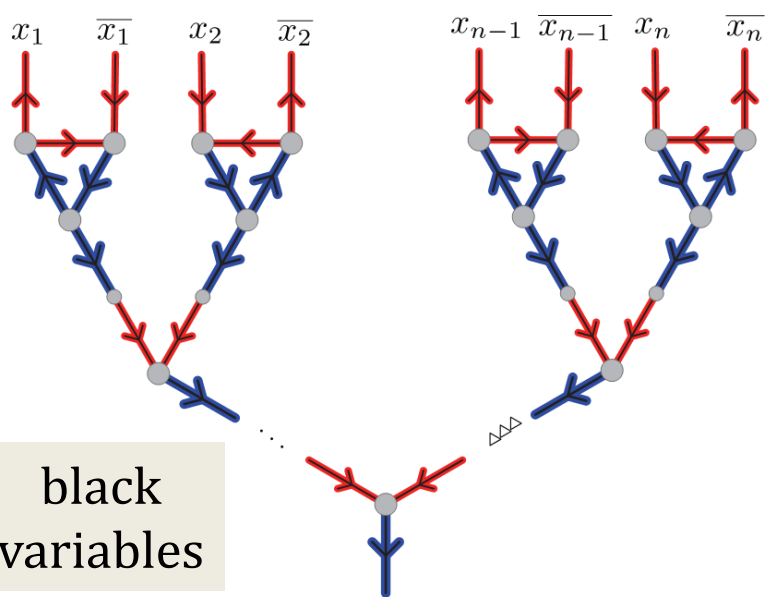


white variable



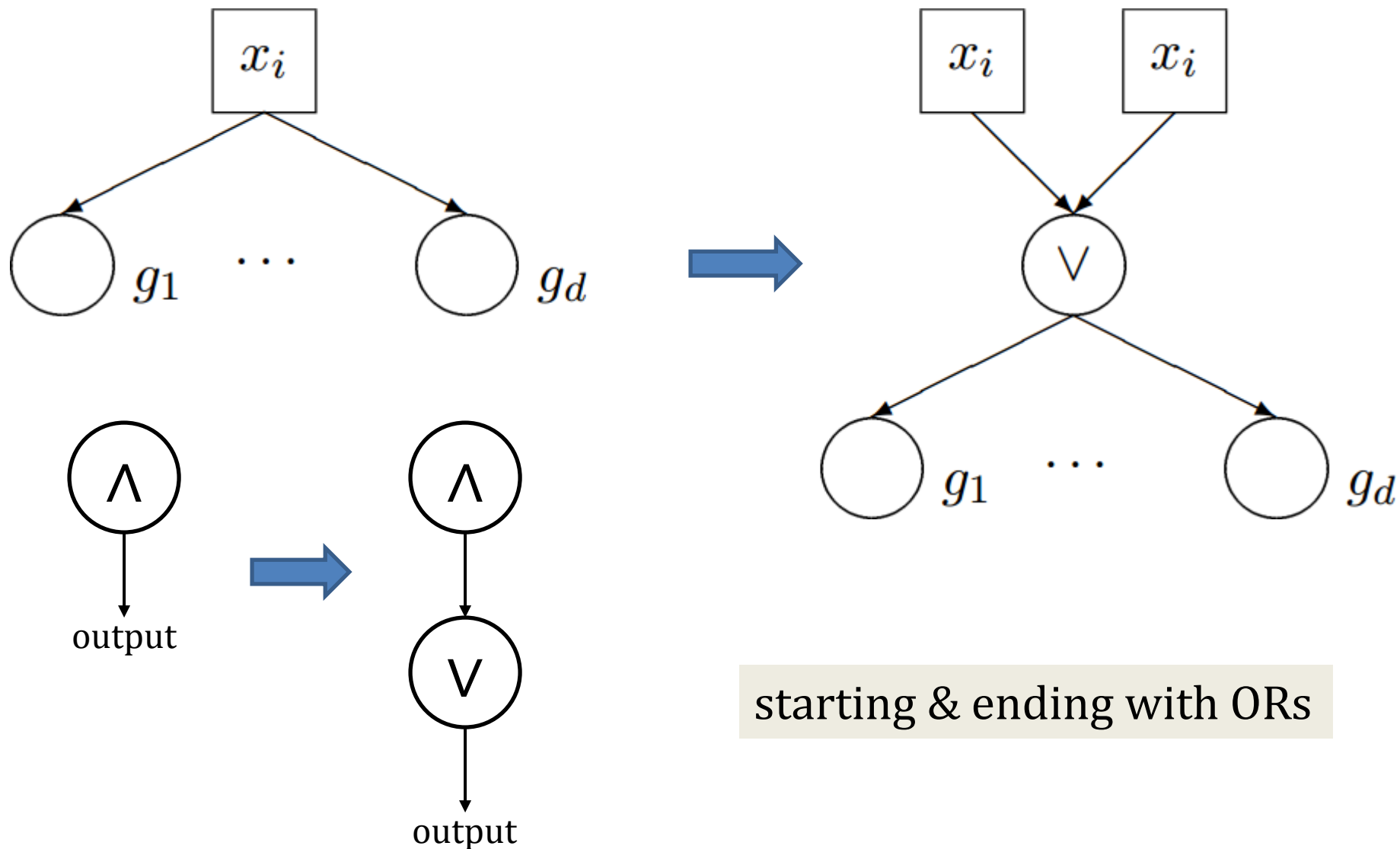
black variable

TPCL is Undecidable



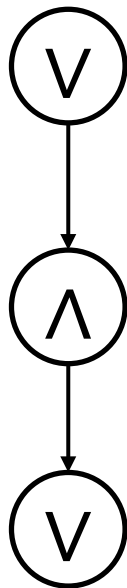
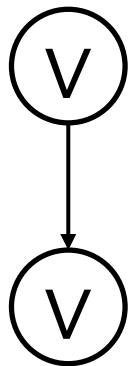
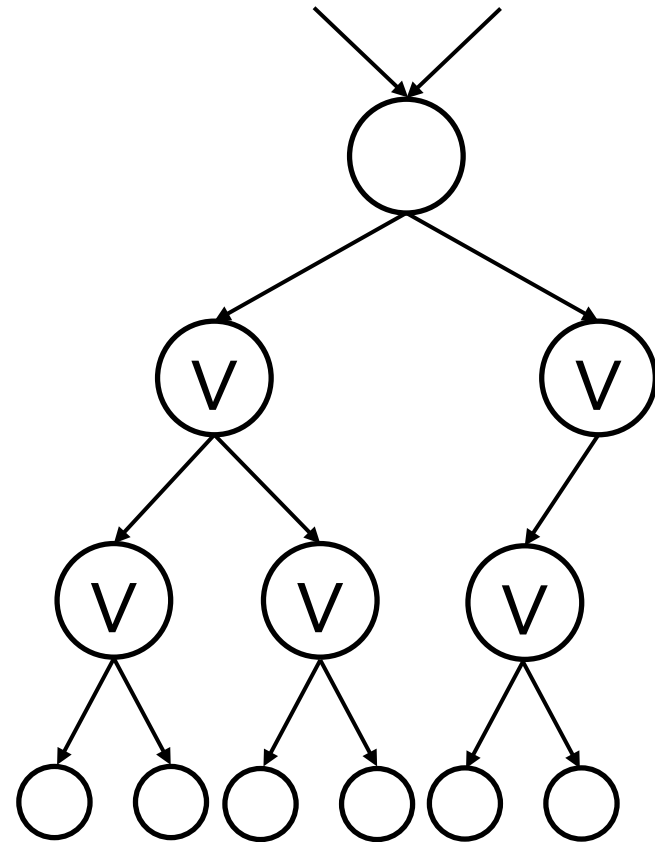
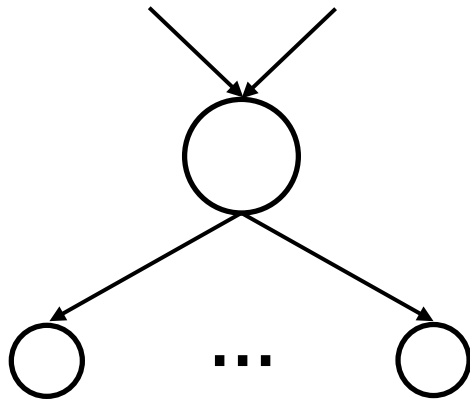
Simpler Circuit Value Problems

[Greenlaw, Hoover, Ruzzo 1995]



Simpler Circuit Value Problems

[Greenlaw, Hoover, Ruzzo 1995]

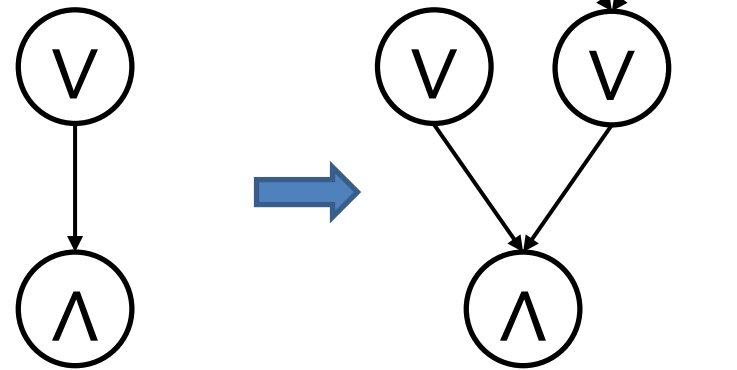
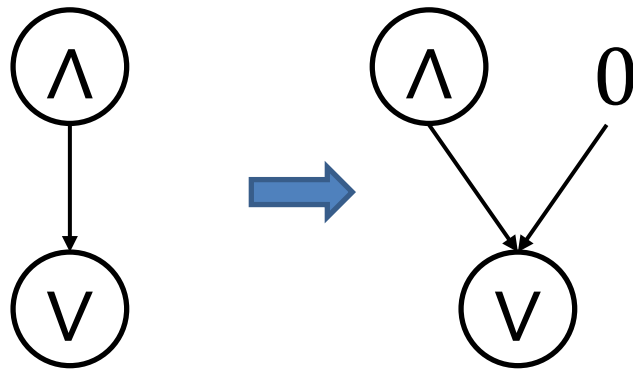


alternating

fanout ≤ 2

Simpler Circuit Value Problems

[Greenlaw, Hoover, Ruzzo 1995]



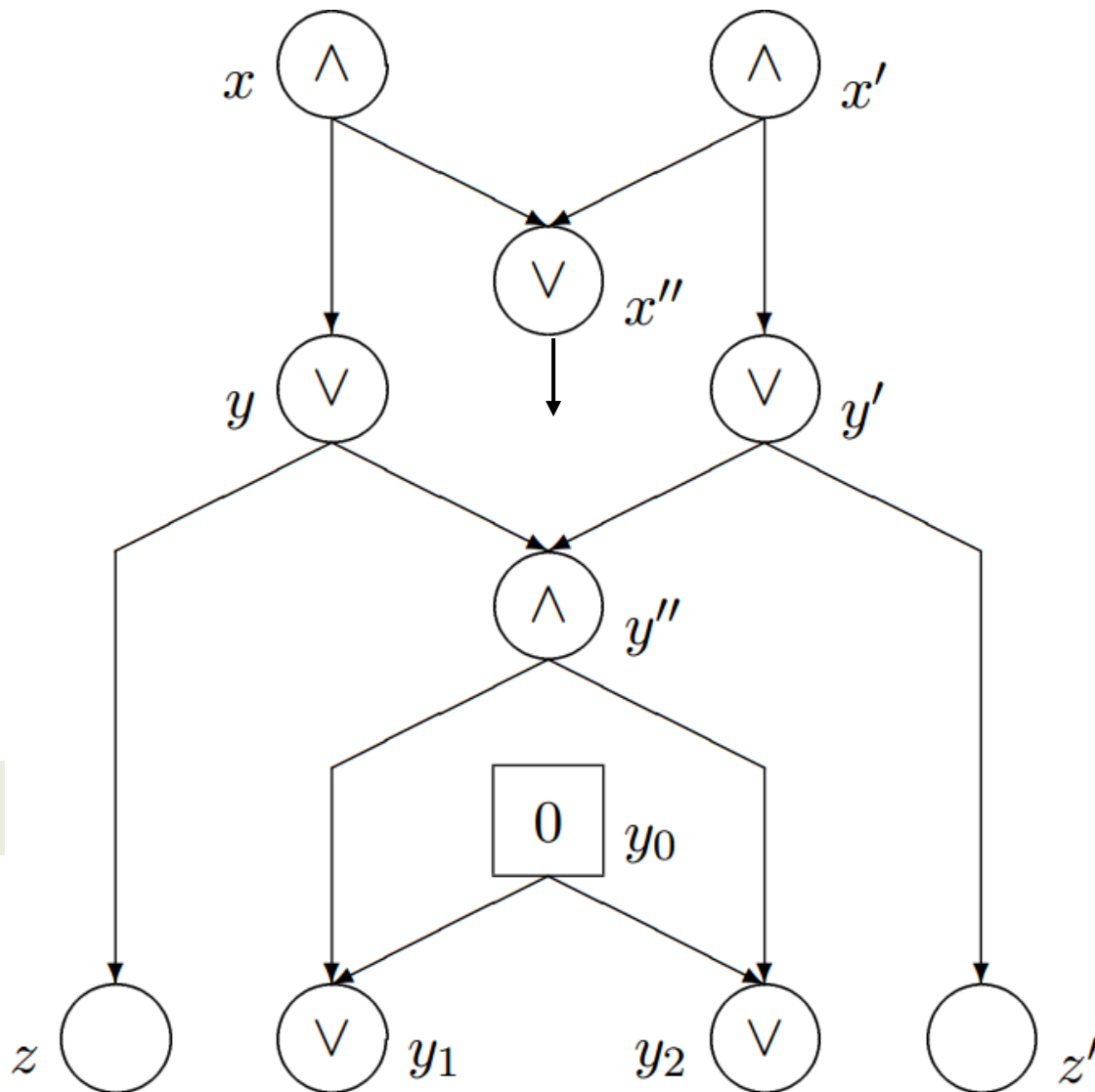
fanin = 2

Simpler Circuit Value Problems

[Greenlaw, Hoover, Ruzzo 1995]

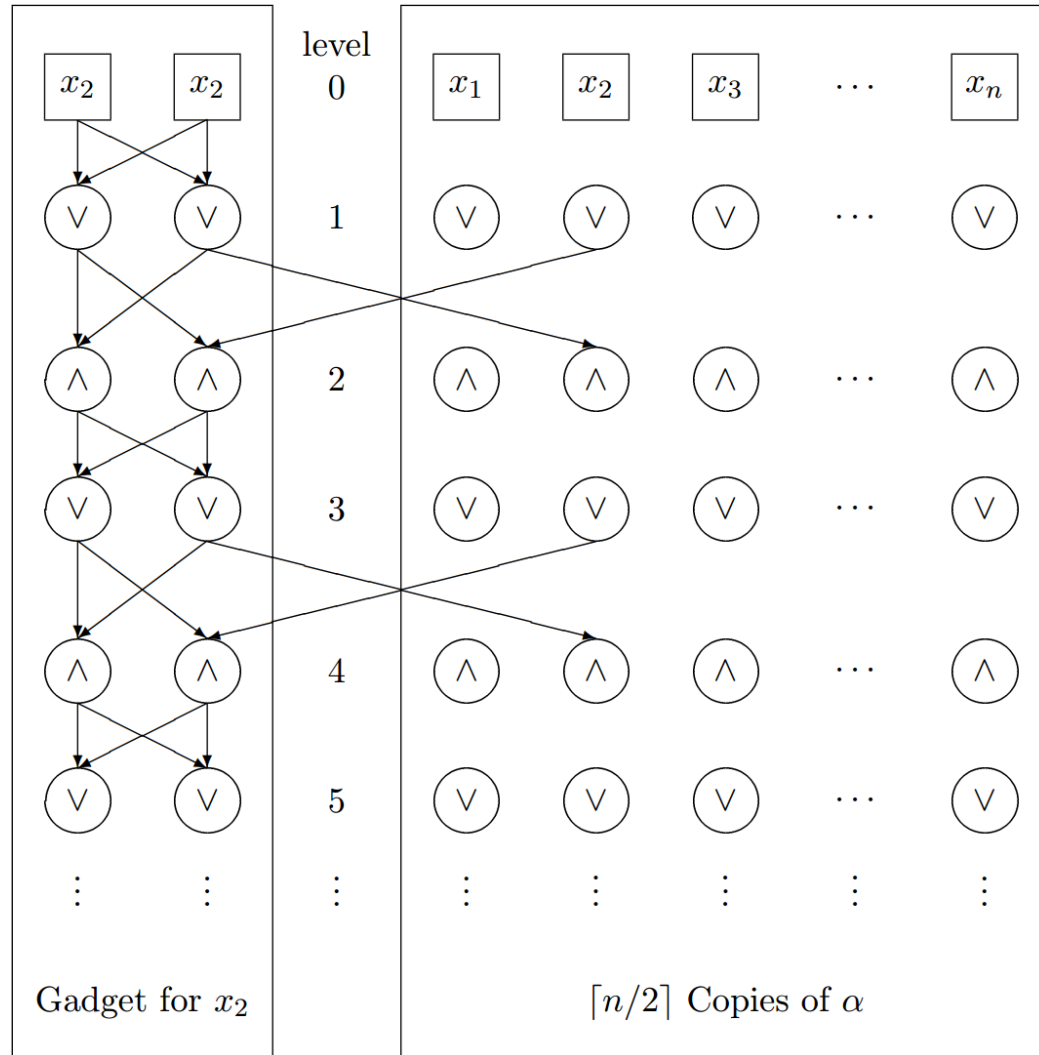


fanout = 2



Simpler Circuit Value Problems

[Greenlaw, Hoover, Ruzzo 1995]



synchrony



Bounded DCL is P-complete

$$(a \vee b \vee d) \wedge (a \vee c \vee f) \wedge (b \vee e \vee f)$$

