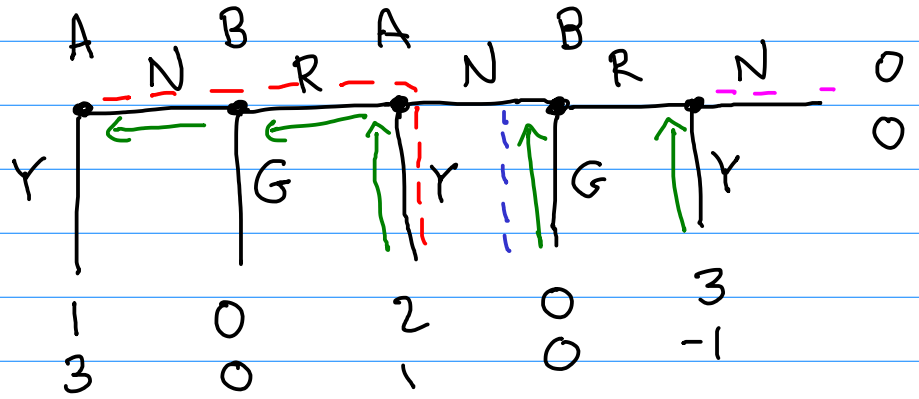
SPE vs non-SPE NE

— backward induction

-- equilibrium path

ex



Only SPE: (NYY,RG) <-- found using backward induction

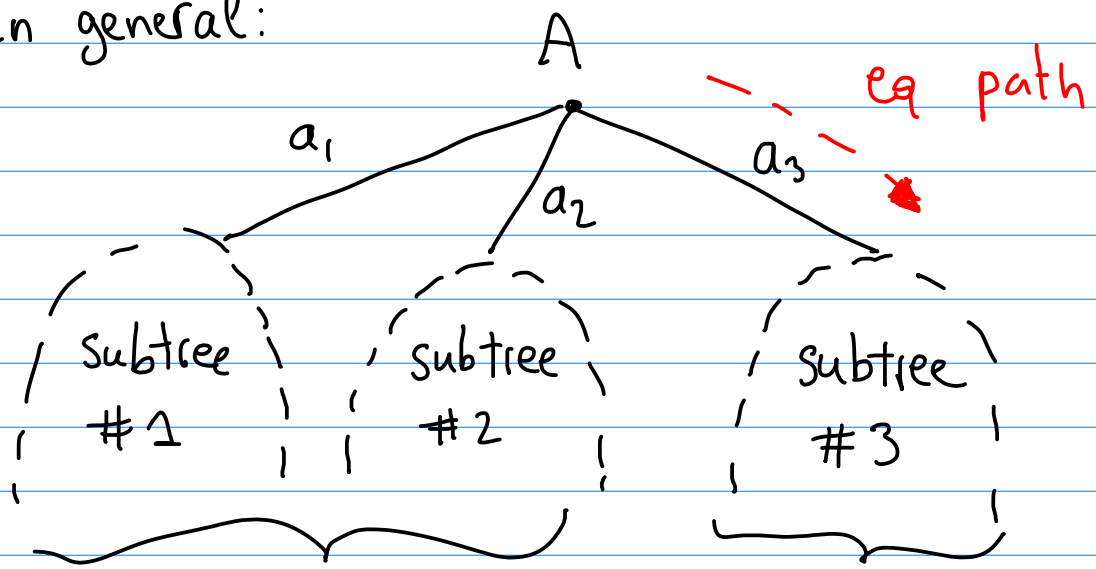
Non-SPE NE can be found by:
- following the equilibrium path
- playing irrational moves off-path s.t. the eq. path is still sustainable

In this game:
- A ends the game by playing Y
- B playing G afterwards makes the NE sustainable
- What A plays afterwards does not break the equilibrium

	GG	GR	RG	RR
YYY	1 3	1 3	1 3	1 3
YYN	1 3	1 3	1 3	1 3
YNY	1 3	1 3	1 3	1 3
YNN	1 3	1 3	1 3	1 3
NYY	0 0	0 0	2 1	2 1
NYN	0 0	0 0	2 1	2 1
NNY	0 0	0 0	0 0	3 -1
NNN	0 0	0 0	0 0	0 0

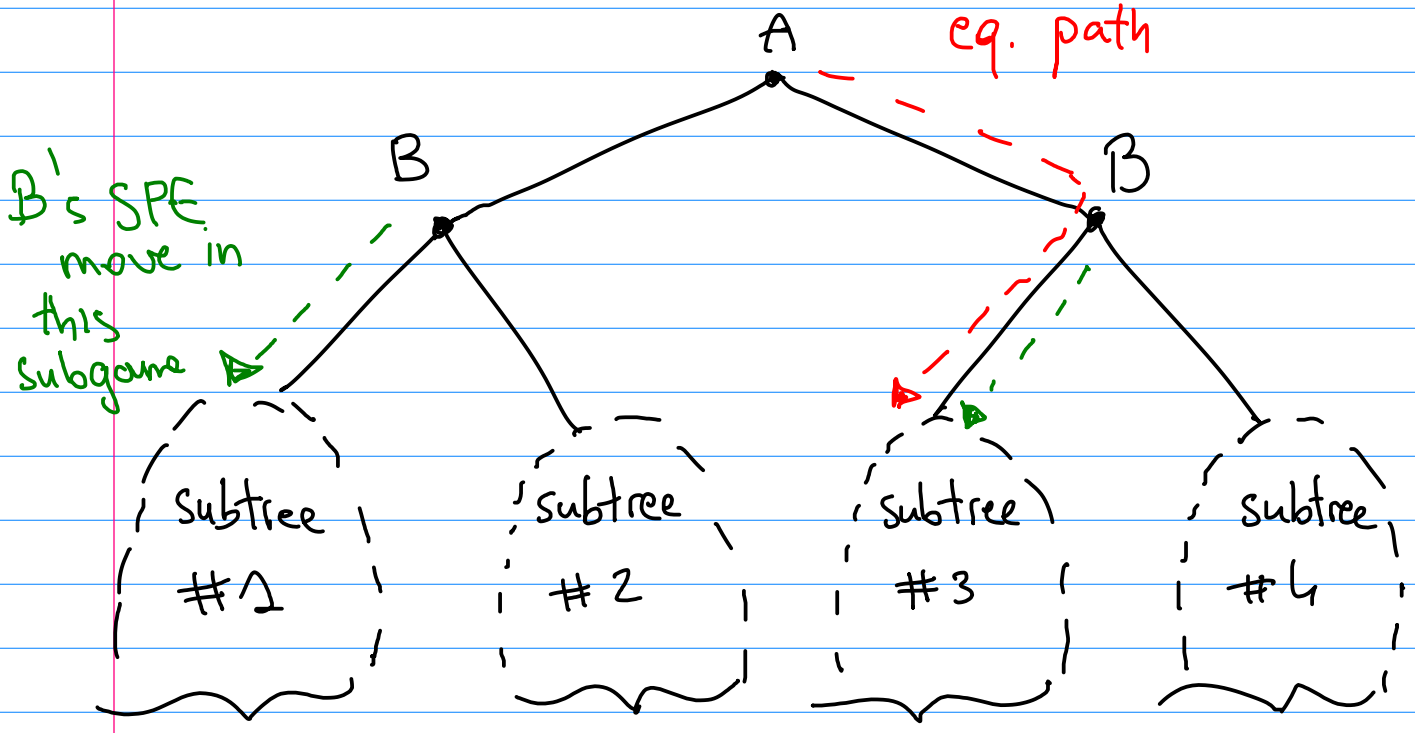
If B plans to play R on 2nd move, then A does not have incentive anymore to play Y on 2nd move

In general:



What A plays here does not matter, still a NE
(but other players' choices do)

keep the equilibrium strategy here



keep SPE strategy here

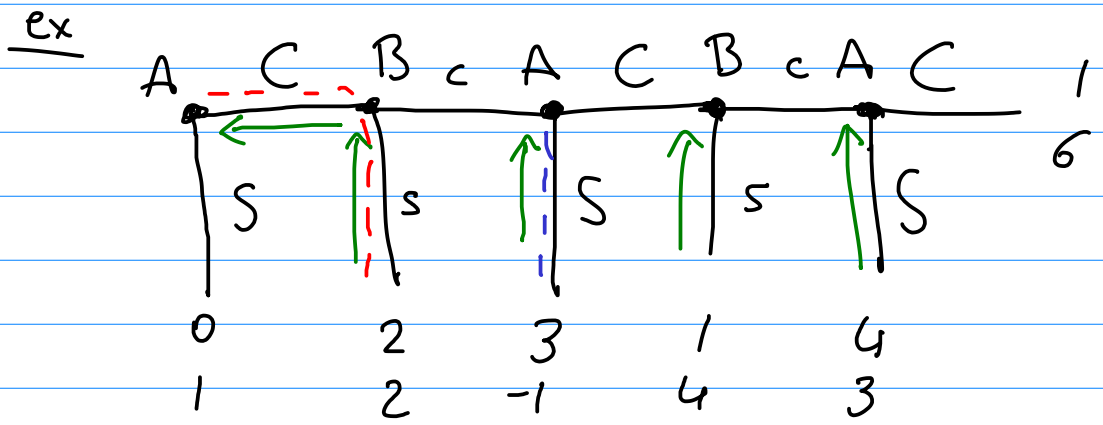
make B play anything here

keep SPE strategy

make B play anything here

To find non-SPE Nash equilibrium:
- fix player X at some point in the game (e.g., above it's B on 2nd move of the game)
- keep X's SPE moves in the subgame where X is willing to go (above, subtree #1 and subtree #3)
- play an irrational move in one (or more) subgames where X in not willing to go
- IMPORTANT: Keep other players' SPE strategy

ex

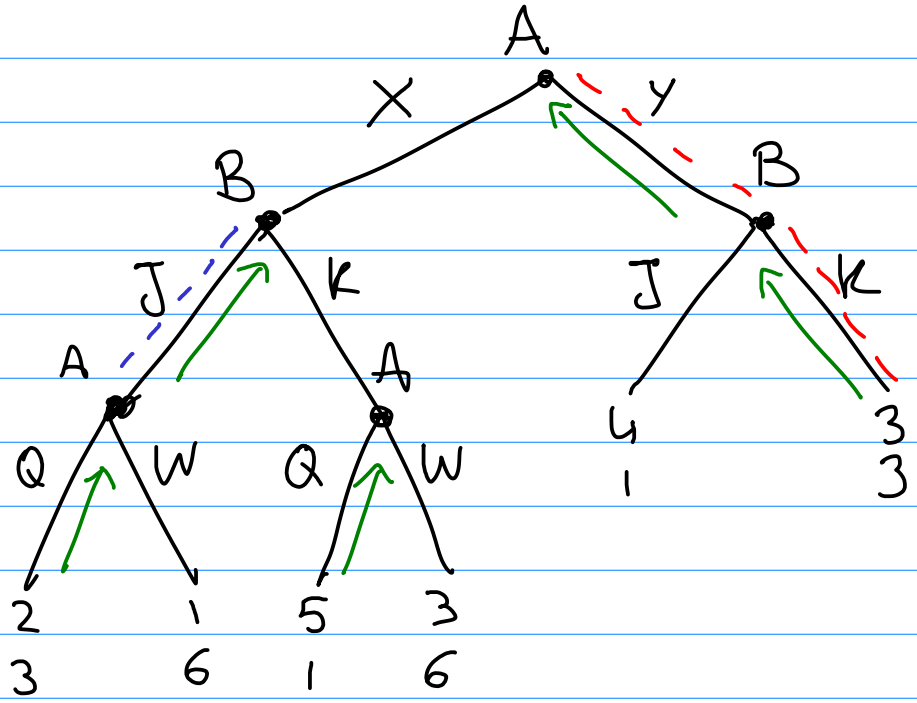


SPE: (CSS,ss) <-- found via backward induction

---> Any (CS*,s*) is a NE

E.g., (CSS,sc) is a NE but not a SPE

	ss	sc	cs	cc
SSS	0 1	0 1	0 1	0 1
SSC	0 1	0 1	0 1	0 1
SCS	0 1	0 1	0 1	0 1
SCC	0 1	0 1	0 1	0 1
CSS	2 2	2 2	3 -1	3 -1
CSC	2 2	2 2	3 -1	3 -1
CCS	2 2	2 2	1 4	4 2
CCC	2 2	2 2	1 4	1 6



SPE: (YQQ,JK) found via backward induction

Guaranteed NE: (Y**,JK)

E.g., NE that is not SPE: (YQW,JK)

	JJ	JK	KJ	KK
XQQ	2 3	2 3	5 1	5 1
XQW	2 3	2 3	5 1	5 1
XWQ	1 6	1 6	3 6	3 6
XWW	1 6	1 6	3 6	3 6
YQQ	4 1	3 3	4 1	3 3
YQW	4 1	3 3	4 1	3 3
YWQ	4 1	3 3	4 1	3 3
YWW	4 1	3 3	4 1	3 3