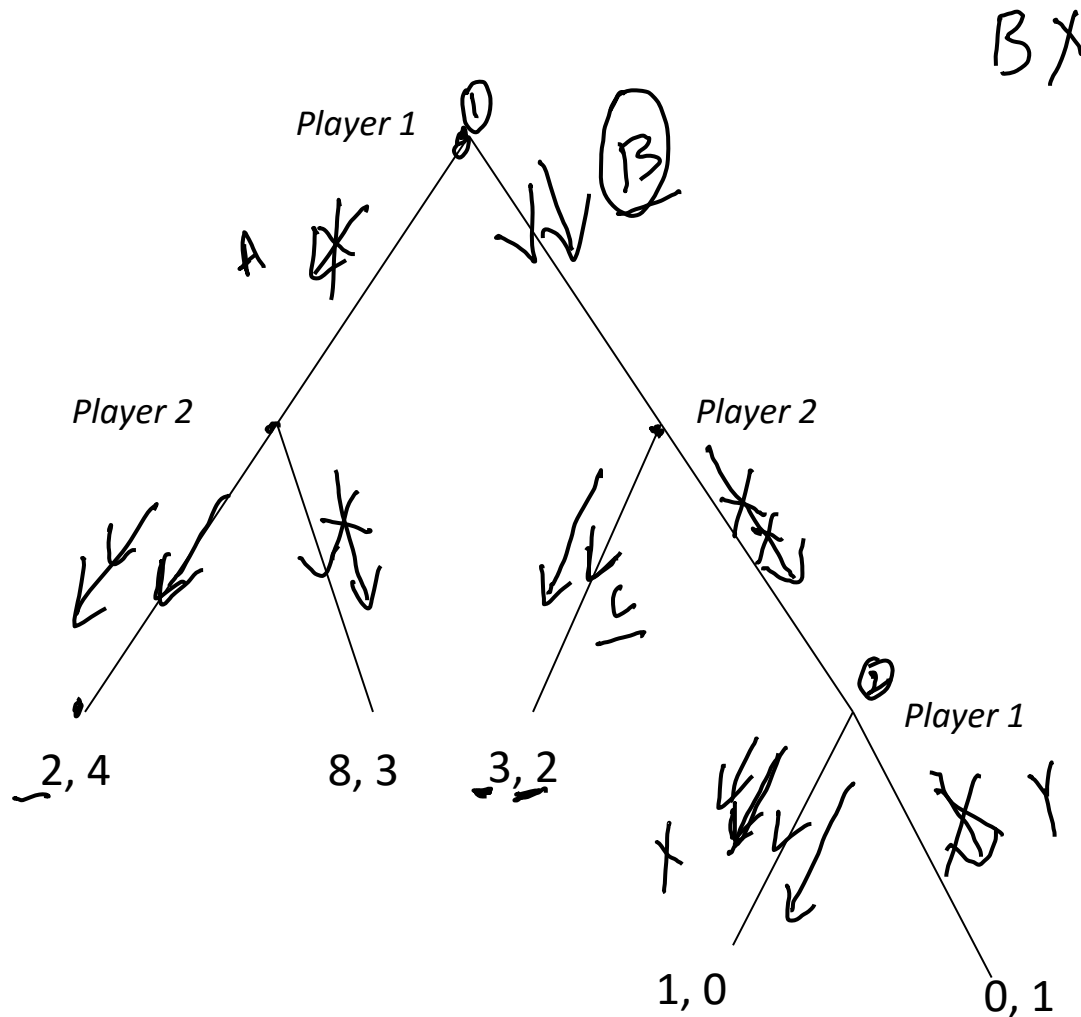# Sub Game Perfect Equilibrium
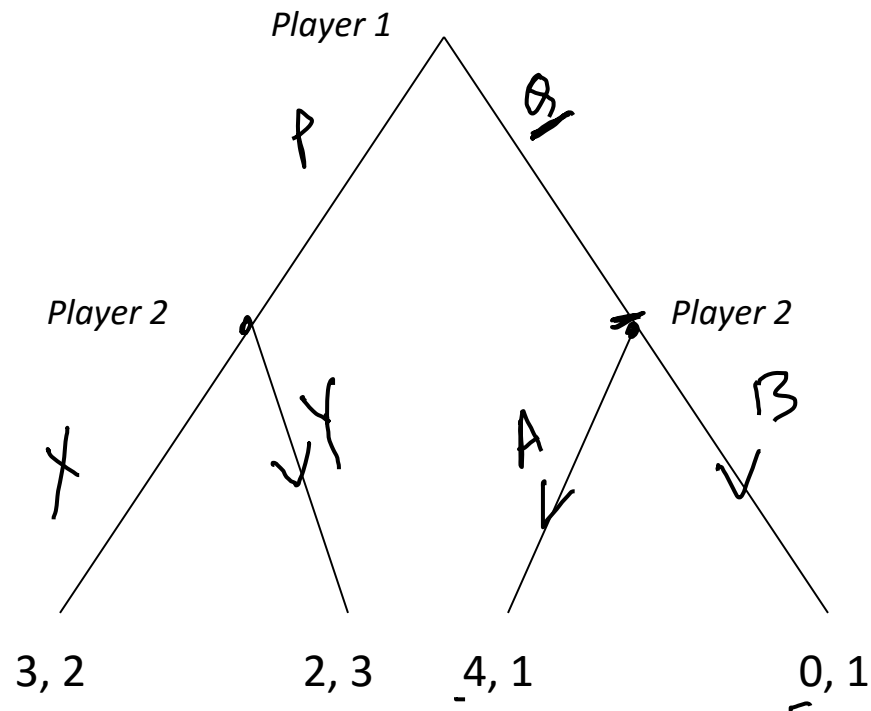
Dr. Vimal Kumar, Assistant Professor of Economics

Indian Institute of Technology Kanpur, vimalk@gmail.com
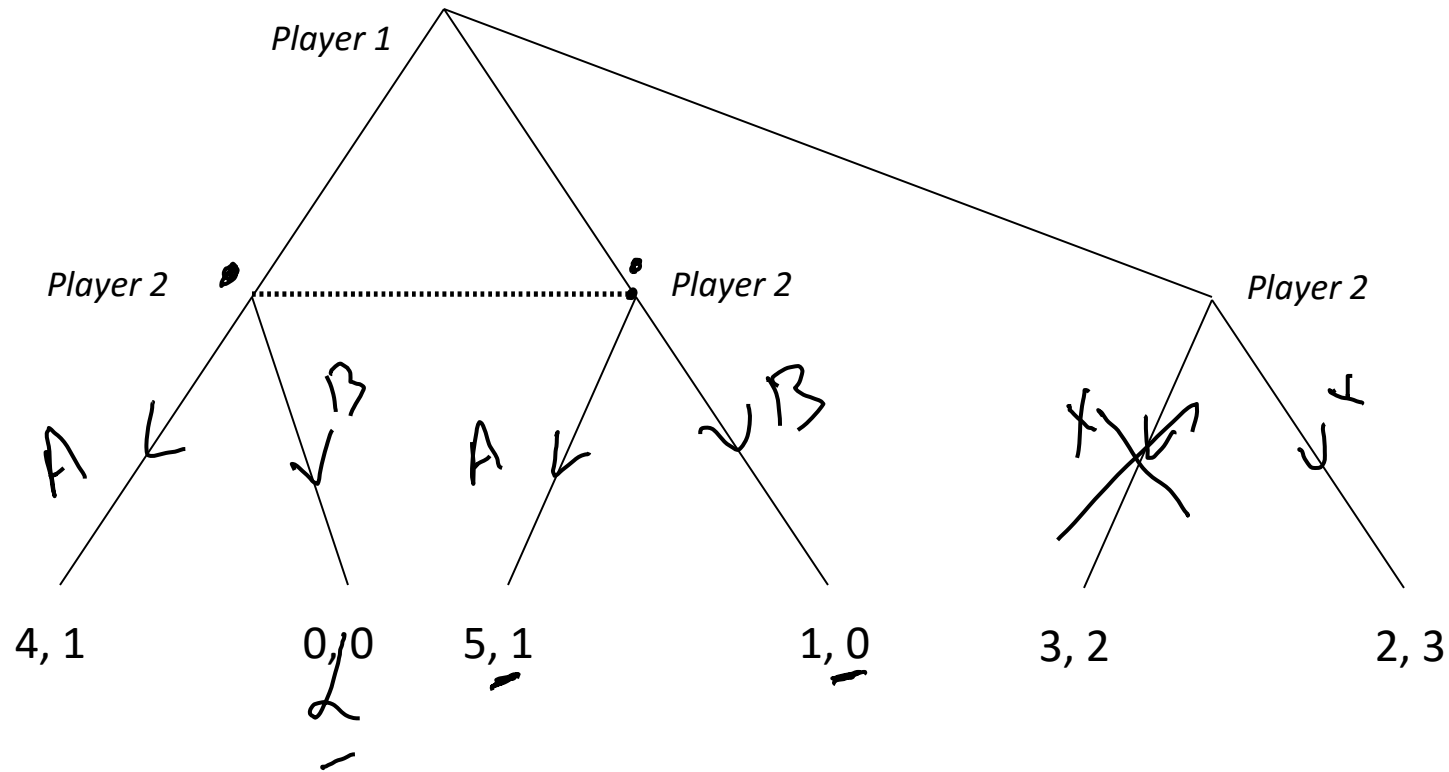
Recap: Backward induction

BX

Player 1

①

Ⓑ

A

Player 2
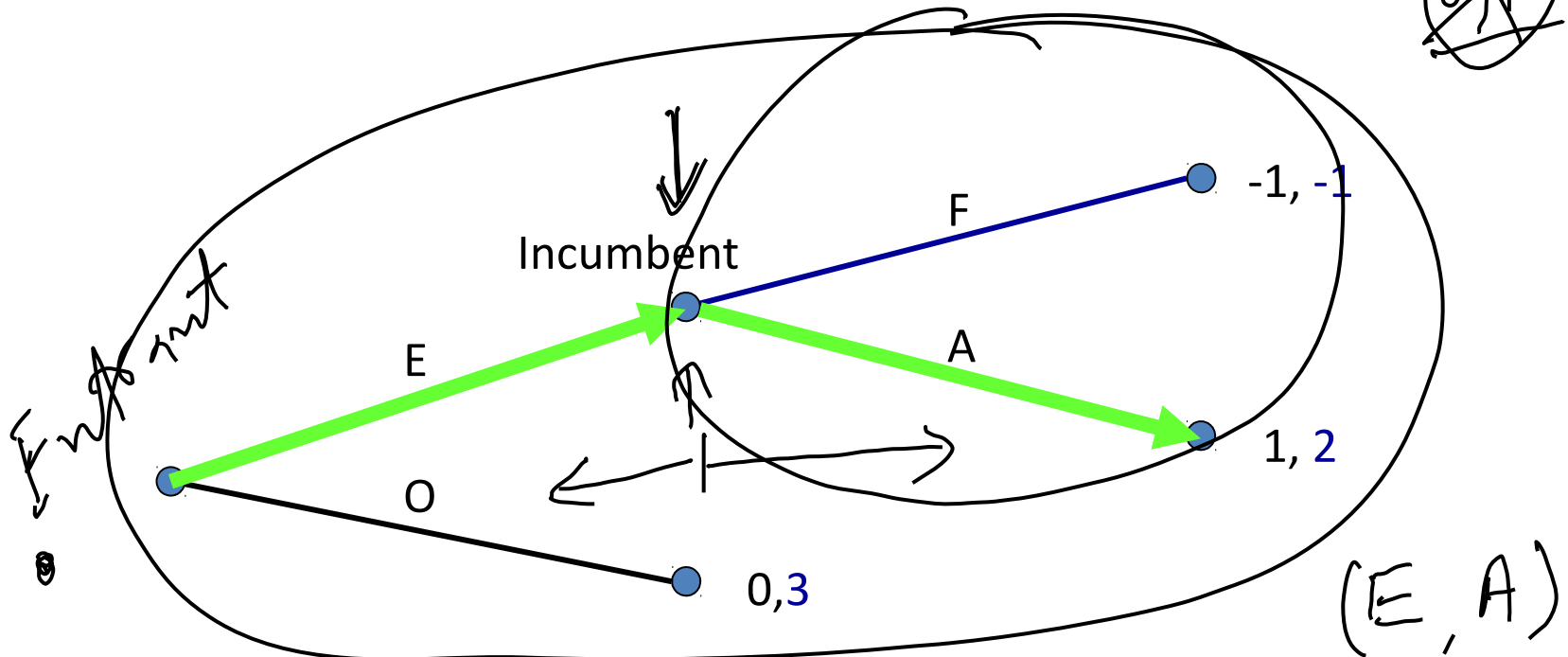
Player 2

Ⓓ

Player 1

2, 4

8, 3

3, 2

C

X

Y

1, 0

0, 1

A limitation of backward induction

Player 1

P   θ

Player 2   *Player 2*

X   Y   A   B

3, 2   2, 3   4, 1   0, 1

Another Limitation of Backward Induction

Problem with Nash Equilibrium

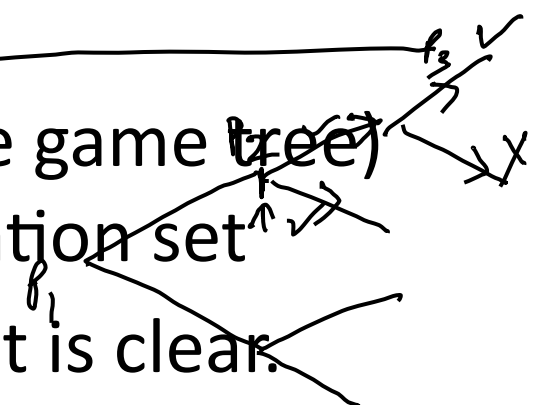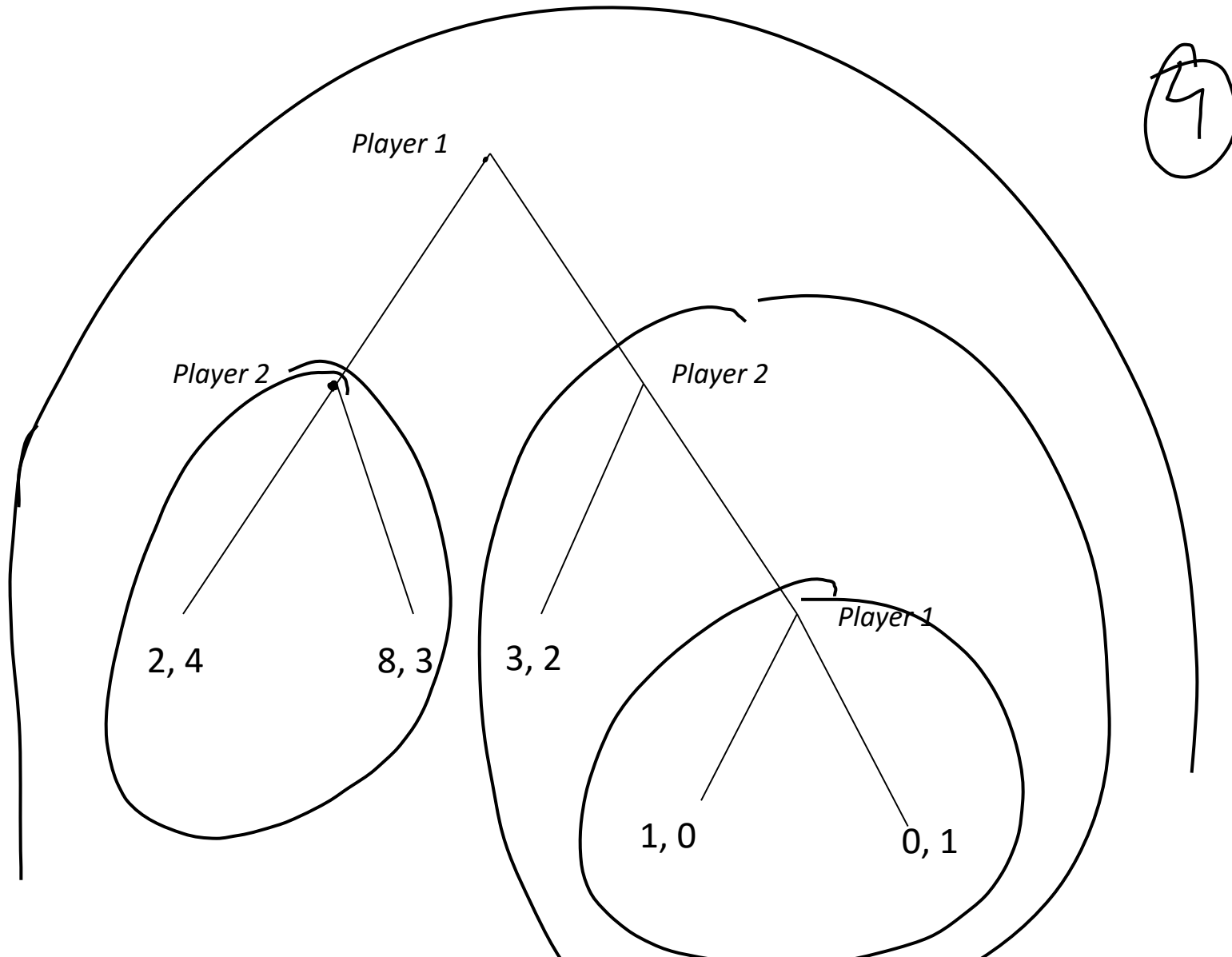| Entrant\Incumbent	F	A
E	-1,-1	1,2
O	0,3	0,3

Subgame

- A subgame in an extensive-form game
  - begins at some decision node, say A, with a singleton information set
  - includes all the successor nodes [decision and terminal nodes] of *A*
  - If includes one node from an information set, then includes all the nodes of that information set.
- ~~Proper subgame = subtree (of the game tree) whose root is alone in its information set~~
- Notion of movement: whenever it is clear.

Example

Player 1

Player 2

Player 2

Player 1

2, 4   8, 3   3, 2

1, 0   0, 1

Another Example

Player 1

Player 2   Player 2   Player 2

4, 1   0, 0   5, 1   1, 0   3, 2   2, 3