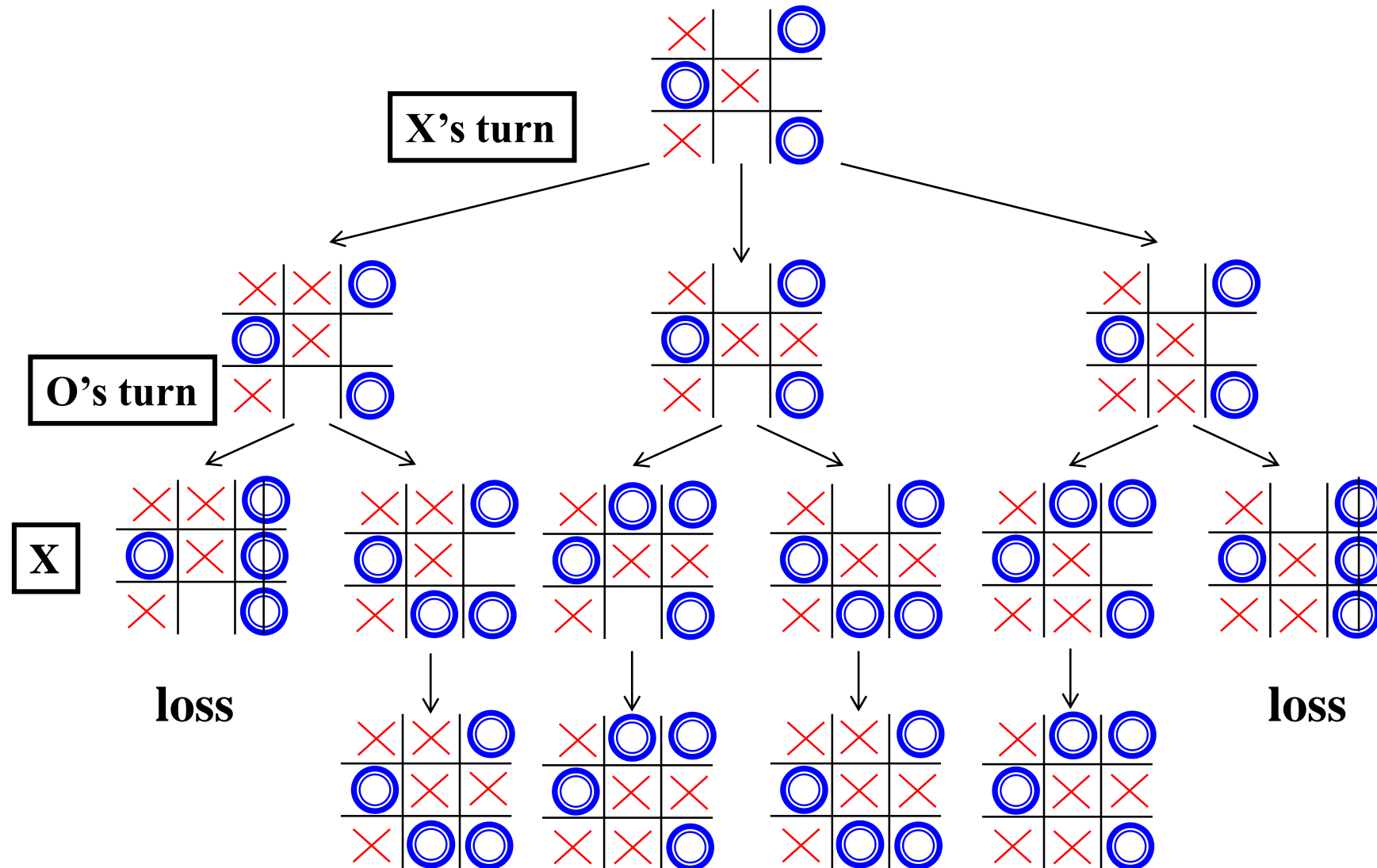# Traditional Board Games

Dr. Poulami Dalapati

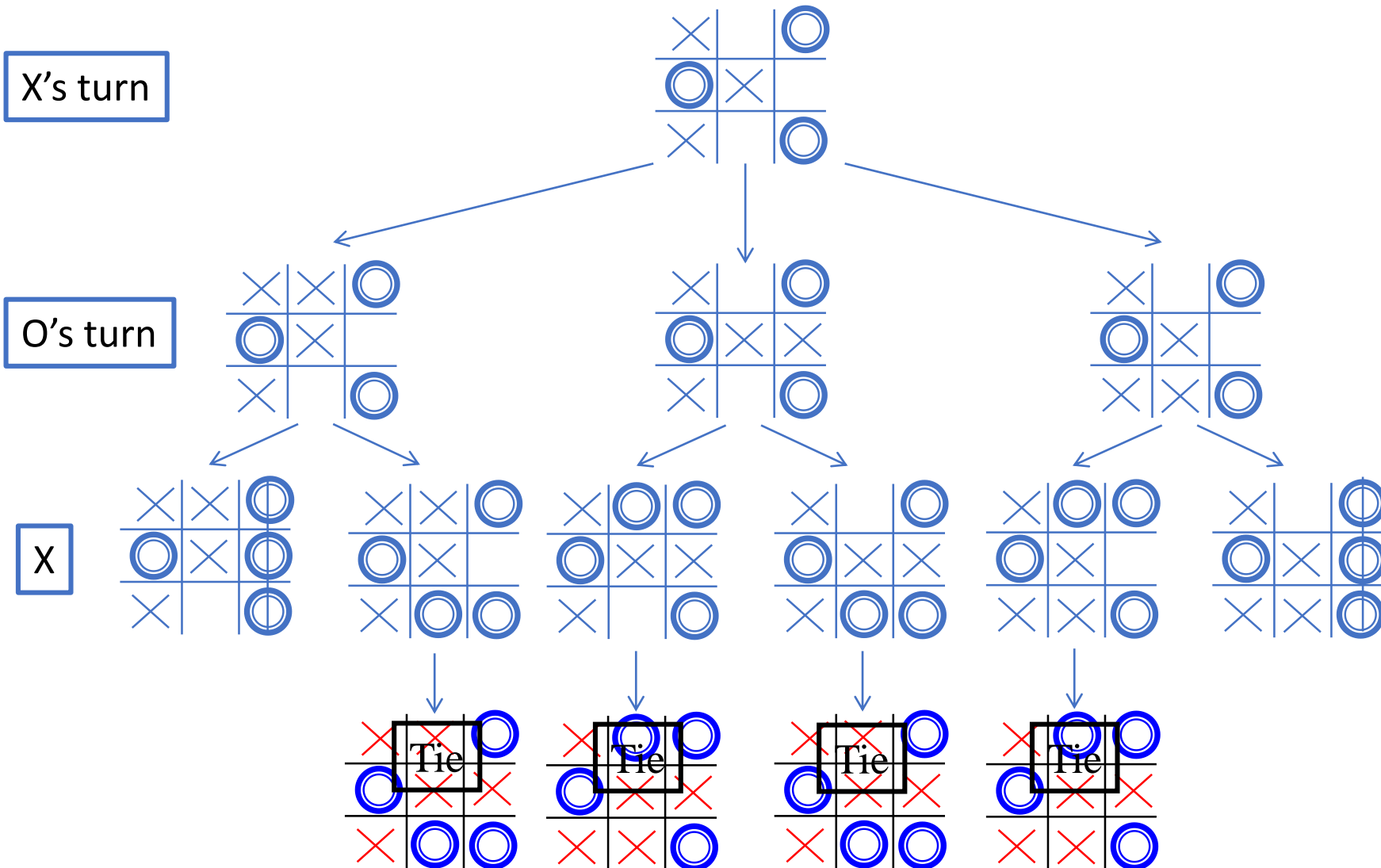Asst. Prof., Dept. of CSE

LNMIIT Jaipur

Games & Environment

- Finite

- Two-player

- Zero-sum

- Deterministic

- Perfect Information

- Sequential

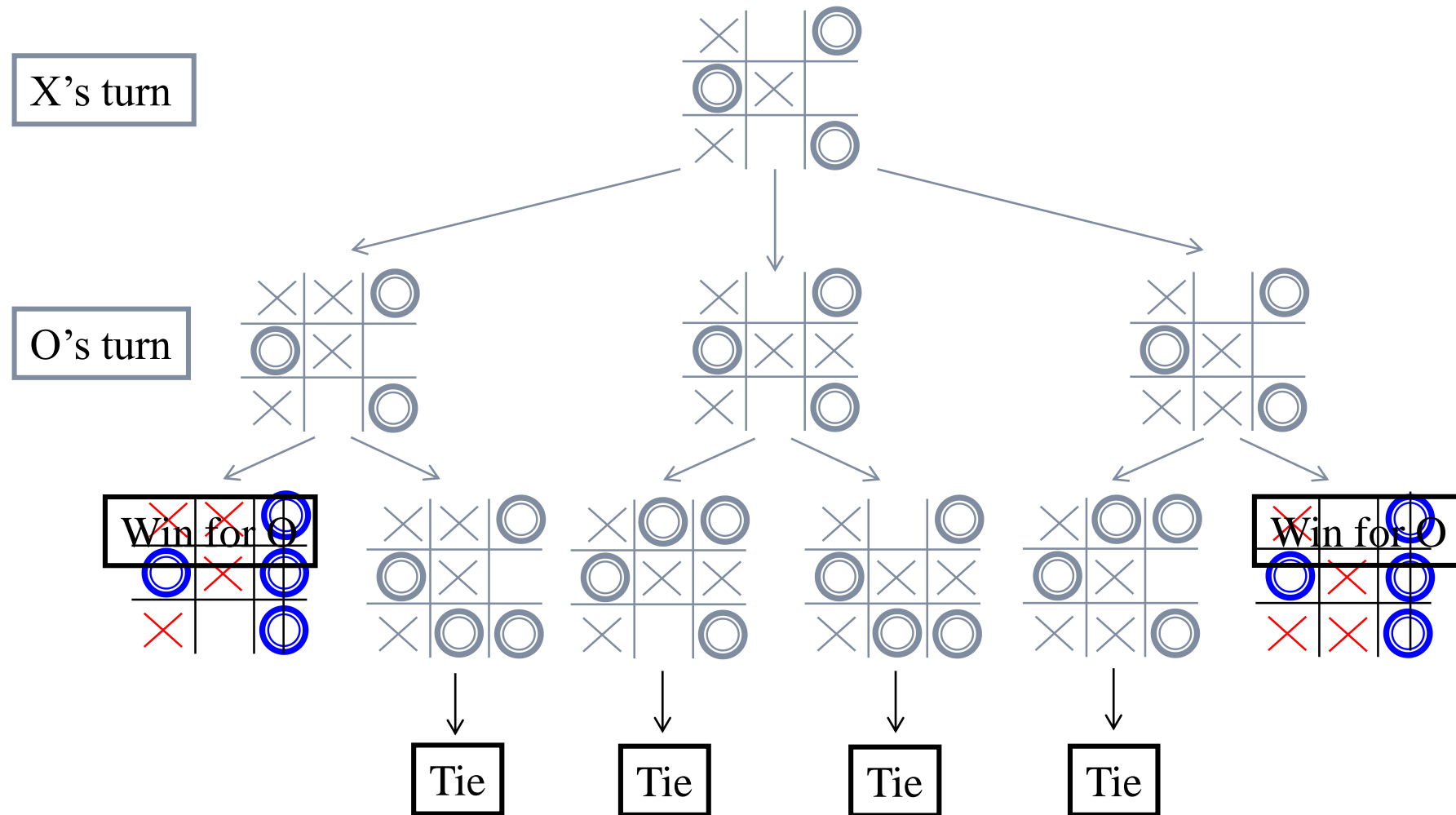- Utility (payoff) is always equal and opposite

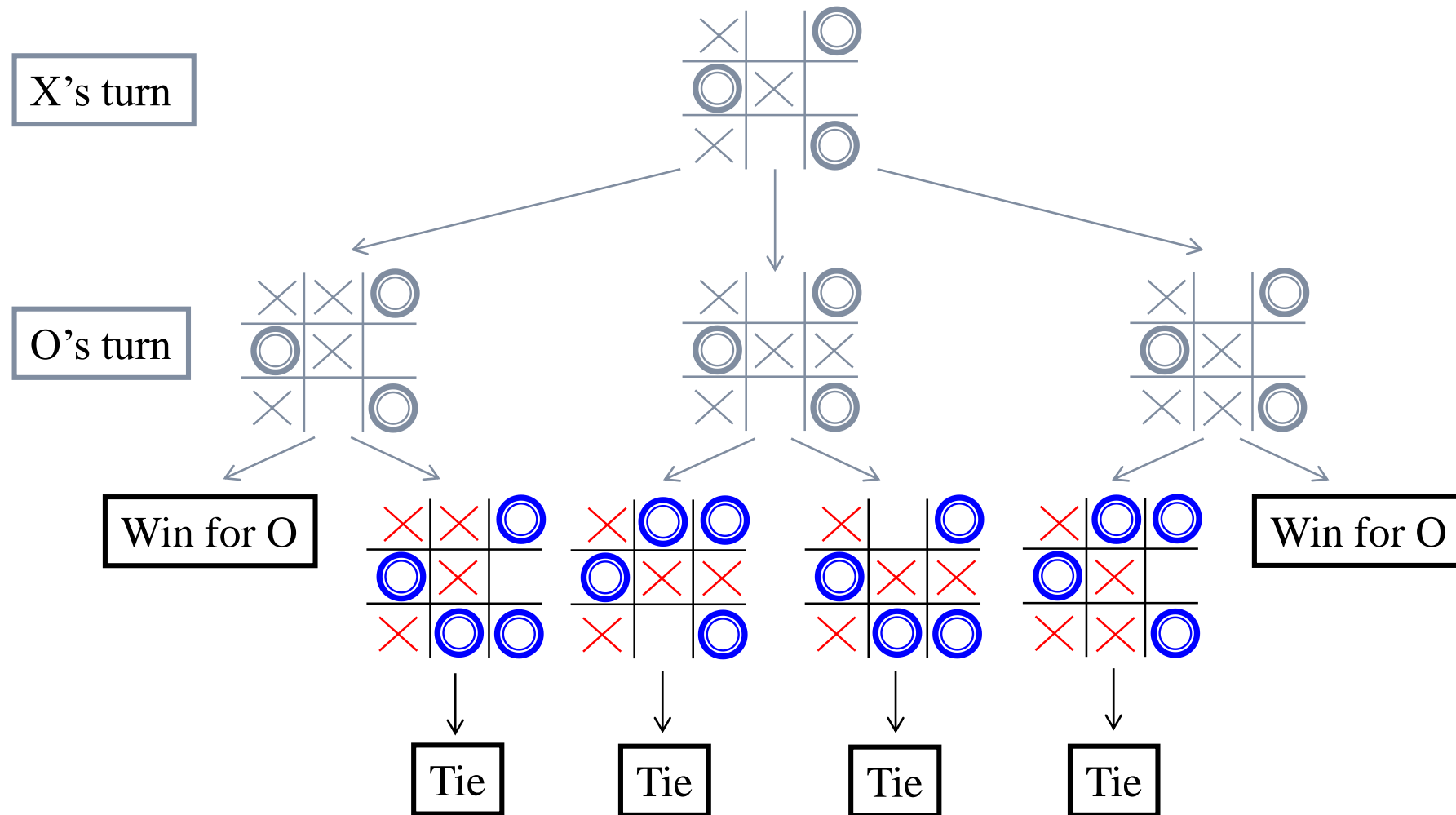# 2 Player Zero Sum Game: *Tic-tac-toe (or Noughts and crosses, Xs and Os)*

X's turn

O's turn

X

loss

loss

Look-ahead based Tic-Tac-Toe

Look-ahead based Tic-Tac-Toe

X's turn

O's turn

Win for O

Win for O

Tie

Tie
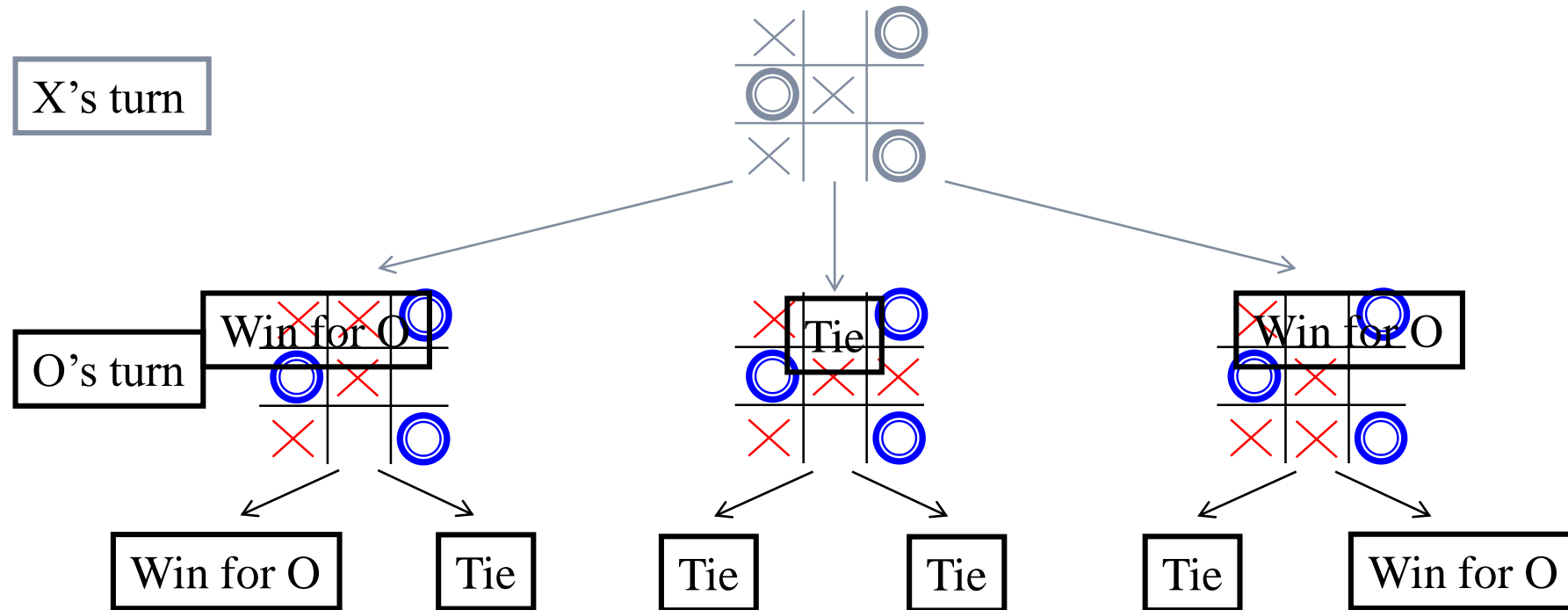
Tie

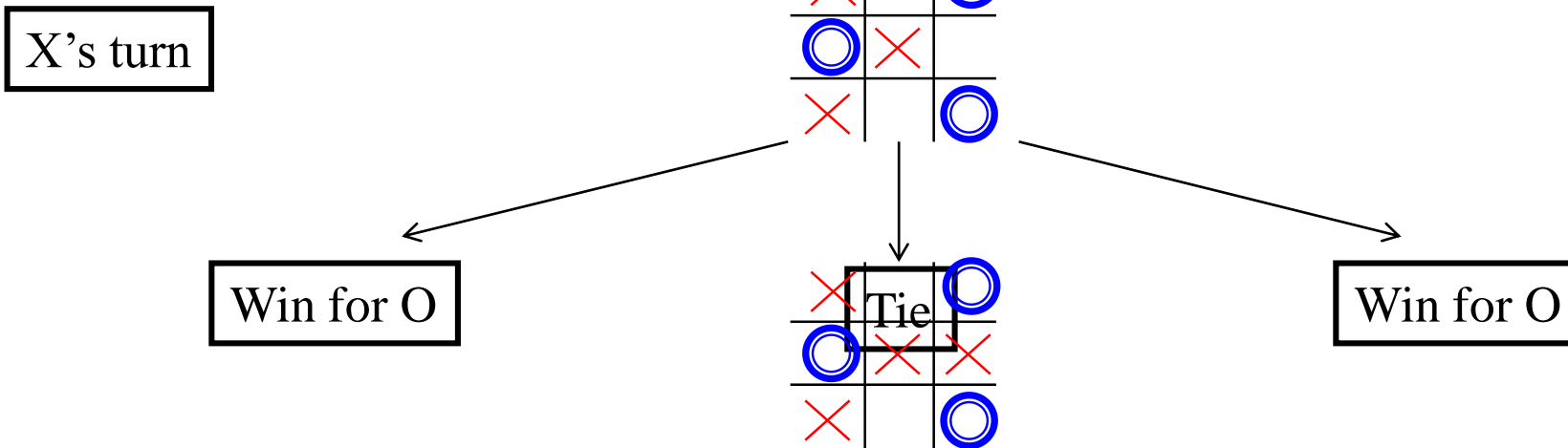Tie

Look-ahead based Tic-Tac-Toe

Look-ahead based Tic-Tac-Toe

Each board in game tree gets *unique* game tree value (utility; -1/0/+1) under optimal rational play. (Convince yourself.)

E.g. 0 for top board.

What if our opponent does not play optimally?

X's turn

Win for O

Tie

Win for O

- Approach: Look first at bottom tree. Label bottom-most boards.
- Then label boards one level up, according result of best possible move.
- … and so on. Moving up layer by layer.
- Termed the Minimax Algorithm