Auction: As a Normal Form Game

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Auction as a Game

- Players: n Potential Bidders.

- Strategy Set of Bidder *i:* A set of all not negative bids

- Payoff: If she wins then amount equals to her valuation minus what she pays. And,0 if she loses

- Rules of the game: Type of Auction, Type of valuation, how does winner get decided.

- Is the seller a player in the game? The seller typically gets to set the rules for the auction.

Modelling Vickrey Auction as a Game .

- Vickrey Auction: Second Price sealed bid auction & players have private valuation.

- Players: all the bidders.

- Strategy Set of Bidder *i:* A set of all not negative bids

- Payoff: If she submits the highest bid then amount equals to her valuation minus the highest among remaining bids. And, 0 if she loses

- What is the Nash Equilibrium of this game?

Optimal Bidding Strategy in Vickrey Auction

○ Player i's bid

● Other players' bid
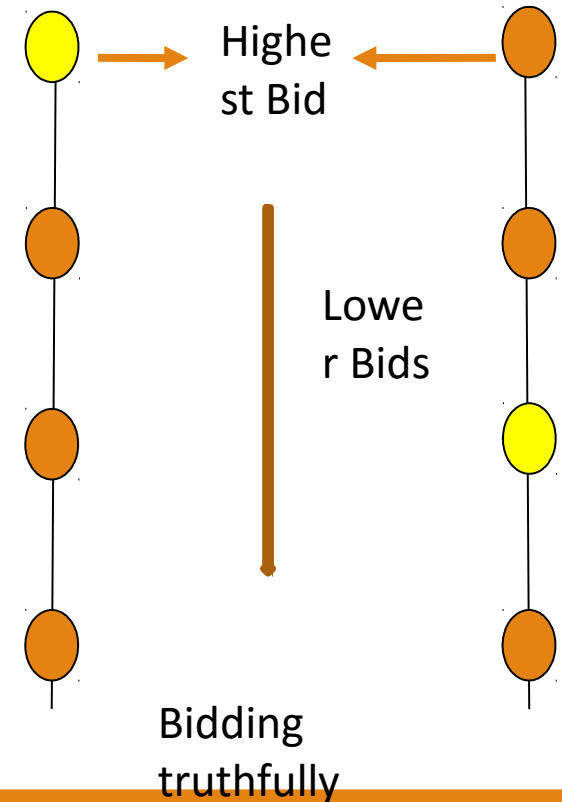
● Player i's valuation

Three Strategies for Player i:
Strategy 1: Bidding truthfully
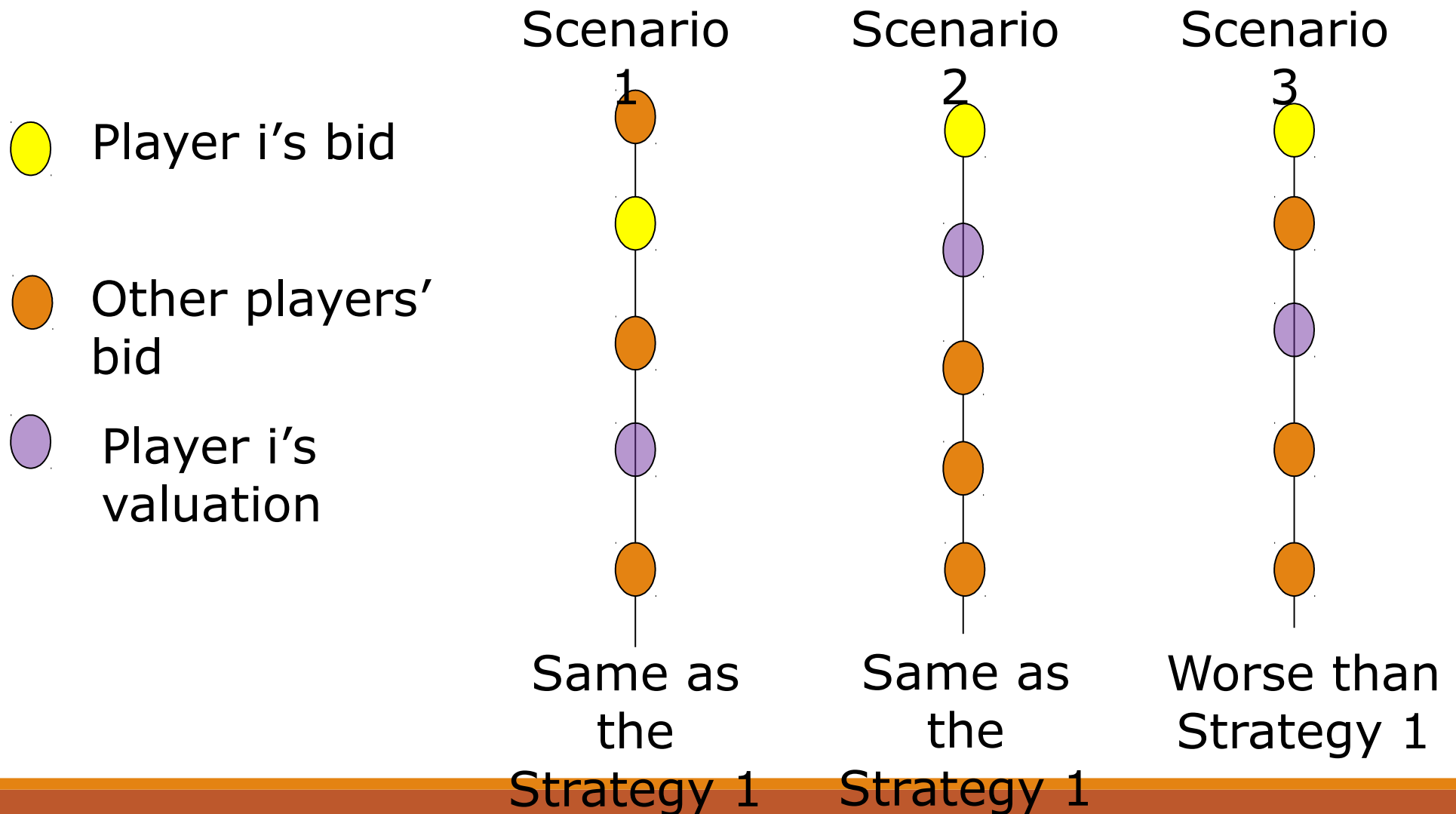Strategy 2: Bidding more than the valuation
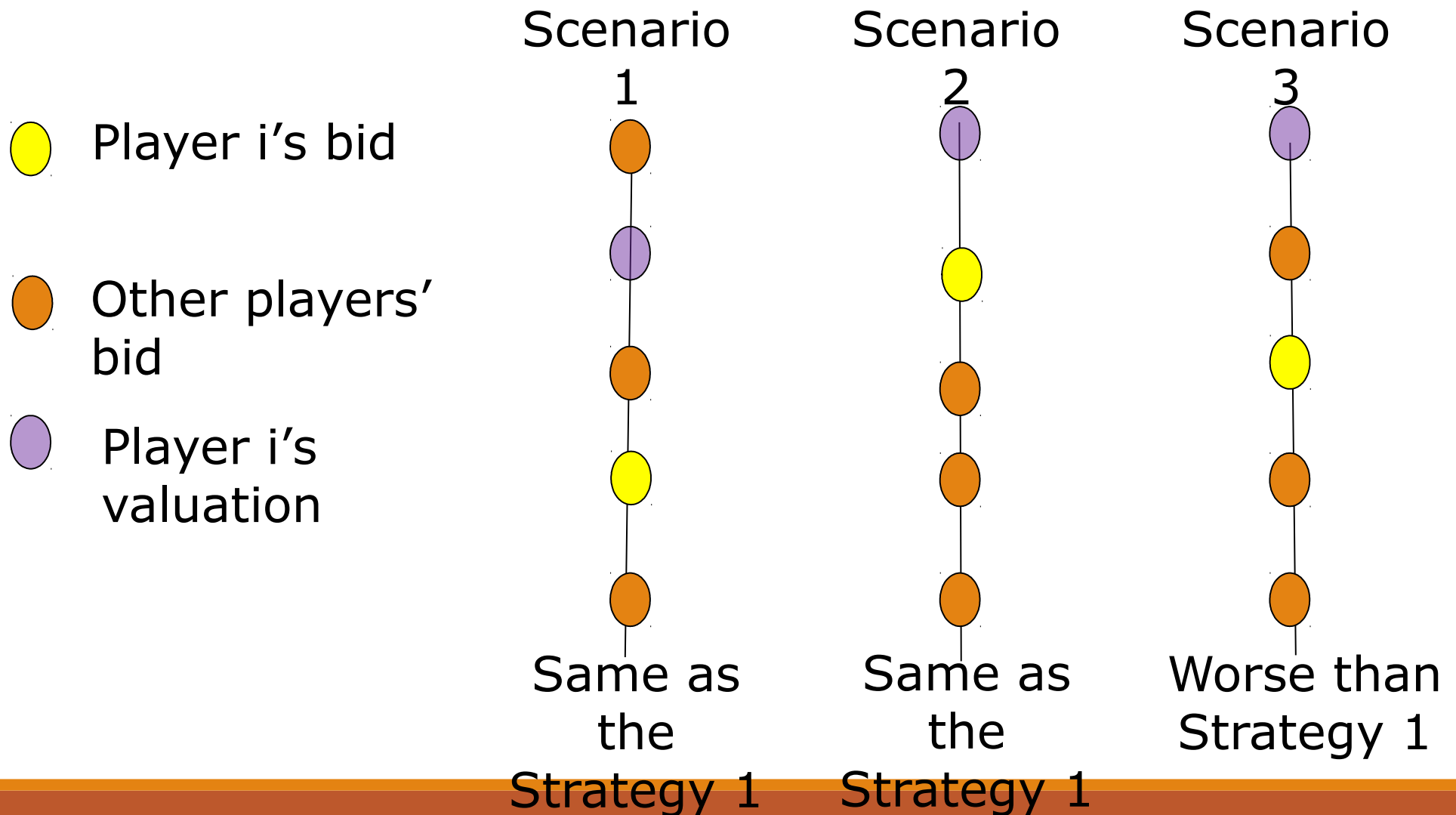Strategy 3: Bidding less than the valuation

Player i wins   **Player i loses**

Highest Bid

Lower Bids

Bidding truthfully

Strategy 2: Bidding More than the true value.

○ Player i's bid

● Other players' bid

● Player i's valuation

Scenario 1

Scenario 2

Scenario 3

Same as the Strategy 1

Same as the Strategy 1

Worse than Strategy 1

Strategy 3: Bidding Less than the true value.

Player i's bid

Other players' bid

Player i's valuation

Scenario 1

Scenario 2

Scenario 3

Same as the Strategy 1

Same as the Strategy 1

Worse than Strategy 1

Nash Equilibrium

- Vickrey Auction: Equilibrium strategy is to bid truthfully.

- One Nash Equilibrium is a strategy profile in which all the bidders bid truthfully. [Weak Dominant Strategy Equilibrium]

- Any other Nash Equilibrium?: Consider a Vickrey Auction with only two players.

- In English Auction: what does it mean?

- How about First Price Sealed Bid Auction.

- Revisit the topic of Auction after the introduction of Bayesian Games.

Other Auction Formats

- All Pay Auction

- Double Auction

- Auction as a scheduling mechanism

- Combinatorial Auctions