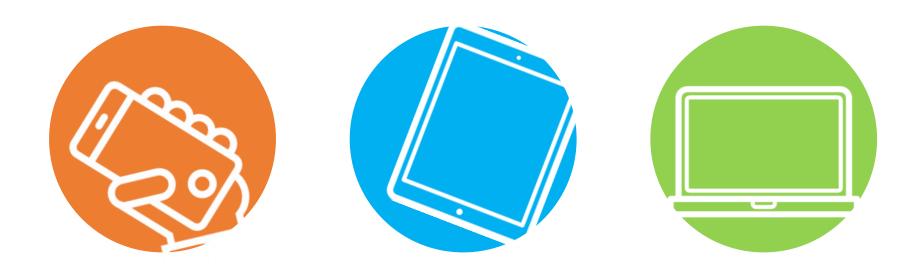
CSC304 Lecture 22

BUT FIRST...

Course Evaluation

Low response rate

Complete your course evaluations...



Check your e-mail for a link to your evaluations, or log-in to www.portal.utoronto.ca and click the Course Evals tab!



Should I expect drumrolls?

Course Evaluation

New response rate

REVIEW (Of most concepts)

Part I: Game Theory

- Normal (matrix) form games
- Strategies: pure & mixed
- Weak/strict dominance
 - Strategy A dominates strategy B
 - > Iterated elimination of dominated strategy
 - Strategy A is dominant
- Nash equilibrium: pure and mixed
 - Nash's theorem

Part I: Game Theory

- Price of anarchy and stability
 - > Anarchy: Worst NE vs social optimum
 - > Stability: Best NE vs social optimum
 - $> PoA \ge PoS \ge 1$
- Potential functions
 - Cost-sharing games
 - Braess' paradox
- Zero-sum games
 - > The minimax theorem
- Stackelberg games, Stackelberg equilibrium

Part II: Mech Design w/ Money

- Goals: social welfare or revenue
- Incentive guarantees:
 - > Strategyproofness
 - Bayes-Nash incentive compatibility (BNIC)
- VCG mechanism
 - > Strategyproof + maximizes social welfare on every instance
 - $> \sqrt{m}$ approximation for single-minded bidders
 - > Sponsored search, comparison to GSP
- Myerson's auction
 - Strategyproof + maximizes expected revenue among all BNIC mechanisms

Part II: Mech Design w/ Money

Revelation principle

Revenue equivalence principle

- Bayes-Nash equilibria of non-BNIC mechanisms
 - > 1st price auction and its equilibrium

Part III: Mech Design w/o Money

- Facility location
- Social cost
 - > The median mechanism
- Maximum cost
 - > The left-right-middle mechanism
- Stable matching
 - > Gale-Shapley deferred acceptance algorithm

Part IV: Voting

- Ranked voting
- Voting rules
- Gibbard-Satterthwaite theorem
- Axiomatic approach to voting
 - Strategyproofness, strong / weak monotonicity, consistency, Condorcet consistency
- Utilitarian approach to voting
- Impartial selection

Part V: Fair Division

- Cake-cutting
 - > Proportionality and envy-freeness
 - > Robertson-Webb model
- 2-players
 - > Cut-and-choose
- 3+ players proportional
 - Dubins-Spanier protocol (moving knife)
 - Even-Paz protocol
- Pareto optimality
- Strategyproofness via perfect partition

Part V: Fair Division

- Indivisible goods
 - > Envy-freeness up to one good
 - > Maximum Nash Welfare allocation