

1. **Front:** What is an information set?

2. **Back:** Set of nodes that are indistinguishable to a player;

3. **Front:** Report an example of one 2-players game with perfect information and one with imperfect information in extensive form representation;
4. **Back:**

5. **Front:** Report an example of one 2-players game with perfect recall and one with imperfect recall in extensive form representation;
6. **Back:**

7. **Front:** Report the definition of timeable extensive form game;
8. **Back:** A game is timeable if and only if all its information sets are chronologically ordered

9. **Front:** Report an example of game with perfect recall that is not timeable
10. **Back:**

11. **Front:** Provide the definition of the normal form representation of a game, including games with Nature;

12. **Back:** Given an extensive form game $(N, A, T, \iota, \rho, \chi, U, H)$, its normal form representation is the tuple (N, P, U') (3), where:

- N is the set of strategic players
- P is the set of sets of plans s.t. P_i is the set of plans available to player i
- P_i is the set of plans available to player i , specifying one action $a \in A_i$ for each information h set belonging to H_i s.t. $a \in \rho(h)$
- U is the set of utility functions corresponding to each player
- $U_i: P_1 \times P_2 \times \dots \times P_n \rightarrow \mathbb{R}$ is a function returning the utility of player i given a plan profile p returning $U(w)$, where w is the terminal node reached by following the plan profile p

13. **Front:** Given an extensive form game with 2 players, h information sets per player, and 2 actions per information set, what is the asymptotical size of the normal form representation?

14. **Back:** 2^{2h}

15. **Front:** What is the definition of a strategy and a strategy profile in a normal form game?

16. **Back:** A strategy in a normal form game is a function $\sigma_i: P_i \rightarrow [0, 1]$ returning the probability of player i playing a given plan ($\in P_i$). A strategy profile is a tuple $(\sigma_1, \sigma_2, \dots, \sigma_n)$ containing a strategy for each player

17. **Front:** What is the definition of the reduced normal form representation of an extensive form game?

18. **Back:** Given a normal form representation of the extensive form game, the reduced normal form representation is the tuple (N, P', U') where:
- (a) N, U' are the same as in the normal form representation
 - (b) $P' \subset P$ s.t. no two plans belonging to the same player in P' are realisation equivalent and any plan $\in P$ not included in P' is realisation equivalent to a plan in P'

19. **Front:** Given an extensive form game with 2 players, h information sets per player, and 2 actions per information set, what is the asymptotical size of a reduced normal form representation?

20. **Back:** 2^{2h} (same as non reduced normal form)
21. **Front:** What is the expected utility of a player in a normal form game?

22. **Back:** Given a strategy profile σ , the expected utility of player i is $\sum_{n=1}^n \sigma_i(p) U_i(p)$

23. **Front:** Provide the definition of a sequence form representation of an extensive form game (with Nature);

24. **Back:** Given an extensive form game $(N, A, T, \iota, \rho, \chi, U, H)$, its sequence form representation is the tuple (N, Q, U', C) where:

- N is the set of strategic players
- Q is the set of sets of sequences s.t. Q_i is the set of sequences available to player i
- U' is the set of utility functions U'_i , where each U'_i returns the utility obtained by the terminal node reached by the sequence profile q
- C is the set of constraints $\{(F_i, f_i)\}$ over the sequence form strategy of all players

25. **Front:** Given an extensive form representation of a game with 2 players, h information sets per player, and 2 actions per information set, what is the asymptotical size of the sequence form representation?

26. **Back:** 2^{2^h} i.e. the sequence form representation of an extensive form game is linear in the number of nodes

27. **Front:** What is the definition of a sequence form strategy and a sequence form strategy profile in a sequence form game?

28. **Back:** A sequence form strategy (realisation plan) r_i is a function $r_i: Q_i \rightarrow [0, 1]$ returning the probability of player i playing a given sequence ($\in Q_i$).
29. **Front:** $\sum_{q_1 \in Q_1} \sum_{q_2 \in Q_2} \cdots \sum_{q_n \in Q_n} \prod_{i=1}^n r_i(q_i) U_i(\mathbf{q})$
30. **Front:** Provide the statement for Kuhn's Theorem

31. **Back:** There exists at least one realisation equivalent agent form strategy for each normal form strategy if the game has perfect information