Visit Suncam.com for more courses

Continuing Education Course #504
What Every Engineer Should Know about
Game Theory

1. How old is Game Theory?

○ a. It occurred as soon as humans started interacting with each other. Marriage and child rearing involves game theory
○ b. It started with the 1700's for naval combat
○ c. It started with the advent of professional chess matches
○ d. It started during World War I

2. Where does game theory not get applied:

○ a. Negotiations
○ b. Warfare
○ c. Rules of the road
○ d. Establishing cooperation

3. What is not a Zero Sum Game?

○ a. Chess
○ b. A political election
○ c. Commerce
○ d. March Madness

4. Why does this course prefer two player interactions?

○ a. Three player games are always zero sum
○ b. More than two players is not game theory and is defined as warfare
○ c. You can only perform game theory analysis with even numbers of players.
○ d. More than two players rapidly increases the complexity of the game and does not affect the validity of the introductory concepts in this course.

5. What is Utility Theory?

○ a. The need to be truthful in economic exchanges
○ b. The realization that different people may assign different values to a reward.
○ c. The level of usefulness of game theory
○ d. The ability to use game theory in real life.

6. What does a linear utility curve correspond to?

○ a. To a person who values the first dollar as much as the millionth dollar, like a Dutchman.
○ b. To a person who has no interest in money
○ c. To a person who sets certain financial goals and after that does not care whether they get more.
○ d. To a person who will only keep a few donut if he is given a dozen donuts

7. When does a Prisoner's Dilemma not occur?

○ a. When the prisoners speak different languages
○ b. When the prisoners have different economic backgrounds
○ c. When the prisoners both know they will be pardoned
○ d. When one prisoner is the leader of the gang and the other is not

8. What cannot be shown with Iterative Prisoner's Dilemma analysis?
○ a. Cooperation can occur naturally
○ b. A small portion of a cooperative structure will often benefit from taking advantage of the general cooperative nature of the structure
○ c. A history of prior interactions is the best way to build cooperation
○ d. Racism always drives the outcome of an iterative Prisoner's Dilemma analysis

9. Tit for Tat is:
○ a. A child's game that originated in China and now is used to analyze commercial transactions
○ b. The cause for Zero Sum Theory requiring two player interactions
○ c. An effective strategy in repeatedly dealing with opposing players over a long period of time
○ d. The total cost associated with always refusing to cooperate

10. What factor cannot increase the level of cooperation where the players are involved in many transactions over a period of time?
○ a. Transparency
○ b. Punishing non-cooperation
○ c. Rewarding continued non-cooperation
○ d. Apply a moderate amount of forgiveness

11. The Hanseatic league is:
○ a. A real life manifestation of Tit for Tat principles
○ b. A real life manifestation of Cold War theories
○ c. A predecessor to the League of Nations that used first Game Theory concepts to end the Spanish American War
○ d. A real life Canadian curling league that proves that the Tit for Tat approach always wins.

12. What does a Tit for Two Tats strategy address?
○ a. Excessive rewards
○ b. Human errors and miscommunications
○ c. Too much cooperation
○ d. The special nature of engineering

13. What is the ladder test?
○ a. A test of the reliability of the prisoner's dilemma
○ b. A description of real-life decision making based on iterative cooperative systems
○ c. The negative outcome when rewards become too high
○ d. The rare case where multiple players can engage in prisoner's dilemma games as long as they start at different points in time

14. How does marine insurance differ from land based insurance due to game theory considerations?
○ a. Utmost Good Faith is a greater requirement since risks and losses are more difficult to evaluate due to the difficulty in inspecting the insured object while it moves around the world
○ b. International marine insurance companies only insure shipowners that all have the same religion
○ c. Premiums are higher because of international exchange rates
○ d. Marine insurance needs to be completely locally based. There are no nationwide or international marine insurance companies.

15. Lloyd's Open Form is:
- a. An insurance contract that uses total transparency
- b. The ability to choose different premiums based on Tit for Two Tats
- c. The ability to raise the insured value based on the level of cooperation in an insurance syndicate
- d. An insurance contract for salvage in an uncertain situation for players that do not know each other.

16. When a lunch menu achieves Pareto Optimality it:
- a. means there is one best lunch and the others are bad deals
- b. means the prices on the lunch menu will never change
- c. means the cost of each item will go down over time
- d. is a lunch menu where all the lunches are priced as fairly as possible

17. As engineers in vehicle design, what does the Pareto Front indicate?
- a. The sound barrier in aerospace design and hull speed in ship design
- b. International competition based on labor rates
- c. The difference between irrational and rational customer choices in vehicle selection
- d. The state of the art in commercial vehicle design

18. How was the Gariella-von Karman line broken?
- a. By drag reductions and improved jet engines on airplanes
- b. By building much larger slow ships
- c. By Wing in Ground effect
- d. By the use of much better antifouling coatings on ships

19. Which are design variables that complicate Pareto optimization in ship design that have been introduced between 1980 and 2021?
- a. Operating costs, Hybrid Options and Sustainability
- b. Door-to-Door CO2 emissions, Regulatory, and Environmental
- c. Sustainability, Door-to-Door CO2 emissions, and Mission
- d. Environmental, Sustainability, and Hybrid Options

20. Using the Nash Approach does it make sense to occasionally select the second most attractive shipbuilder?
- a. No, the Nash Approach specifically forbids the selection of a less attractive decision option
- b. Yes, but it is dependent on knowing what other potential ship purchasers may choose to do
- c. Yes, as long as you do not know what other ship purchasers will do
- d. No, because it will fail the Pareto test

21. What is most effective at achieving the most lucrative single deal?
- a. Knowing your opponent's BATNA and your opponent not knowing your BATNA
- b. Knowing your BATNA but not your opponent's BATNA
- c. Not paying too much attention to BATNA's
- d. Your opponent knowing your BATNA

22. In efficient societies:
- a. Everything is negotiated all the time
- b. Negotiations and contracts are always a waste of time
- c. Contracts are always required
- d. Negotiations and custom contracts are expensive and their need should be reduced to the maximum extent possible using game theory analysis

23. Using "Figure 6: The contract matrix" in what sector does homeowner's insurance fit?

- a. Sector 1
- b. Sector 2
- c. Sector 3
- d. Sector 4

24. What does not reasonably benefit from taking an OODA loop approach?
- a. Ship maneuverability design
- b. Ship Salvage
- c. Ship structural design
- d. Naval Warfare

25. Where is the OODA loop approach most effective:
- a. Golf
- b. Archery
- c. Baseball
- d. Sailboat Racing

26. Where does a nested OODA loop become attractive?
- a. In airplane dogfighting
- b. In marine salvage with press coverage
- c. In ship navigation
- d. In chess matches

27. What is needed for effective game theory analysis?
- a. Useful data
- b. Realistic goals
- c. Complete and correct data and goals
- d. Effective data and goals

28. Where did the Titanic engineers fail?
- a. The Titanic engineers failed to run an effective OODA loop just before the vessel sank.
- b. The Titanic engineer continually failed at the Decide stage during the flooding of the engine room
- c. The Titanic engineers did not Act before the vessel struck the Iceberg
- d. The Titanic engineers did not Observe the Iceberg

29. What name is not associated with Game Theory in this course?
- a. Robert Axelrod
- b. Peter Ziegfried
- c. John Nash
- d. John Boyd