Candidate Number: AE05750, Advanced Game Theory Project

Payoffs (Standard Game)

Player 1 Principles:

- **Rule 1.1: Initial payoff for player 1 is -1 for low quality, -2 for high quality.**
    - This is because high quality products cost more to make.
    - These negative initial payoffs represent the production cost of the product.
- **Rule 1.2: Player 1 gets additional +4 payoff, given player 2 buys.**
    - This is the revenue received from the product being bought by the consumer.
    - Both types have the same revenue, as if the prices of the two types differed, this would no longer be an incomplete information game.
- **Rule 1.3a: Player 1 gets additional -1.5 payoff, given type is low-quality, player 1 includes warranty, and player 2 buys the product.**
    - Warranties cost money to set up and operate, so including a warranty will result in a decrease of payoff for the firm.
    - See following rules for comparisons.
- **Rule 1.3b: Player 1 gets additional -1 payoffs, given type is low-quality, player 1 includes warranty, but player 2 refuses the product.**
    - While the consumer has not bought the product, the warranty still has initial upfront costs, such as phone lines, supply chains and suppliers, to pay for even if the product is not bought.
- **Rule 1.4a: Player 1 gets additional -1 payoff, given type is high-quality, player 1 includes warranty, and player 2 buys the product.**
    - The warranty cost is lower for the high-quality type than low-quality type (compare with rule 1.3a), as high quality products break less often, and thus, warranty costs for the firm are lower.
- **Rule 1.4b: Player 1 gets additional -0.5 payoff, given type is high-quality, player 1 includes warranty, but player 2 refuses to buy the product.**

- The warranty cost is lower for the high-quality type than low-quality type (compare with rule 1.3b), as high quality products break less often, and thus, warranty costs for the firm are lower.
- While the consumer has not bought the product, the warranty still has initial upfront costs, such as phone lines, supply chains and suppliers, to pay for even if the product is not bought.

Player 2 principles:

- **Rule 2.1: Player 2 gets additional +1 payoff, given warranty is included by player 1, player 2 choses to buy, and type is high quality.**
    - This is because the warranty is a signal to the consumer that the product is high quality, and in this case, it is a high-quality product, so, the consumer's expectations are met, and gets a bonus payoff.
- **Rule 2.2: Player 2 gets additional -2 payoff, given warranty is included by player 1, player 2 choses to buy, and type is low-quality.**
    - This is because the warranty is a signal to the consumer that the product is high quality, and in this case, it is a low-quality product, so, the consumer is disappointed that they did not get a high-quality product as the signal would have suggested, thus, receiving a decrease in payoff.
- **Rule 2.3a: Player 2 gets additional +1 payoff, given warranty is not included by player 1, player 2 choses to buy, but type is high quality.**
    - This is because without the warranty being included, the consumer isn't expecting a high-quality product, but is pleasantly surprised when the receive a high quality product, so gain payoff.
- **Rule 2.3b: Player 2 gets additional +0 payoff, given player 1 does not include a warranty, player 2 choses to buy, and type is low quality.**
    - The lack of warranty means lack of signal, and when combined with the unsurprising low-quality product, is not surprising or disappointing in any way for the consumer, as they got what they expected to get.

- **Rule 2.4: Player 2 gets additional +1 payoff, given player 1 includes a warranty, player 2 buys the product, no matter the type.**
  - o This is because warranties are always nice for the consumer. It is essentially free money and free replacement: a bonus for the consumer.
- **Rule 2.5: Player 2 gets additional -1 payoff, given type is low quality, and player 2 buys.**
  - o Consumers are less satisfied with low-quality goods, and since in this game, both low and high quality cost the same (see rule 1.2), it is also not worth the money. Thus, consumer loses payoff.
- **Rule 2.6: Player 2 gets additional +1 payoff, given type is high quality, and player 2 buys.**
  - o High-quality products make consumers more happy, and since low and high quality cost the same (see rule 1.2), it is a "bargain", and thus, consumer gains payoff.
- **Rule 2.7a: Player 2 gets additional -1 payoff, given type is high-quality, player 1 did not include a warranty, and player 2 chose not to buy.**
  - o Player 2 feels like they are "missing out" on a high-quality product, so they lose payoff.
- **Rule 2.7b: Player 2 gets additional -2 payoff, given type is high-quality, player 1 includes a warranty, and player 2 chose not to buy.**
  - o Player 2 feels like they are "missing out" on a high-quality product, so they lose payoff.
  - o Furthermore, since a warranty was included, their was a signal that the product was indeed high quality, so the player is upset they didn't follow the obvious choice.
- **Rule 2.8a: Player 2 gets additional +1 payoff, given type is low-quality, player 1 does not include a warranty, and player 2 refuses to buy.**
  - o Player 2 is happy they avoided a "scam" and low quality product, thus are happy, gaining payoff.
- **Rule 2.8b: Player 2 gets additional +2 payoff, given type is low-quality, player 1 includes a warranty, and player 2 refuses to buy.**

- o Player 2 is happy they avoided a "scam" and low quality product, thus are happy, gaining payoff.
- o Furthermore, player 2 is extra happy with oneself, as they "snuffed out" that even though a warranty was included, signaling it was a good product, they knew that it was a low-quality product. Player 2 is extra happy about "sniffing out" the scam.

Payoffs for the Different Outcomes:

- (H, W, B): (1,3).
    - o Player 1: -2 (rule 1.1), +4 (rule 1.2), -1 (Rule 1.4a)
    - o Player 2: +1 (rule 2.1), +1 (rule 2.4), +1 (rule 2.6)
- (H, W, R): (-2.5, -2)
    - o Player 1: -2 (rule 1.1), -0.5 (rule 1.4b)
    - o Player 2: -2 (rule 2.7b)
- (H, N, B): (2, 1)
    - o Player 1: -2 (rule 1.1), +4 (rule 1.2),
    - o Player 2: +1 (rule 2.3a) +1 (rule 2.6)
- (H, N, R): (-2, -1)
    - o Player 1: -2 (rule 1.1)
    - o Player 2: -1 (rule 2.7a)
- (L, W, B): (1.5, -2)
    - o Player 1: -1 (rule 1.1), +4 (rule 1.2), -1.5 (rule 1.3a)
    - o Player 2: -2 (rule 2.2), +1 (rule 2.4), -1 (rule 2.5)
- (L, W, R): (-2, 2)
    - o Player 1: -1 (rule 1.1), -1 (rule 1.3b)
    - o Player 2: +2 (rule 2.8b)
- (L, N, B): (3, -1)
    - o Player 1: -1 (rule 1.1), +4 (rule 1.2)
    - o Player 2: +0 (rule 2.3), -1 (rule 2.5)
- (L, N, R): (-1, 1)

- o Player 1: -1 (rule 1.1)
- o Player 2: +1 (rule 2.8a)

Diagram: