Axioms - Decision Theory

Group 2

1. We should have a preference about any combination of lotteries.

$$f \succsim_s g \text{ or } g \succsim_s f$$

2. If you prefer A over B and B over C, then you must prefer A over C.

$$\text{If } f \succsim_s g \text{ and } g \succsim_s h, \text{ then } f \succsim_s h$$

3. A player would be indifferent between two lotteries that differ only in states outside S.

$$\text{If } f(\cdot|t) = g(\cdot|t)\ \forall t \in S, \text{ then } f \sim_s g$$

4. A higher probability of getting a better lottery is always better.

$$\text{If } f \succ_s h \text{ and } 0 \leq \beta < \alpha \leq 1, \text{ then } \alpha f + (1-\alpha)h \succ_s \beta f + (1-\beta)h$$

5. Any lottery g that is ranked between f and h is just as good as some randomization between f and h.

$$\text{If } f \succsim_s g \text{ and } g \succsim_s h, \text{ then } \exists 0 \leq \gamma \leq 1 \text{ such that } g \sim_s \gamma f + (1-\gamma)h$$

6. $$\text{If } e \succsim_s f \text{ and } g \succsim_s h \text{ and } 0 \leq \alpha \leq 1, \text{ then } \alpha e + (1-\alpha)g \succsim_s \alpha f + (1-\alpha)h$$

7. $$\text{If } e \succ_s f \text{ and } g \succ_s h \text{ and } 0 \leq \alpha \leq 1, \text{ then } \alpha e + (1-\alpha)g \succ_s \alpha f + (1-\alpha)h$$

8. $$\text{If } f \succsim_s g \text{ and } f \succsim_T g \text{ and } S \cap T = \emptyset, \text{ then } f \succsim_{S \cup T} g$$

9. $$\text{If } f \succ_s g \text{ and } f \succ_T g \text{ and } S \cap T = \emptyset, \text{ then } f \succ_{S \cup T} g$$

10. There are some prices that you prefer over others, otherwise nothing interesting would happen.

$$\text{For every state } t \in \Omega, \text{ there exists } x, y \in X \text{ such that } [x] \succ_t [y]$$

11. The preference order should be the same in all states of the world. Otherwise the prices have a different amount of value to you in different states of the world.

$$\text{For any two states } t, r \in \Omega, \text{ if } f(\cdot, t) = f(\cdot, r) \text{ and } g(\cdot, t) = g(\cdot, r) \text{ and } f \succsim_r g, \text{ then } f \succsim_t g$$