Assessment guidelines SØK2012 H18

The grade is based on an overall assessment, so the points are only indicative.

1. (a) **Answer:** When 10 is the reference point, the price movement is considered as a change in gains:

$$v(2) - v(7) = 1 - 3.5 = -2.5.$$

   (b) **Answer:** When 17 is the reference point, the price movement is considered a change in losses:

$$v(-5) - v(0) = -10 - 0 = -10.$$

   (c) **Answer:** Benice.

   Since questions (a) and (b) were about size of loss, absolute values are also accepted.

2. (a) **Answer:** Your utility $U^0(\boldsymbol{u})$ of utility streams $\langle u_0, u_1, u_2, \ldots \rangle$ from the point of view of time 0 is:

$$U^0(\boldsymbol{u}) = u_0 + \delta u_1 + \delta^2 u_2 \ldots$$

$$U^0(A) = 3$$
$$U^0(B) = \frac{1}{2}4 = 2$$
$$U^0(C) = \left(\frac{1}{2}\right)^2 7 = 1\frac{3}{4}$$

   You therefore choose A.

   (b) **Answer:** Your utility $U^0(\boldsymbol{u})$ of utility streams $\langle u_0, u_1, u_2, \ldots \rangle$ from the point of view of t = 0 is:

$$U^0(\boldsymbol{u}) = u_0 + \beta\delta u_1 + \beta\delta^2 u_2 \ldots$$

At time 0, the utility of the alternatives are:

$$U^0(A) = 3$$
$$U^0(B) = \frac{1}{2} \times 1 \times 4 = 2$$
$$U^0(C) = \frac{1}{2} \times 1 \times 7 = 3\frac{1}{2}$$

You therefore drop A and plan to choose C.
At time 1, the utility of the alternatives are:

$$U^1(B) = 4$$
$$U^1(C) = \frac{1}{2} \times 1 \times 7 = 3\frac{1}{2}.$$

So you forego C and choose B.

(c) **Answer:** From the point of view of time 1, you know you will drop C, so from the point of view of time 0, your choices are between A and B, so you choose A.

3. (a) **Answer:** Let $Pr(T) = \frac{1}{10000} = 1 - Pr(\neg T)$, $Pr(H \mid T) = \frac{9}{10}$, and $Pr(H \mid \neg T) = \frac{1}{10}$. Then:

$$Pr(H\&T) = Pr(H \mid T) \times Pr(T) = \frac{9}{10} \times \frac{1}{10000} = 0.00009.$$

(b) **Answer:**

$$Pr(H\&\neg T) = Pr(H \mid \neg T) \times Pr(\neg T) = \frac{1}{10} \times \frac{9999}{10000} = 0.09999.$$

(c) **Answer:** By the rule of total probability:

$$\begin{aligned} Pr(H) &= Pr(H\&T) + Pr(H\&\neg T) \\ &= \frac{9}{10} \times \frac{1}{10000} + \frac{1}{10} \times \frac{9999}{10000} \\ &= \frac{10008}{100000} = 0.00009 + 0.09999 = 0.10008. \end{aligned}$$

(d) **Answer:** By Bayes rule:

$$\begin{aligned} Pr(T \mid H) &= \frac{Pr(H \mid T) \times Pr(T)}{Pr(H)} \\ &= \frac{0.00009}{0.10008} \approx 0.0009. \end{aligned}$$

(e) **Answer:** Base rate neglect.

4. (a) i. **Answer:** A Nash equilibrium is found as the strategy profile such that each strategy in the profile is a best response to the other strategies in the profile. Here that will be $\langle U, L\rangle$ and $\langle D, R\rangle$.

ii. **Answer:** Let the probability that Player 1 plays U be $p = Pr(U) = 1 - Pr(D)$. The probability depends upon the mixed strategy of Player 2. This must be where Player 2 is indifferent between L and R in terms of expected payoffs:

$$\begin{aligned} Eu(L) &= Eu(R) \\ 2 \times p + 0 \times (1-p) &= 1 \times p + 1 \times (1-p) \\ 2 \times p &= 1 \\ p &= \frac{1}{2}. \end{aligned}$$

Answer: Let the probability that Player 2 plays L be $q = Pr(L) = 1 - Pr(R)$. The probability depends upon the mixed strategy of Player 1. This must be where Player 1 is indifferent between U and D in terms of expected payoffs:

$$\begin{aligned} Eu(U) &= Eu(D) \\ 3 \times q + 0 \times (1-q) &= 1 \times q + 2 \times (1-q) \\ 3 \times q &= 2 - q \\ q &= \frac{1}{2}. \end{aligned}$$

Answer: Since the probabilities are assumed to be independent, the expected payoff for Player 1 is:

$$Eu_1 = \frac{1}{2} \times \frac{1}{2}(3+0+1+2) = \frac{6}{4} = 1.5.$$

Answer: Since the probabilities are assumed to be independent, the expected payoff for Player 2 is:

$$Eu_2 = \frac{1}{2} \times \frac{1}{2}(2+1+0+1) = 1.$$

(b) i. **Answer:** There are two Nash equilibria $\langle U, L\rangle$ and $\langle D, R\rangle$.

5. **Answer:** This is covered in Chapter 12 of the textbook.

   A very good answer will also include examples and critique.