

## Exercise Sheets - Solutions

### Exercise Sheet 1

1. (a) Dominant:  $M$ , Dominating:  $M$ , Dominated:  $T, B$
- (b)  $B_1(L) = \{M, B\}$ ;  $B_1(C) = M$ ;  $B_1(R) = M$   
 $B_2(T) = R$ ;  $B_2(M) = \{L, R\}$ ;  $B_2(B) = L$
- (c) NE:  $(M, L)$ ;  $(B, L)$ ;  $(M, R)$
- (d) PO:  $(M, R)$

2.

		$P2$	
		L	R
$P1$	T	-3, -3	4, -5
	B	-5, 4	1, 1

3. (a)  $Q_1 = 70 - \frac{Q_2}{2}$ ;  $Q_2 = 80 - \frac{Q_1}{2}$
  - (b)  $Q_1 = 40$ ;  $Q_2 = 60$ ;  $P = 50$
  - (c) Produce at firm 2 only (because of lower marginal costs) and divide profit in some way (various possible answers). Total production 80;  $P = 60$
  - (d) No, firm 1 might want to produce as well. Be careful: various different possibilities depending on what the exact agreement in (c) has been
  - (e)  $Q_1 = 60$ ;  $Q_2 = 50$ ;  $P = 45$
  - (f) Bertrand equilibrium: firm 2 sells at price 29.99. Firm 1 at price 30 (assuming that fix-costs are not paid if there is no production). Only firm 2 produces and sells.
4. (a)  $N = \{1, 2\}$ . Terminal histories:  $D, (C, E), (C, F, G), (C, F, H)$ . Player function:  $P(\emptyset) = 1$ ,  $P(C) = 2$ ,  $P(C, F) = 1$ . Preferences: rank strategy profiles according to payoffs in the game tree.
  - (b) 3 (2 of them proper)
  - (c)  $(CH, E)$
  - (d) Yes, optimal at every subset.
5. (a) not available
  - (b) NE:  $(in, acc)$  and  $(out, fight)$ . Only  $(in, acc)$  subgame perfect.
  - (c) threat not credible. To make it credible  $u_C(in, acc)$  needs to be smaller than  $u_C(in, fight)$ .

### Exercise Sheet 2

1. (a) No, because firm  $B$  would also offer a 1-year-warranty.
  - (b) Firm  $B$  would not want to match  $A$ 's offer.
  - (c)  $t = 1.5 + \epsilon$  years.
2. (a)  $e = 1$ , profit of firm  $(\pi_F)$  equal 7.
  - (b)  $e = 4$ ,  $\pi_F = 12$

- (c)  $e = 4.5$ ,  $\pi_F = 12.5$
3. (a) low effort  $U_l \approx 758$ ; high effort  $U_h \approx 658$ ; expected profit for firm  $\pi = 10 - W = 9.425$  mio.  
(b)  $U_l \approx 758$ ;  $U_h \approx 814$ ;  $\pi = 13.254$  mio  
(c)  $U_l \approx 707$ ;  $U_h \approx 762$ ;  $\pi = 13.3$  mio
4. (a)  $E^* = 12$   
(b)  $MB(12) = MC(12) = 260$   
(c) 1690
5. (a)  $Q = 45$ ;  $P = 55$   
(b)  $Q^* = 30$ ;  $P^* = 70$   
(c) tax function  $T = 30Q$  or a marginal tax of  $t = 30$  per unit  
(d)  $Q^m = 30$ ;  $P^m = 70$   
(e)  $t = 0$
6. (a) nonrival and nonexcludable  
(b)  $T = 112$   
(c)  $T = 80$