Game Theory
Exercise Sheet 1

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Student: Tarek Saier

Exercise 1.1

(a)
$G = \langle N, (A_i), (u_i) \rangle$ with
$N = \{1, 2\}$
$A_1 = A_2 = \{u, l, m\}$ //Note: u =upper path, l =lower path
m=path using vertical edge in the middle

	u	l	m
u	-2.2 , -2.2	-1.7 , -1.7	-2.2 , -1.6
l	-1.7 , -1.7	-2.2 , -2.2	-2.2 , -1.6
m	-1.6 , -2.2	-1.6 , -2.2	-2.1 , -2.1

stricktly dominated actions:
$u_1(a_{-1}, m_1) > u_1(a_{-1}, l_1)$
$u_2(a_{-2}, m_2) > u_2(a_{-2}, l_2)$
$u_1(a_{-1}, m_1) > u_1(a_{-1}, u_1)$
$u_2(a_{-2}, m_2) > u_2(a_{-2}, u_2)$

weakly dominated actions:
$u_1(a_{-1}, m_1) \geq u_1(a_{-1}, l_1)$
$u_2(a_{-2}, m_2) \geq u_2(a_{-2}, l_2)$
$u_1(a_{-1}, m_1) \geq u_1(a_{-1}, u_1)$
$u_2(a_{-2}, m_2) \geq u_2(a_{-2}, u_2)$

Nash equilibria: (m, m)

(b) A notable difference to the lecture example is that fact that the main diagonal of the matrix does not have the same values for all action sets. If both players choose m they gain a higher utility compared to both choosing u or l.
In both variants adding more players to the game would increase the benefit of taking a $\frac{n_i}{n}$-path alone whilst the rest of the players take the respective other path.

Exercise 1.2

(a) Nash equilibria: (yield,claim), (claim,yield)
The game is *not* strictly competitive, since $\forall a \in A : u_1(a) = -u_2(a)$ does not hold.

(b) Nash equilibria: (landside,landside), (seaside,seaside)
The game is different insofar, als choosing the *same* action as the opponent is beneficial. For the claim-yield game it's the opposite: playing the action *different* from the opponent's is beneficial.