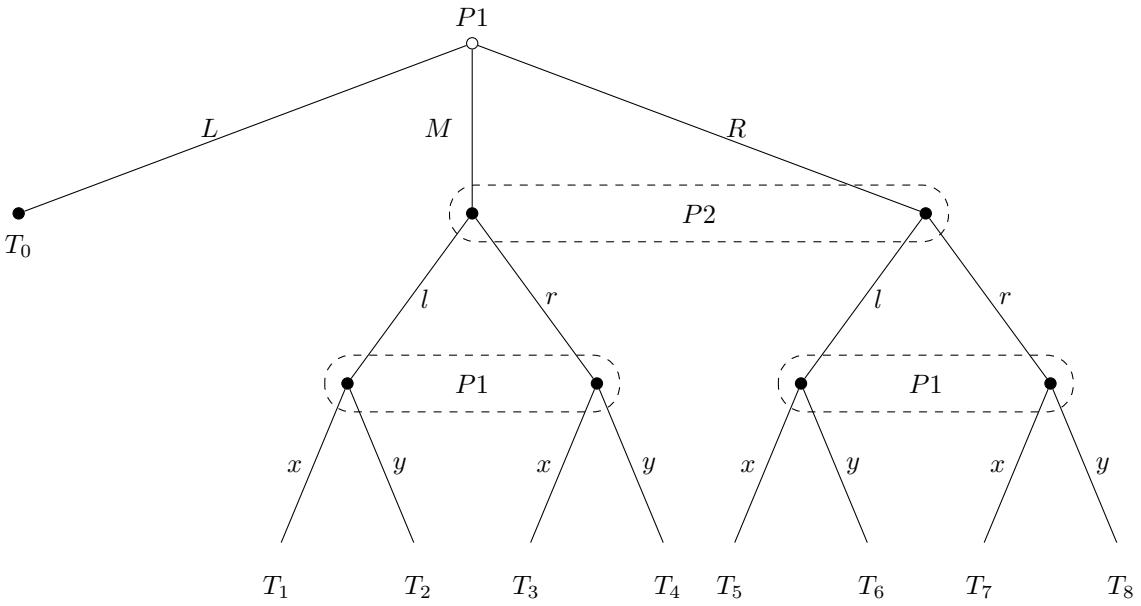
Advanced Game Theory - Exercise 1

Aufgabe 1.1

Es gilt $|S| = \Pi_{n=1}^{N} M_n$: $\quad S = M_1 \times \cdots \times M$.

Aufgabe 1.2

Extensive form game with imperfect information



a) Die Strategieräume sind:

$$
\begin{aligned}
S_1 = \Big\{ & (L,x,x),(L,x,y),(L,y,x),(L,y,y), \\
& (M,x,x),(M,x,y),(M,y,x),(M,y,y), \\
& (R,x,x),(R,x,y),(R,y,x),(R,y,y) \Big\} \\
= \Big\{ & S_1^1, \ldots, S_1^{12} \Big\} \\
S_2 = \{ & (l),(r) \}
\end{aligned}
$$

b) It must hold that:

$$p_1 + p_2 + p_3 = 1$$
$$q_1 + q_2 = 1$$
$$r_1 + r_2 = 1$$

Example of a behaviour strategy: $(p_1 L + p_2 M + p_3 R, q_1 x + q_2 y, r_1 x + r_2 y)$
Example of a mixed strategy: $\sum_{i=1}^{12} p_i S_1^i$
For player 2 there is nothing to show.

Probability distribution of the outcomes:

$$p_1,\ p_2\sigma(l)q_1,\ p_2\sigma(l)q_2,\ p_2\sigma(r)q_1,\ p_2\sigma(r)q_2, \ldots$$

The following mixed strategy of player 1 is realisation equivalent

$$\left(p_1 S^1 + p_2 q_1 S_1^5 + p_2 q_2 S_1^7 + p_3 r_1 S_1^9 + p_3 r_2 S_1^{10}\right)$$

z.z.: $1 = p_1 + p_2 q_1 + p_2 q_2 + p_3 r_1 + p_3 r_3$ klar.

Aufgabe 1.3

		Player 2			
		LL	L	M,	R
Player 1	U	$100, 2$	$-100, 1$	$0, 0$	$-100, -100$
	D	$-100, -100$	$100, -49$	$1, 0$	$100, 2$