

§3 Tournaments

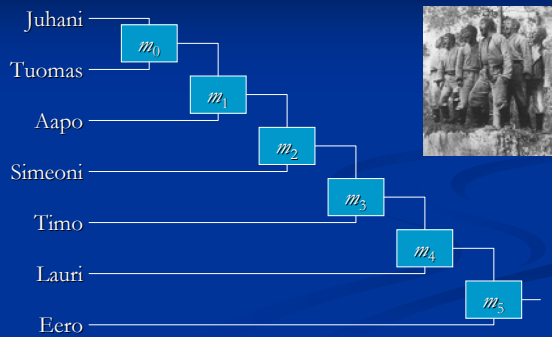
- rank adjustment (or challenge) tournament
 - each match is a challenge for a rank exchange
 - types: ladder, hill climbing, pyramid, king of the hill
- elimination tournament (or cup)
 - each match eliminates the loser from the tournament
 - types: random selection, random pairing, single elimination
- scoring tournament
 - each match rewards the winner
 - types: round robin
- hybridizations

Other uses

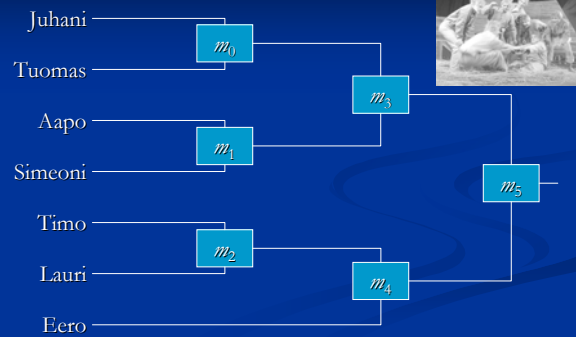
- game balancing
 - duelling synthetic players
 - adjusting point rewarding schemes
- heuristic search
 - selecting suboptimal candidates for a genetic algorithm
- group behaviour
 - modelling pecking order
- learning player characteristics
 - managing history knowledge



Example: Hill climbing tournament



Example: Elimination tournament



Example: Scoring tournament

	Tuomas	Aapo	Simeoni	Timo	Lauri	Eero
Juhani	m_0	m_6	m_{11}	m_{15}	m_{18}	m_{20}
Tuomas		m_1	m_7	m_{12}	m_{16}	m_{19}
Aapo			m_2	m_8	m_{13}	m_{17}
Simeoni				m_3	m_9	m_{14}
Timo					m_4	m_{10}
Lauri						m_5



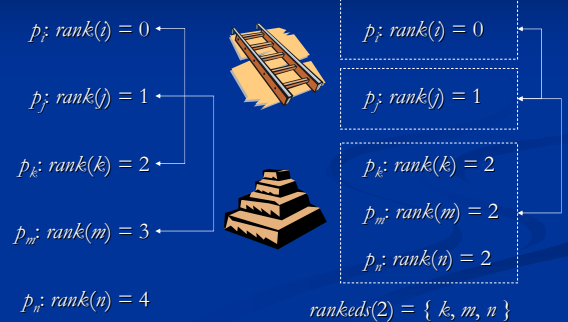
Terms

- players: p_0, \dots, p_{n-1}
- match between p_i and p_j : $match(i, j)$
- outcome: WIN, LOSE, TIE
- rank of p_i : $rank(i)$
- players with the rank r : $rankeds(r)$
- round: a set of (possibly) concurrent matches
- bracket: diagram of match pairings and rounds

Rank adjustment tournaments

- a set of already ranked players
- matches
 - independent from one another
 - outcome affects only the participating players
- suits on-going tournaments
 - example: boxing
- matches can be limited by the rank difference

Ladder and pyramid tournaments

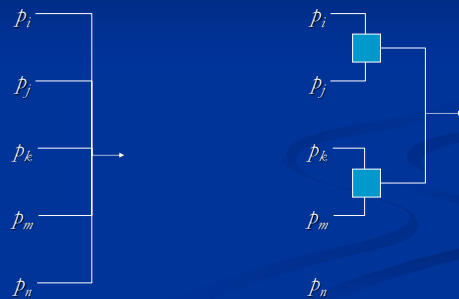


Elimination tournaments

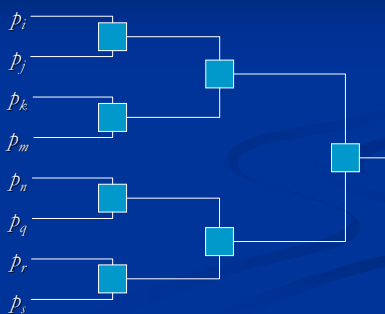
- loser of a match is eliminated from the tournament
 - no ties! → tiebreak competition
- winner of a match continues to the next round
- how to assign pairings for the first round?
 - seeding
- examples
 - football cups, snooker tournaments



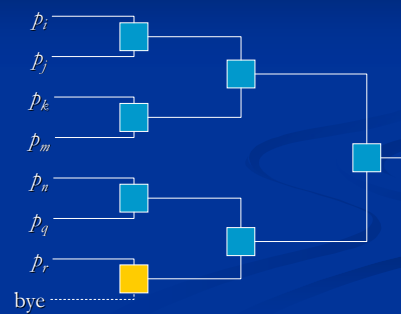
Random selection and random pairing



Single elimination



Bye



Seeding

- some match pairing will not occur in a single elimination tournament
- pairings for the first round (i.e., seeding) affects the future pairings
- seeding can be based on existing ranking
 - favour the top-ranked players
 - reachability: give the best players an equal opportunity to proceed the final rounds



Seeding methods

- random
 - does not favour any player
 - does not fulfil reachability criterion
- standard and ordered standard
 - favours the top-ranked players
 - ordered standard: matches are listed in increasing order
- equitable
 - in the first round, the rank difference between the players is the same for each match