Project 2

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Part 1 - BOA Components

Domains

- Size - Different offers
- Opposition - High=less likely to agree

Domain	Size	Opposition
Itex vs Cypress	180	0.43146(high)[1]
England Zimbabwe	432	0.27212(med)
Party Domain	7200	0.20880(low)

[1]Low, med, high - based on https://link.springer.com/chapter/10.1007/978-4-431-54758-79

Opponents

- Great Opponents -> The Best BOA agent
- Only ANAC winners

- AgreeableAgent - ANAC 2018
- PonPokoAgent - ANAC 2017
- Caduceus - ANAC 2016
- Atlas3 - ANAC 2015

BOA Components

- “Impossible” with every combination
- 3 Opponent Models
- 3 Bidding Strategies
- 2 Acceptance Strategies
- Best Bid OM
- Total 18 agents

Agent Name	Bidding Strategy	Acceptance Strategy	Opponent Model
boa_0	2012 - AgentLG	2011 - TheNegotiator	Perfect Model
boa_1	2012 - AgentLG	2011 - TheNegotiator	Bayesian Model
boa_2	2012 - AgentLG	2011 - TheNegotiator	Agent X Frequency Model
boa_3	2012 - AgentLG	2011 - HardHeaded	Perfect Model
boa_4	2012 - AgentLG	2011 - HardHeaded	Bayesian Model
boa_5	2012 - AgentLG	2011 - HardHeaded	Agent X Frequency Model
boa_6	2012 - IAMHaggler	2011 - TheNegotiator	Perfect Model
boa_7	2012 - IAMHaggler	2011 - TheNegotiator	Bayesian Model
boa_8	2012 - IAMHaggler	2011 - TheNegotiator	Agent X Frequency Model
boa_9	2012 - IAMHaggler	2011 - HardHeaded	Perfect Model
boa_10	2012 - IAMHaggler	2011 - HardHeaded	Bayesian Model
boa_11	2012 - IAMHaggler	2011 - HardHeaded	Agent X Frequency Model
boa_12	2011 - AgentK2	2011 - TheNegotiator	Perfect Model
boa_13	2011 - AgentK2	2011 - TheNegotiator	Bayesian Model
boa_14	2011 - AgentK2	2011 - TheNegotiator	Agent X Frequency Model
boa_15	2011 - AgentK2	2011 - HardHeaded	Perfect Model
boa_16	2011 - AgentK2	2011 - HardHeaded	Bayesian Model
boa_17	2011 - AgentK2	2011 - HardHeaded	Agent X Frequency Model

Testing

- Three tournaments 1000 rounds each Domain
- Kruskal-Wallis & Post hoc Dunn
- Find statistically best agent

	BOA0	BOA1	BOA2	BOA3	BOA4	BOA5	BOA6	BOA7	BOA8	BOA9	BOA10	BOA11	BOA12	BOA13	BOA14	BOA15	BOA16	BOA17
BOA0		1	1	0.02442755924	1	1	1	1	1	1	1	1	0.8594985477	0.8622275802	0.3804425858	1	1	1
BOA1	1		1	0.002725045951	0.4393796407	1	1	1	1	1	1	1	1	1	1	1	1	1
BOA2	1	1		9.30E-05	0.03580734583	1	1	1	1	1	1	1	1	1	1	1	1	1
BOA3	0.02442755924	0.002725045951	9.30E-05		1	0.4246601948	1.29E-07	6.93E-08	3.95E-06	5.62E-05	5.58E-05	0.001729622522	9.11E-09	9.18E-09	1.59E-09	4.27E-06	3.13E-05	5.57E-05
BOA4	1	0.4393796407	0.03580734583	1		1	0.000212901249	0.000129066884	0.003156333245	0.02443636352	0.02430461229	0.3156277857	2.52E-05	2.53E-05	6.12E-06	0.003353406215	0.015625242	0.02425647122
BOA5	1	1	1	0.4246601948	1		0.2542937994	0.1809599797	1	1	1	1	0.0582082602	0.0584372540	0.0213516070	1	1	1
BOA6	1	1	1	1.29E-07	0.000212901249	0.2542937994		1	1	1	1	1	1	1	1	1	1	1
BOA7	1	1	1	6.93E-08	0.000129066884	0.1809599797	1		1	1	1	1	1	1	1	1	1	1
BOA8	1	1	1	3.95E-06	0.003156333245	1	1	1		1	1	1	1	1	1	1	1	1
BOA9	1	1	1	5.62E-05	0.02443636352	1	1	1	1		1	1	1	1	1	1	1	1
BOA10	1	1	1	5.58E-05	0.02430461229	1	1	1	1	1		1	1	1	1	1	1	1
BOA11	1	1	1	0.001729622522	0.3156277857	1	1	1	1	1	1		1	1	1	1	1	1
BOA12	0.8594985477	1	1	9.11E-09	2.52E-05	0.0582082602	1	1	1	1	1	1		1	1	1	1	1
BOA13	0.8622275802	1	1	9.18E-09	2.53E-05	0.0584372540	1	1	1	1	1	1	1		1	1	1	1
BOA14	0.3804425858	1	1	1.59E-09	6.12E-06	0.0213516070	1	1	1	1	1	1	1	1		1	1	1
BOA15	1	1	1	4.27E-06	0.003353406215	1	1	1	1	1	1	1	1	1	1		1	1
BOA16	1	1	1	3.13E-05	0.015625242	1	1	1	1	1	1	1	1	1	1	1		1
BOA17	1	1	1	5.57E-05	0.02425647122	1	1	1	1	1	1	1	1	1	1	1	1	

Hypothesis

1. BOA3 and BOA4 are very good, rest are bad
2. BOA14, 13, 12, 7 and 6 are the best - BOA14 THE best

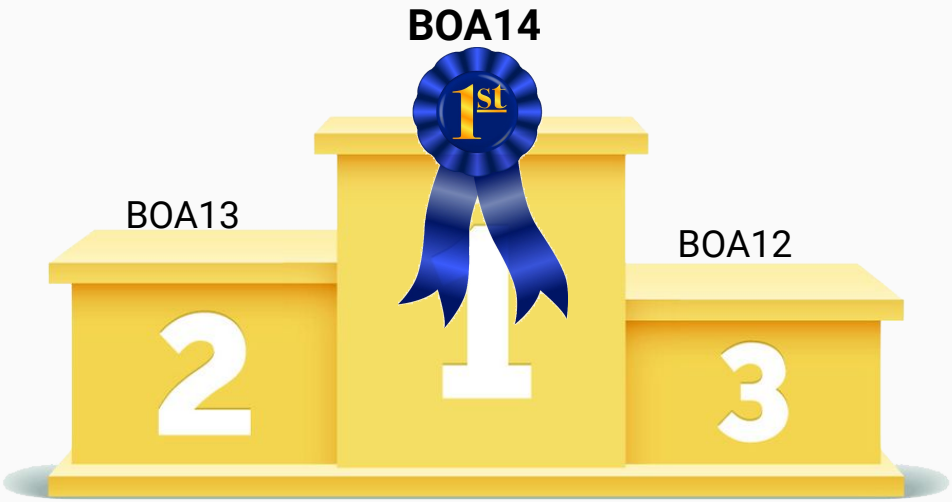
Utilities

	Average		Itex		Party		EngZim
BOA14	**0.7710**	BOA6	0.6389	**BOA14**	**0.8748**	BOA6	0.8103
BOA13	0.7674	BOA13	0.6343	BOA12	0.8667	**BOA14**	**0.8047**
BOA12	0.7659	**BOA14**	**0.6334**	BOA13	0.8652	BOA12	0.8034
BOA6	0.7592	BOA12	0.6276	BOA7	0.8504	BOA13	0.8027
BOA7	0.7539	BOA7	0.6097	BOA15	0.8302	BOA7	0.8017
[illegible]	[illegible]	[illegible]	0.6072	BOA6	0.8284	BOA8	0.7995
[illegible]	[illegible]	[illegible]	0.5711	BOA17	0.8259	BOA2	0.7766
BOA2	0.7124	BOA2	0.5504	BOA16	0.8230	BOA15	0.7724
BOA17	0.7084	BOA17	0.5372	BOA8	0.8205	BOA16	0.7718
BOA16	0.7074	BOA10	0.5365	BOA2	0.8103	BOA1	0.7687
BOA9	0.6960	BOA15	0.5363	BOA1	0.8044	BOA9	0.7644
BOA10	0.6938	BOA11	0.5296	BOA0	0.8012	BOA17	0.7620
BOA1	0.6849	BOA16	0.5273	BOA10	0.7842	BOA10	0.7607
BOA0	0.6714	BOA1	0.4815	BOA9	0.7524	BOA0	0.7492
BOA11	0.6627	[illegible]	[illegible]	[illegible]	[illegible]	BOA11	0.7252
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BOA4	0.4588	**BOA3**	0.3103	BOA4	0.5631	BOA4	0.5177
BOA3	0.3808	BOA4	0.2956	**BOA3**	0.4406	**BOA3**	0.3915

Hypothesis 2 - Correct!

Hypothesis 1 - FAIL

Agent	Bidding Strategy	Acceptance Strategy	Opponent Model
BOA14	AgentK2	The Negotiator	Agent X Frequency Model
BOA13	AgentK2	The Negotiator	Bayesian Model
BOA12	AgentK2	The Negotiator	Perfect Model



Part 2 - Opponent Model

The model

- Based on Frequency model
- opponentUtilitySpace.getUtility
- Checks the difference
- Needs testing