

# Grammar for Language Describing Game Structures

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March 20, 2019

## Pretty-printed EBNF grammar:

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 $\langle game \rangle ::= \langle roundList \rangle \text{ 'played by' } \langle teamList \rangle$   
 $\langle teamList \rangle ::= (\langle team \rangle \{', ' \langle team \rangle\} \mid \langle playerList \rangle \mid \text{ 'randomly divide' } \langle playerList \rangle \mid \text{ 'into' } \langle nameList \rangle) [\text{ 'all' } \langle attributeList \rangle]$   
 $\langle team \rangle ::= \text{ 'team' } \langle name \rangle \langle playerList \rangle$   
 $\langle playerList \rangle ::= \langle player \rangle \{', ' \langle player \rangle\}$   
 $\langle player \rangle ::= \langle name \rangle \langle attributeList \rangle$   
 $\langle attributeList \rangle ::= \langle attribute \rangle \{', ' \langle attribute \rangle\}$   
 $\langle attribute \rangle ::= \langle affiliation \rangle \mid \langle score \rangle \mid \langle resource \rangle$   
 $\langle affiliation \rangle ::= \text{ 'affiliated with' } \langle name \rangle$   
 $\langle score \rangle ::= \text{ 'score' } \langle name \rangle \langle number \rangle$   
 $\langle resource \rangle ::= \text{ 'resource' } \langle name \rangle \langle number \rangle$   
 $\langle roundList \rangle ::= \langle round \rangle \{', ' \langle round \rangle\} [\langle modifierList \rangle]$   
 $\langle modifierList \rangle ::= \langle modifier \rangle \{', ' \langle modifier \rangle\}$   
 $\langle modifier \rangle ::= \langle roundReference \rangle (\text{ 'before' } \mid \text{ 'after' }) \langle phaseReference \rangle \text{ 'insert' } \langle phase \rangle$   
 $\langle roundReference \rangle ::= \text{ 'round' } \langle number \rangle$   
 $\langle phaseReference \rangle ::= \text{ 'phase' } \langle number \rangle$   
 $\langle round \rangle ::= \langle phase \rangle \{', ' \langle phase \rangle\} [\text{ 'repeated' } \langle number \rangle \text{ 'times' }]$ 
```

$\langle phase \rangle ::= \langle action \rangle \mid \langle progression \rangle$   
 $\langle action \rangle ::= \langle competition \rangle \mid \langle decision \rangle$   
 $\langle competition \rangle ::= [\text{'scored'} \mid \text{'placed'}] [\text{'team'}] \text{'competition between'} \langle idList \rangle$   
 $\langle decision \rangle ::= \text{'vote by'} \langle idList \rangle \text{'between'} \langle idList \rangle [\text{'tiebroken by'} \langle decision \rangle]$   
 $\quad \mid \text{'nomination of'} \langle number \rangle \text{'of'} \langle idList \rangle \text{'by'} \langle identifier \rangle \mid \text{'allocate'} \langle resource \rangle$   
 $\quad \mid \text{'binary'}$   
 $\langle progression \rangle ::= (\langle affiliationUpdate \rangle \mid \langle scoreUpdate \rangle \mid \langle resourceUpdate \rangle) \text{'for'}$   
 $\quad \langle idList \rangle$   
 $\langle affiliationUpdate \rangle ::= \text{'elimination'} \mid (\text{'add'} \mid \text{'remove'}) \langle affiliation \rangle \mid [\text{'evenly'}$   
 $\quad \mid \text{'number preserving'}] \text{'swap'} \langle affiliationList \rangle [\text{'adding'} \langle affiliationList \rangle] \mid$   
 $\quad \text{'change'} \langle affiliation \rangle \text{'to'} \langle affiliation \rangle$   
 $\langle scoreUpdate \rangle ::= (\text{'increase'} \mid \text{'decrease'}) \langle score \rangle \text{'by'} (\langle number \rangle \mid \langle resultReference \rangle)$   
 $\quad \mid \text{'reset'} \langle score \rangle$   
 $\langle resourceUpdate \rangle ::= (\text{'gain'} \mid \text{'expend'}) \langle number \rangle \langle resource \rangle$   
 $\langle idList \rangle ::= \langle identifier \rangle \{', ' \langle identifier \rangle\} [\text{'except'} \langle idList \rangle]$   
 $\langle identifier \rangle ::= \text{'everyone'} \mid \langle name \rangle \mid \langle affiliation \rangle \mid \langle idReference \rangle \mid \text{'chance'}$   
 $\langle idReference \rangle ::= \langle compReference \rangle (\text{'winner'} \mid \text{'loser'}) \mid \langle voteReference \rangle (\text{'majority'}$   
 $\quad \mid \text{'minority'}) \text{'voted'} \mid \langle allocationReference \rangle \text{'amount'}$   
 $\langle compReference \rangle ::= \text{'competition'} \langle number \rangle$   
 $\langle voteReference \rangle ::= \text{'vote'} \langle number \rangle$   
 $\langle allocationReference \rangle ::= \text{'allocation'} \langle number \rangle$   
 $\langle name \rangle ::= (\text{'a'} \mid \dots \mid \text{'z'} \mid \text{'A'} \mid \dots \mid \text{'Z'}) \{\text{'a'} \mid \dots \mid \text{'z'} \mid \text{'A'} \mid \dots \mid \text{'Z'} \mid \text{'0'} \mid \dots \mid \text{'9'}\}$   
 $\langle number \rangle ::= (\text{'0'} \mid \dots \mid \text{'9'}) +$

Notes:

- Allow for random decisions
- Vote tiebreakers?
- Win condition or update affiliation to winner for someone in last round?  
Have a progression shortcut for win?

- make grammar unambiguous
- multiple votes?
- I've restricted player attributes into 3 categories, with no opportunity for customization outside those three. Am I okay with this?
- affiliation used everywhere, get syntax right
- score/resource include init number... maybe need separate non-terminals for initializing attributes and referencing/updating attributes
- should allocate be a decision and progression or just progression? Probably just progression.