Which Pairing System is Best
… for my Scrabble tournament?

John J. Chew, III
CEO, NASPA
poslfit@gmail.com
Revised 2023-12-11

Which Pairing System is Best?

- How to compare pairing systems?
- What pairing systems are there?

How to Compare Pairing Systems: 10 Ideal Properties

Practicality: the event runs on schedule.

Division Sizing: the number of players in a division is right for the pairing system.

Fairness: players are ranked in the end according to how well they played.

Incentivization#: players are motivated to win.

Aristomachy*: strong players play each other.

Exagony*: teammates don’t play each other.

Inclusivity: pairings don’t exclude players from prize contention.

Monagony*: repeat pairings are minimized.

Monotony: pairings favour higher-ranked players over lower-ranked ones.

Suspense: the event outcome is determined as late as possible.

* not a Scrabble word **#** not an NWL word

1. Practicality

A pairing system can be impractical if

- It requires too much computational power, e.g. because too many players are being paired in a group with too many constraints on the pairings (complex Swiss systems late in a long, large event).
- It requires too much input data. Any round-by-round pairing system can delay an event unless pairings are lagged (based on earlier results). Pairing systems which initially use small fixed pairing groups of 4, 8 or 16 can help make huge events manageable.

2. Division Sizing

Some pairing systems work better, worse, or not at all with some division sizes. Larger division sizes give fewer but larger prizes, and the need to wait for the slowest game lengthens event schedules.

Pairing systems that are predetermined require specific numbers of players. For a full round robin, one more player than rounds; for early round robin groups, a number of players divisible by group size.

Swiss-style pairings with too few repeats permitted give undesirable pairings if players only slightly outnumber rounds.

3. Fairness

Ideally, performance ratings should decrease steadily down the final standings; in practice, this is never the case, because tournaments are too short to give statistically accurate rankings.

Errors in the rank order of a pair of players are reduced by having them play each other repeatedly. Full round robins don’t do this, so ranking error is spread evenly across the field (good for the bottom of the field, not so good for fairly awarding prizes). Swiss and King-of-the-Hill (KOTH) systems reduce rank error among closely ranked players, but increase it between top and lower-ranked players.

4. Incentivization#

Players have found many situations in which they are not motivated to win a game:

- In some Swiss pairing situations, losing early games gives easier mid-event opponents and a better chance of finishing in first place. This issue led to the development of Chew pairings.
- If a player has already clinched a prize, they may be willing to lose to a friend. This issue led to the development of Gibsonization.
- If a player has clinched a finals berth, they may want to lose a game to promote a weaker opponent to the finals.

5. Aristomachy*

In short but populous tournaments, it can be difficult to have top seeds play each other. This may be a necessary evil in some circumstances, but is regarded as a pairing system fault when it happens unexpectedly or unnecessarily.

Moreover, top-ranked players at a tournament should generally play each other repeatedly, to accurately determine their final ranking. KOTH does this best, Swiss does it adequately (except in the case of a successful early-loss gambit), Round Robin does not do this at all.

6. Exagony*

Even when players are competing individually rather than in teams, they may not wish to play with the familiar people they travelled with. At some individual events (WESPAC) where team standings are of secondary importance, there may be a rule that teammates may not play each other in early rounds.

Permitting teammates to play each other can cause a suspicion of collusion, or a perception of a missed opportunity for the teammates to defeat other players.

Not permitting teammates to play each other can result in unfair pairings (if one team is doing better than all the rest but keeps playing other players), or even impossible pairings (if more than half the field belongs to one team).

7. Inclusivity

Aristomachy* is opposed by inclusivity. Inclusivity is a frequently occurring technical issue best illustrated by an example. If there is one round left and the top three players have N, N and N-1 wins, and the top two players have a 500-point spread advantage over the third, then the third player can only reasonably be expected to finish in first if they play one of the top two.

Deciding when aristomachy (here, the top two play each other) or inclusivity (#1 plays #3) should prevail is a sensitive issue, and must be resolved before the start of the competition, as there is no way to choose one when an event is in progress without disadvantaging at least one player.

8. Monagony*

Aristomachy* also opposes monagony*. Players who are not in contention generally prefer the variety of playing as many different players as possible. Second-tier players would also rather play top players rather than see the top players repeatedly play each other (cf. inclusivity).

In a long tournament, there is a tendency for a group of leaders to break away from the rest of the field; when that happens, there is no statistical purpose in pairing them with nonleaders, and it is better to pair the leaders with each other repeatedly. Determining when this has happened though can be complex, and should be left to predetermined algorithms.

9. Monotony

Pairings monotony is another technical issue. In Swiss-like pairing systems, when a pairing group is odd and a player with fewer wins needs to be promoted into it to even the group, the player who is chosen should be the most deserving (highest-ranked) one.

Likewise, in complex late-event situations where there is a choice as to who the top player faces, it should generally be the weakest player still in reasonable contention, to ensure that the top player’s winning chances remain greater than anyone else’s. Many tournaments use Monte Carlo simulation to validate algorithmic pairings in such cases.

10. Suspense

All else being equal, a tournament director should maintain interest in the outcome of an event for as long as possible, by making sure that it remains uncertain.

Round robin tournaments involving players ranging widely in strength can end in a series of rounds that have no impact on standings. Dynamic pairing algorithms tend to maintain interest in more of the final top standings, and can exclude clinched players from competition through Gibsonization.

Multi-phase tournaments involving a long qualifying event followed by finals or an elimination event can also help ensure a satisfying experience for spectators.

Comparing Popular Pairing Systems

- Random
- Manual
- King-of-the-Hill (KOTH)
- Quartiles
- Factored
- Round Robin
- Swiss
- Chew
- Other

1. Random Pairings

Random pairings are good when there is little or no *a priori* information about player rating strength, or when an event is more social than competitive. Randomness can be algorithmic or by ceremonial drawing of lots. They can be a good way of pairing the first (and sometimes second) round of a very large event for first-time players, and are also used in the initial round of WESPAC because of the uncertainty in player input ratings.

Practicality:	Very high
Division Sizing:	Completely flexible
Fairness:	Very low
Incentivization#:	Very high

Aristomachy*:	Very low
Exagony*:	Configurable
Inclusivity:	Very low
Monagony*:	Configurable
Monotony:	Very low
Suspense:	Very low

2. Manual Pairings

Manual pairings, where a director exercises their own judgement, are occasionally necessary in unusual situations where pairings software has made an unequivocal error or encountered a situation they cannot handle (some dropouts and late arrivals). They may also be appropriate in informal events where players start and stop games without an official schedule, and may need to be paired with whomever is available.

Practicality:	Low
Division Sizing:	Completely flexible
Fairness:	Variable
Incentivization#:	Variable

Aristomachy*:	Variable
Exagony*:	Configurable
Inclusivity:	Variable
Monagony*:	Configurable
Monotony:	Variable
Suspense:	Variable

3. King-of-the-Hill Pairings

KOTH pairings, where players are paired with the next opponent in the standings, are historically popular because of their ease of computation and communication. When standings are printed, players can simply be directed to play their adjacent opponent. Their main disadvantage is their poor inclusivity: it's too easy for two strong players to pull ahead, never get caught, and keep playing each other to the detriment of the next few players. Restricting repeats can help, but results in difficulty explaining pairings to players. For historical reasons, many tournaments end in one or more KOTH rounds.

Practicality:	Very high
Division Sizing:	Completely flexible
Fairness:	Low
Incentivization#:	High

Aristomachy*:	Very high
Exagony*:	Configurable
Inclusivity:	Very low
Monagony*:	Configurable
Monotony:	Very high
Suspense:	Low

4. Quartile Pairings

Quartile pairings divide the field into four quartiles, then the players of one quartile play randomly against those of another. They strike a good balance between fully random pairings and round robin groups, and are often used in the first 1~3 rounds of tournaments. One particular variant (InitFontes) schedules players in possibly partial round robin groups randomly selected from quartiles (or *n*-iles), to accelerate the tournament schedule by minimizing player movements. One weakness shared with many pairing systems is a difficulty in accommodating a large number of late arrivals in a high or low quartile.

Practicality:	High
Division Sizing:	Flexible
Fairness:	Very high
Incentivization#:	High

Aristomachy*:	Very low
Exagony*:	Can be tricky
Inclusivity:	Very high
Monagony*:	Configurable
Monotony:	Very low
Suspense:	High

5. Factored Pairings

Factored pairings are a historical variant of KOTH pairings, where players are paired with the nth next player in the standings for *n* > 1. They were popular with directors in the pre-computer era for their ease of manual computation, and they were a way to improve the inclusivity of a pure KOTH system, typically by gradually decreasing *n* toward the end of the event. It’s impossible to fairly determine how to decrease *n* before a tournament begins though, and adjusting to avoid repeats is complicated.

Practicality:	High
Division Sizing:	Completely flexible
Fairness:	Medium
Incentivization#:	High

Aristomachy*:	High
Exagony*:	Configurable
Inclusivity:	Medium
Monagony*:	Partly configurable
Monotony:	High
Suspense:	Medium

6. Round Robin Pairings

Round robin pairings distribute ranking error evenly across the field, and maximize social contact among players. Distributing ranking error evenly means that disorder at the top is more severe than in systems where top players play each other repeatedly. Pure RR pairings require one more player than rounds, but directors often add Swiss or KOTH rounds after an initial RR, which can mitigate the fairness issue. Round robins are typically scheduled either randomly or with the top seed facing opponents in increasing order of strength. Round robins typically have to be abandoned in favour of Swiss when the player roster changes mid-event.

Practicality:	High
Division Sizing:	Very constrained
Fairness:	High
Incentivization#:	Very High

Aristomachy*:	Very low
Exagony*:	Impossible
Inclusivity:	High
Monagony*:	Standard
Monotony:	High
Suspense:	Low

7. Swiss Pairings

Swiss pairings were developed in the Chess world for tournaments where numbers did not permit round robins. Players are paired as much as possible with opponents with the same number of wins; many complexities arise when the number of players with the same number of wins is greater than two, and especially when it is odd. In Scrabble play, a key parameter for Swiss pairings is when to permit how many repeats; the ideal method varies according to the integrity of the field (whether leaders break away). There is also a known weakness, exploited at the 1997 WSC, where a player who loses early games can sometimes earn easy wins against weaker opponents. These led to the development of Chew pairings.

Practicality:	Medium
Division Sizing:	Completely flexible
Fairness:	High
Incentivization#:	Low

Aristomachy*:	High
Exagony*:	Configurable
Inclusivity:	Medium
Monagony*:	Configurable
Monotony:	High
Suspense:	High

8. Chew Pairings

Chew pairings evolved from US NSC pairings, and are a Swiss variant where contenders are split into a minimal upper and maximal lower group without increasing maximum repeat pairings, the upper group is paired by repeatedly matching the top unpaired player with their lowest competitor and the lower group and noncontenders separately Swiss. Pairings are lagged by one round except at the start of a session and during the final session. Chew pairings address all resolvable technical issues with pairings, at the cost of significant complexity that imposes a communications and verification burden on the director.

Practicality: High
Division Sizing: Completely flexible
Fairness: Very high
Incentivization#: Very high

Aristomachy*: High
Exagony*: Configurable
Inclusivity: High
Monagony*: Configurable
Monotony: High
Suspense: High

9. Other Pairing Systems

Other individual pairing systems that have been used at Scrabble tournaments include fixed or partly fixed one-day tournament formats developed historically for manual pairings (fairness depends heavily on pattern of wins), single-elimination formats where players are seeded into a bracket and play best-of-n matches to advance or be eliminated (impractical without side events if players have to travel), and double-elimination events where contenders are paired random-Swiss and noncontenders KOTH (hard to schedule because of their uncertain duration).

Practicality: Varies
Division Sizing: Varies
Fairness: Varies
Incentivization#: Varies

Aristomachy*: Varies
Exagony*: Varies
Inclusivity: Varies
Monagony*: Varies
Monotony: Varies
Suspense: Varies

Conclusion

This talk shares knowledge and experience gleaned over a 25-year career directing tournaments, and draws heavily on the documentation and code of the TSH tournament management software available at tsh.poslfit.com.

Questions are always welcome at poslfit@gmail.com or +1 416 876 7675.