Notes on Poules in Petanque

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Abstract

This paper describes a petanque tournament with four elements: (i) a *Qualifying* series of games that establish a top-ranked and a lower-ranked group of teams; (ii) a *Social* event for the lower-ranked group from the Qualifying series; (iii) a *Poules* stage where the top-ranked teams from Qualifying play in four-team poules to determine their progression to either, (iv) a primary final series known as the *Principale,* or (v) a secondary final series known as the *Complémentaire.* The Principale and Complémentaire are both single elimination finals using *fold-pairing* to create a *draw* of games and we demonstrate that it is the structure of these draws that determines the makeup of the teams in each poule.

Introduction

In the sport of Petanque the word *poule(s)* can refer to a <u>stage in a tournament</u> for example, Qualifying, Poules, Finals, etc., and <u>a group of teams</u>, most often four teams per poule. In this paper we will have four poules (each with 4 teams) and a *Poules* stage will involve 16 teams.

A common tournament format for a two-day event (say with n teams) where poules could be used is:

Day 1.   Five to six *Qualifying* rounds using either a SWISS system or a ROUNDS system.

At the conclusion of play, teams are ordered according to their number of wins, and for equal wins according to a tiebreak system. Strong teams have more wins than weaker teams and this ordering process yields a ranked list of teams from strongest (rank = 1) to weakest (rank = n).

The top-16 teams are placed into four poules for the *Poules* stage.

The remaining teams from the Qualifying, ranked 17, 18, 19, ..., n are placed into a *Social* event.

Day 2   *Poules* stage. There are three rounds of games for teams in each poule as follows.

Round 1   The highest and lowest ranked teams play in game 1 and the other two play in game 2.

Round 2   The winners of games 1 and 2 play in game 3 and the losers play in game 4.

At the conclusion of Round 2, one team will have two wins (rank 1 in poule), and another team will have two losses (rank 4 in poule) and take no further part in the Poules stage. The other two teams will have a win and a loss and play a third round known as the *barrage.*

Round 3   The winner of game 4 plays the loser of game 3.

At the conclusion of Round 3 one team will have two wins and one loss (rank 2 in poule) and the other will have one win and two losses (rank 3 in poule).

At the conclusion of the Poules stage, the teams ranked 1 and 2 in each poule will form the group of eight teams in the *Principale,* and the teams ranked 3 and 4 in each poule will form the group of eight teams in the *Complémentaire.*

The *Social* event starts in the morning and concludes in the early afternoon.

The *Principale* and *Complémentaire* finals (quarter-final, semi-final, final) in the afternoon.

Prizes awarded for the winners of the three events.

In the following sections we set down the reasoning used to arrive at an **optimum**[1] arrangement of the teams in poules from the Qualifying rounds, and we show that the arrangement is a consequence of:

(i)   *fold pairing* used in creating the *draw* for the finals and the team pairs in the poules,

(ii)   the principal of *maximum benefit* accorded to the top-ranked teams and,

(iii)   a requirement that no finals series game (except possibly the final) is a repeat of a poules game.

In our analysis we use rank numbers from the Qualifying to denote teams and we assume that in any supposed game between teams, the higher ranked team will win.

Also, we note the basic expectation in the design of petanque tournaments like the one described above, is that the two best-ranked teams from Qualifying will play in the final of the Principale.

Fold pairing in Petanque

Fold pairing, also known as *slaughter pairing,* is a common pairing method in Petanque. To perform the pairing, pair the strongest team with the weakest team in the group and repeat by pairing strongest with the weakest from amongst those teams that are unpaired, until all teams have been paired. If a bye needs to be given (for an odd number of teams in the group) then the bye is generally given to the strongest team (Sensei 2023).

Fold pairing aims at getting the strongest teams reaching the last rounds, postponing the most exciting games until the end of the tournament and is popular in knockout tournaments.

In our use of fold pairing there are only even numbers of teams to pair so there will be no byes to consider.

As examples of fold pairing, suppose we have five groups; the first has 8 teams ranked 1 to 8, the second has 4 teams ranked 1 to 4, the third group 8 teams ranked 9 to 13, the fourth group 4 teams ranked 9 to 12 and the fifth group has 16 teams ranked 1 to 16. Write a descending column of numbers in rank order for the top-half of the group, and beside it an ascending column in rank order for the bottom half. The pairings in each group are shown in rows in Figure 1.

Group 1		Group 2		Group 3		Group 4		Group 5	
1	8	1	4	9	16	9	12	1	16
2	7	2	3	10	15	10	11	2	15
3	6			11	14			3	14
4	5			12	13			4	13
								5	12
								6	11
								7	10
								8	9

Figure 1

The sum of the ranks in each pairing in Group 1 is 9, in Group 2 it is 5, in Group 3 it is 25, in Group 4 it is 21 and in Group 5 it is 17. This is a property of fold pairing.

Groups 1 and 2, and 3 and 4 are the pairings for the quarter-finals and semi-finals of the Principale and Complémentaire respectively (see the next section).

Group 5 is the top-16 teams after Qualifying and will be used in the section The Arrangement of Teams in the Poules.

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[1] The best result obtained or obtainable under specific conditions.

The Principale and Complémentaire

At the conclusion of the Poules stage of the tournament the top-two ranked teams in each poule will play in the Principale, and the remaining teams will play in the Complémentaire. If the results of the Poules stage games follow the ranking then teams ranked 1 to 8 will be in the Principale and teams ranked 9 to 16 will be in the Complémentaire.

Both these events are 8-team single elimination finals (also known as knockout finals) with 3 rounds of play: quarter-finals, semi-finals and final; with quarter-final and semi-final games determined by fold pairing. The draw for these finals is shown below as a series of brackets where the team number is its rank, and the results of games follow the ranking order.
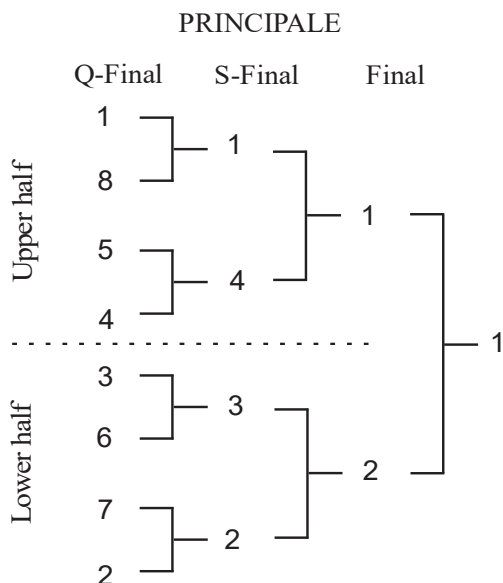
PRINCIPALE

Q-Final	S-Final	Final

Upper half

1
8 — 1
5 — 1
4 — 4

Lower half

3
6 — 3
7 — 2
2 — 2

1

Figure 2a

COMPLEMENTAIRE

Q-Final	S-Final	Final

Upper half

9
16 — 9
13 — 9
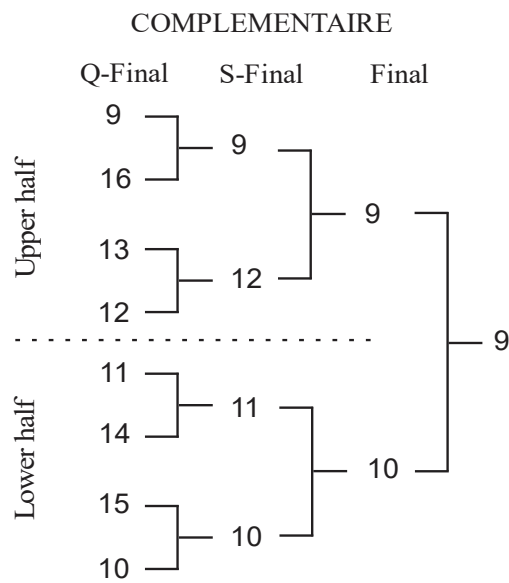12 — 12

Lower half

11
14 — 11
15 — 9
10 — 10

9

Figure 2b

The fold pairing games for the quarter-finals and semi-finals are shown in Figure 1 where Groups 1 and 2 and 3 and 4 are Principale and Complémentaire pairings respectively and the draw for the Principale is constructed in the following sequence.

1. Place teams 1 and 2 in the Final bracket and then in the appropriate semi-final bracket.
2. Team 4 is paired with team 1 in one semi-final and 2 with 3 in the other, because of fold pairing.
3. Teams 1 and 8 are paired in one quarter-final and 2 with 7 in another, and these two quarter finals pairings are at opposite ends of the draw, one at the top of the upper-half and the other at the bottom of the lower half.
4. The remaining two quarter-final pairings, 4-5 in the upper-half of the draw and 3-6 in the lower half follow from the semi-final pairings.

The draw for the Complémentaire is constructed in a similar manner, or simply by adding 8 to the ranking values of teams in the Principale draw.

The Arrangement of Teams in the Poules

Our rules for the arrangement of teams in the poules are:

(i)   *fold pairing* used in creating team pairs in the poules,

(ii)   the principal of *maximum benefit* accorded to the top-ranked teams and,

(iii)   a requirement that no finals series game (except possibly the final) is a repeat of a poules game.

The team pairs are shown as Group 5 of Figure 1 and as a first step in forming the poules we place the first four pairs into four poules numbered 1, 2, 3, and 4 as shown in Figure 3.

$$
\begin{array}{cccc}
\mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} \\
\left[\begin{array}{c|c} 1 & 16 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 2 & 15 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 3 & 14 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 4 & 13 \\ \hline & \end{array}\right] \\
\times\,5-12 & ?\,\,5-12 & ?\,\,5-12 & \times\,5-12 \\
?\,\,6-11 & \times\,6-11 & \times\,6-11 & ?\,\,6-11 \\
?\,\,7-10 & \times\,7-10 & \times\,7-10 & ?\,\,7-10 \\
\times\,8-9 & ?\,\,8-9 & ?\,\,8-9 & \times\,8-9
\end{array}
$$

Figure 3

This initial placement of 1-16, 2-15, 3-14, 4-13 in the top row of separate poules ensures that teams 1, 2, 3, and 4 do not play each other in any Poules stage games (and similarly for teams 13, 14, 15, and 16).

Below this initial placement in each poule are the remaining pairings that could be candidates for the 2nd row of each poule with either a cross ($\times$) indicating disallowed, or a question mark (?) indicating possible.

And if we concern ourselves with the left-hand numbers and the draw for the Principale (Figure 2a) we can show why the crosses and question marks are attached by way of example. Consider Poule 1 where pairings 5-12 and 8-9 are disallowed because:

(a)   If Poule 1 was $\left[\begin{array}{c|c} 1 & 16 \\ \hline 5 & 12 \end{array}\right]$ then it's possible that 1 and 5 would play each other in a game in the Poules stage. It's also possible that they could play each other in a semi-final in violation of our rule (iii);

(b)   If Poule 1 was $\left[\begin{array}{c|c} 1 & 16 \\ \hline 8 & 9 \end{array}\right]$ then it's possible that 1 and 8 would play each other in a game in the Poules stage. They also play each other in a quarter-final in violation of our rule (iii).

We can apply similar reasoning to explain the disallowances and possibilities in poules 2, 3, and 4 and our partial poules arrangement reduces to

$$
\begin{array}{cccc}
\mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} \\
\left[\begin{array}{c|c} 1 & 16 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 2 & 15 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 3 & 14 \\ \hline & \end{array}\right] &
\left[\begin{array}{c|c} 4 & 13 \\ \hline & \end{array}\right] \\
?\,\,6-11 & ?\,\,5-12 & ?\,\,5-12 & ?\,\,6-11 \\
?\,\,7-10 & ?\,\,8-9 & ?\,\,8-9 & ?\,\,7-10
\end{array}
$$

Figure 4

Note here in Figure 4, that if a pairing is selected from the two possibilities for Poule 1 then the pairing for Poule 4 is selected consequently, since the possible pairings are the same. Similarly, for Poules 2 and 3.

With this in mind, we consider Poule 1 and the two possibilities (a) $\begin{bmatrix} 1 & 16 \\ \hline 6 & 11 \end{bmatrix}$ and (b) $\begin{bmatrix} 1 & 16 \\ \hline 7 & 10 \end{bmatrix}$.

In both (a) and (b) there is a possibility that teams 1 and 6, or 1 and 7 could meet in a Poules stage game, but they could only meet again in the final of the Principale so both (a) and (b) satisfy our rule (iii).

If we consider the Poules stage and option (a) then the 1st round games would be 1 v 16, and 6 v 11 and if results follow rankings, then a 2nd round game would be 1 v 6. For option (b), the 1st round games would be 1 v 16 and 7 v 10 with a possible 2nd round game 1 v 7. The option that gives maximum benefit to the top-ranked team is (b), i.e., 1 v 7 is a better option than 1 v 6. This satisfies our rule (ii) and the partial arrangement of the poules becomes.

$$
\begin{array}{cccc}
\mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} \\
\begin{bmatrix} 1 & 16 \\ \hline 7 & 10 \end{bmatrix} &
\begin{bmatrix} 2 & 15 \\ \hline & \end{bmatrix} &
\begin{bmatrix} 3 & 14 \\ \hline & \end{bmatrix} &
\begin{bmatrix} 4 & 13 \\ \hline 6 & 11 \end{bmatrix} \\
 & ?\ 5-12 & ?\ 5-12 & \\
 & ?\ 8-9 & ?\ 8-9 &
\end{array}
$$

Figure 5

If we apply similar reasoning to the options for Poule 2 we will find the option $\begin{bmatrix} 2 & 15 \\ \hline 8 & 9 \end{bmatrix}$ affords the maximum benefit to team 2 (the second-best team) and we conclude that the arrangement below, that we call an optimum arrangement, satisfies all our rules.

$$
\begin{array}{cccc}
\mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} \\
\begin{bmatrix} 1 & 16 \\ \hline 7 & 10 \end{bmatrix} &
\begin{bmatrix} 2 & 15 \\ \hline 8 & 9 \end{bmatrix} &
\begin{bmatrix} 3 & 14 \\ \hline 5 & 12 \end{bmatrix} &
\begin{bmatrix} 4 & 13 \\ \hline 6 & 11 \end{bmatrix}
\end{array}
$$

This is also the arrangement shown in the document *How To Run A Tournament* on the website of Petanque New Zealand (PNZ, 2005)

Discussion

We have shown above, the arrangement of teams in poules for the **Top-16 from Qualifying** given the draw for the Principale. This arrangement is a consequence of three rules:

(i)   *fold pairing* used in creating the *draw* for the finals and the team pairs in the poules,

(ii)   the principal of *maximum benefit* accorded to the top-ranked teams and,

(iii) a requirement that no finals series game (except possibly the final) is a repeat of a poules game.

Similar reasoning can be used to determine the arrangement of teams in poules for a Top-32 and a Top-64 from Qualifying.

Top-32 from Qualifying

From a Top-32 from Qualifying, the Poules stage will determine the 16 teams in the Principale and the 16 teams in the Complémentaire.

Given the draw for the Principale shown Figure 6 the arrangement of the teams in the poules follows.
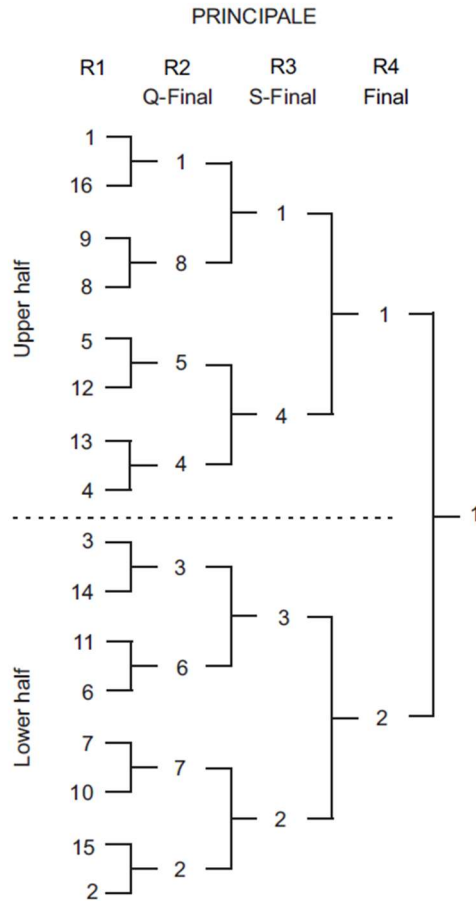

Figure 6. The 4-round draw for the Principale for teams ranked 1 to 16.

The arrangement of the Top-32 teams into 8 poules is.

1	2	3	4	5	6	7	8
$\begin{bmatrix} 1 & 32 \\ 15 & 18 \end{bmatrix}$	$\begin{bmatrix} 2 & 31 \\ 16 & 17 \end{bmatrix}$	$\begin{bmatrix} 3 & 30 \\ 13 & 20 \end{bmatrix}$	$\begin{bmatrix} 4 & 29 \\ 14 & 19 \end{bmatrix}$	$\begin{bmatrix} 5 & 28 \\ 11 & 22 \end{bmatrix}$	$\begin{bmatrix} 6 & 27 \\ 12 & 21 \end{bmatrix}$	$\begin{bmatrix} 7 & 26 \\ 9 & 24 \end{bmatrix}$	$\begin{bmatrix} 8 & 25 \\ 10 & 23 \end{bmatrix}$

Top-64 from Qualifying

From a Top-64 from Qualifying, the Poules stage will determine the 32 teams in the Principale and the 32 teams in the Complémentaire.

Given the draw for the Principale shown Figure 7 the arrangement of the teams in the poules follows.
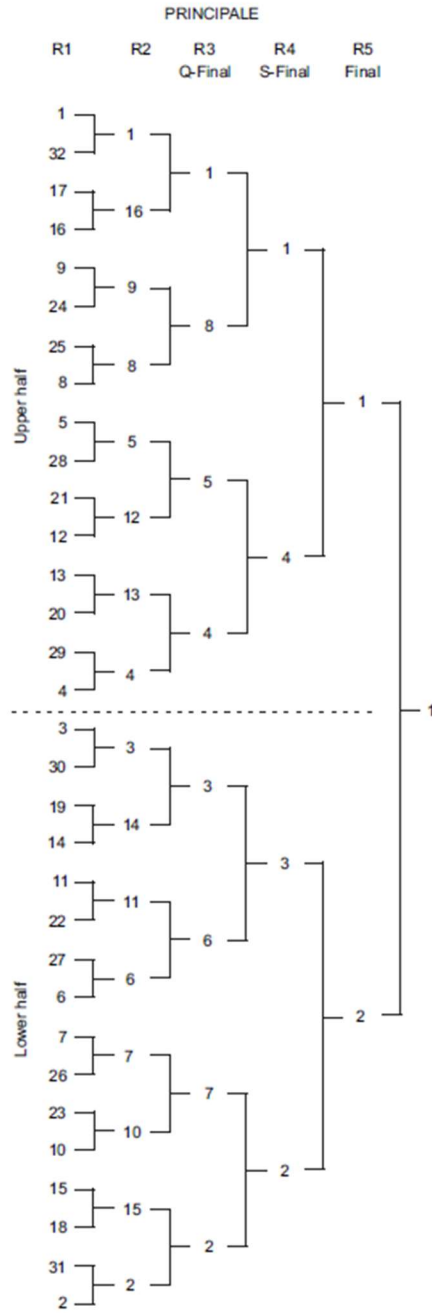
PRINCIPALE

R1	R2	R3	R4	R5
		Q-Final	S-Final	Final

Figure 7. The 5-round draw for the Principale for teams ranked 1 to 32.

The arrangement of the Top-64 teams into 16 poules is.

1	2	3	4	5	6	7	8
$\begin{bmatrix} 1 & 64 \\ \hline 31 & 34 \end{bmatrix}$	$\begin{bmatrix} 2 & 63 \\ \hline 32 & 33 \end{bmatrix}$	$\begin{bmatrix} 3 & 62 \\ \hline 29 & 36 \end{bmatrix}$	$\begin{bmatrix} 4 & 61 \\ \hline 30 & 35 \end{bmatrix}$	$\begin{bmatrix} 5 & 60 \\ \hline 27 & 38 \end{bmatrix}$	$\begin{bmatrix} 6 & 59 \\ \hline 28 & 37 \end{bmatrix}$	$\begin{bmatrix} 7 & 58 \\ \hline 25 & 40 \end{bmatrix}$	$\begin{bmatrix} 8 & 57 \\ \hline 26 & 39 \end{bmatrix}$

9	10	11	12	13	14	15	16
$\begin{bmatrix} 9 & 56 \\ \hline 23 & 42 \end{bmatrix}$	$\begin{bmatrix} 10 & 55 \\ \hline 24 & 41 \end{bmatrix}$	$\begin{bmatrix} 11 & 54 \\ \hline 21 & 44 \end{bmatrix}$	$\begin{bmatrix} 12 & 53 \\ \hline 22 & 43 \end{bmatrix}$	$\begin{bmatrix} 13 & 52 \\ \hline 19 & 46 \end{bmatrix}$	$\begin{bmatrix} 14 & 51 \\ \hline 20 & 45 \end{bmatrix}$	$\begin{bmatrix} 15 & 50 \\ \hline 17 & 48 \end{bmatrix}$	$\begin{bmatrix} 16 & 49 \\ \hline 18 & 47 \end{bmatrix}$

References

Sensei, 2023, *Sensei's Library*, Group Pairing, 21-Oct-2023 available at
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PNZ, 2005, *How To Run A Tournament,* Petanque New Zealand, 33 pages, March 2005, available at
https://www.petanquenz.com/documents/how-to-run-a-tournament-2005.pdf [accessed 20-Apr-2024]