

Scheveningen system

by
Otto Milvang, 29th September 2022

Introduction

The Scheveningen system is a method of organizing a match between two teams. Each player on one team plays each player on the other team

The system was first used in a tournament in Scheveningen, Netherlands in 1923. The idea behind it was that a team of ten Dutch players could face ten foreign masters.

Many mathematical problems arise around Scheveningen system of team meetings. In a two-team tournament, each member of one of the teams meets each member of the other. The question arises about the composition. With n players it is $n! \cdot (n-1)!$ Possible solutions. For 6 players this is 86400 different solutions. The goal is to select a method to select one of this with a generic method.

Literature

A search for Scheveningen gives only a few references.

Most important is the definitions of Scheveningen System in the Arbiters manual 2022, page 73. It does not have any discussion about how to construct the tables or any other references.

Another interesting source is Wikipedia with a website with tables labeled "Standard Tables". It seems that these are the same as the tables generated with <https://www.skakistis.gr/livegames/scheveningen.htm> In the source code for these it seems that this is only a search through all possible solutions, to find the first solution that satisfy some simple requirements. It's a reference to a book "Mathematics and Sport" by L. E. Sadovskii and A.L. Sadovskii, translated from Russian ("Математика и Спорт", Moskva 1985), Russian: <http://mathemlib.ru/books/item/f00/s00/z0000046/st057.shtml> This is interesting, but is far away from a generic and good solution.

In the references it's a statement from Karpov, Anatoly; Roshal, Aleksandr (1980), Anatoly Karpov: "Chess is My Life": "This system is a popular way to create title norm opportunities". The first example is <http://www.uschess.org/index.php/July/Norm-Hunting-in-San-Francisco.html> where the players are divided into two teams, those seeking GM norms, and the teams with titles so that GM norm will be possible. The second example is <https://en.chessbase.com/post/angora-chess-tournaments-in-ankara> also divided in a GM seekers and GMs. Both tournaments had five players on each team, and double round.

From the literature it's quite easy to form Scheveningen tables for an odd number of player and for 4, 8, 12, ... players. There are no perfect solutions for 2, 6, 10, 14, ... players, and to see the difference in published systems, it may be categorized in groups on how match on 6 boards is solved.

Requirements

System requirements in priority:

1. Every player from one team plays every player from the other team.
2. Two players shall not play against each other more than once.
3. Minimize the difference between the number of black and the number of white for:
 - a) for the total games played by the teams
 - b) for each player for all games in the tournament.
 - c) for the games played in consecutive games for a player
 - d) for the games played in a round

Two players

The pairing for a team match with two players per team seems simple.

	Board 1	Board 2				
Round 1	<table border="1" style="border-collapse: collapse; width: 60px; height: 40px;"> <tr><td style="text-align: center;">A 1</td></tr> <tr><td style="text-align: center;">B 1</td></tr> </table>	A 1	B 1	<table border="1" style="border-collapse: collapse; width: 60px; height: 40px;"> <tr><td style="text-align: center;">A 2</td></tr> <tr><td style="text-align: center;">B 2</td></tr> </table>	A 2	B 2
A 1						
B 1						
A 2						
B 2						
<hr/>						
Round 2	<table border="1" style="border-collapse: collapse; width: 60px; height: 40px;"> <tr><td style="text-align: center;">A 1</td></tr> <tr><td style="text-align: center;">B 2</td></tr> </table>	A 1	B 2	<table border="1" style="border-collapse: collapse; width: 60px; height: 40px;"> <tr><td style="text-align: center;">A 2</td></tr> <tr><td style="text-align: center;">B 1</td></tr> </table>	A 2	B 1
A 1						
B 2						
A 2						
B 1						

We can equalize the number of games played with white and black for the players, but we cannot equalize the number of white and black games played for a team in each round.

As a analyze tool we construct a cross table that shows who plays who

	B1	B2
A1	1	2
A2	2	1

The color of the text is the color for the A-player, and the number tells the round they will play, so A2 will have black pieces against B1 in round 2. The background colors have no meaning other than it will visually be easier to identify the rounds.

```

Player:      Col   W/B WW/BB
=====
Player A1:  WB    1/1 0/0
Player A2:  WB    1/1 0/0
Player B1:  BW    1/1 0/0
Player B2:  BW    1/1 0/0
Rounds: 2 0
  
```

The table shows color per round, sum W/B, and number of WW or BB. Last line shows number of players from team A with white per round.

8 players

Table for 8 players is very regular

	B1	B2	B3	B4	B5	B6	B7	B8
A1	1	2	3	4	5	6	7	8
A2	4	1	2	3	8	5	6	7
A3	3	4	1	2	7	8	5	6
A4	2	3	4	1	6	7	8	5
A5	5	6	7	8	1	2	3	4
A6	8	5	6	7	4	1	2	3
A7	7	8	5	6	3	4	1	2
A8	6	7	8	5	2	3	4	1

A-players will alternate their colors throughout the match while all the B-players will play with the same color in round 5 as they had in round 4.

5 players

Table for 5 players is also regular

	B1	B2	B3	B4	B5
A1	1	2	3	4	5
A2	5	1	2	3	4
A3	4	5	1	2	3
A4	3	4	5	1	2
A5	2	3	4	5	1

```

Player:      Col      W/B  WW/BB
=====
Player A1:  WBWBWBWB 4/4  0/0
Player A2:  WBWBWBWB 4/4  0/0
Player A3:  WBWBWBWB 4/4  0/0
Player A4:  WBWBWBWB 4/4  0/0
Player A5:  BWBWBWBW 4/4  0/0
Player A6:  BWBWBWBW 4/4  0/0
Player A7:  BWBWBWBW 4/4  0/0
Player A8:  BWBWBWBW 4/4  0/0
Player B1:  BWBWBWBW 4/4  1/0
Player B2:  BWBWBWBW 4/4  1/0
Player B3:  BWBWBWBW 4/4  1/0
Player B4:  BWBWBWBW 4/4  1/0
Player B5:  WBWBWBWB 4/4  0/1
Player B6:  WBWBWBWB 4/4  0/1
Player B7:  WBWBWBWB 4/4  0/1
Player B8:  WBWBWBWB 4/4  0/1
Rounds:  4 4 4 4 4 4 4 4
    
```

```

Player:      Col      W/B  WW/BB
=====
Player A1:  WBWBW  3/2  0/0
Player A2:  WBWBB  2/3  0/1
Player A3:  WBBWB  2/3  0/1
Player A4:  BWBWW  3/2  1/0
Player A5:  BWWBW  3/2  1/0
Player B1:  BBWBW  2/3  0/1
Player B2:  BWBBW  2/3  0/1
Player B3:  BWBWB  2/3  0/0
Player B4:  WWBWB  3/2  1/0
Player B5:  WBWWB  3/2  1/0
Rounds:  3 2 3 2 3
    
```

6 players, Arbiters manual

This table is unsymmetric and seems to be ad hoc.

	B1	B2	B3	B4	B5	B6
A1	1	2	3	4	5	6
A2	2	3	6	5	1	4
A3	3	6	2	1	4	5
A4	4	1	5	2	6	3
A5	5	4	1	6	3	2
A6	6	5	4	3	2	1

Player:	Col	W/B	WW/BB
=====			
Player A1:	BBWWBW	3/3	1/1
Player A2:	BWWBBW	3/3	1/1
Player A3:	WBBWWB	3/3	1/1
Player A4:	WBBWBW	3/3	0/1
Player A5:	WWBBWB	3/3	1/1
Player A6:	BWWBWB	3/3	1/0
Player B1:	WBWBBW	3/3	0/1
Player B2:	BWBWBW	3/3	0/0
Player B3:	BWBWWB	3/3	1/0
Player B4:	BWBBWW	3/3	1/1
Player B5:	WBWBWB	3/3	0/0
Player B6:	WBWWBB	3/3	1/1
Round:	3 3 3 3 3 3		
Total WW/BB,	A: 5/5,	B: 3/3	

This table is printed in:

[FIDEs Arbiter's Manual 2022](#)

[English Chess Federation](#)

https://gambiter.com/chess/tournaments/Scheveningen_system.html

<https://alchetron.com/Scheveningen-system>

[United States Chess Federation's Official Rules of Chess, Sixth Edition](#)

6 players, several sources

This table is also unsymmetric and seems to be ad hoc.

	B1	B2	B3	B4	B5	B6
A1	1	2	3	4	5	6
A2	6	1	5	2	4	3
A3	3	4	1	5	6	2
A4	4	3	6	1	2	5
A5	5	6	2	3	1	4
A6	2	5	4	6	3	1

Player:	Col	W/B	WW/BB
=====			
Player A1:	WBBWWB	3/3	1/1
Player A2:	BWBBWW	3/3	1/1
Player A3:	WBWWBB	3/3	1/1
Player A4:	BWWBWB	3/3	1/0
Player A5:	BWBWBW	3/3	0/0
Player A6:	WBWBWB	3/3	0/1
Player B1:	BWBWWB	3/3	1/0
Player B2:	WWBBWB	3/3	1/1
Player B3:	BBWWBW	3/3	1/1
Player B4:	WBWBWB	3/3	0/0
Player B5:	WBBWBW	3/3	0/1
Player B6:	BWWBBW	3/3	1/1
Round:	3 3 3 3 3 3		
Total WW/BB, A:	4/4		
Total WW/BB, B:	4/4		

This table is printed in:

[Bulgarian wikipedia](#)

https://wikifaz.icu/wiki/Scheveningen_system

https://ru.upwiki.one/wiki/Scheveningen_system

This was also the pairing on English Wikipedia from 11 September 2019 to 25 April 2022, so I guess it has been copied from earlier versions.

6 players, Wikipedia

This table is also unsymmetric and seems to be ad hoc.

	B1	B2	B3	B4	B5	B6
A1	1	2	3	4	5	6
A2	6	1	2	5	3	4
A3	3	4	1	6	2	5
A4	4	3	5	1	6	2
A5	5	6	4	2	1	3
A6	2	5	6	3	4	1

There are some advantages with this table compared to FIDEs table:

- 1) The color changes are better distributed
- 2) The first round is A1-B1, A2-B2, ...

This table is printed in:

[Wikipedia](#)

<https://www.skakistis.gr/livegames/scheveningen.htm>

[Russian wikipedia](#)

I found that the tables is created and published by the Greek chess player Bousios Hristos, and he has published several revisions of 6-players and 10-player tables.

Hristos defined requirements to find the best pairings are in order of priority:

1. *Each player on one team plays each player on the other team.*
2. *Each player plays an equal number of games with white and black.*
If the number of players in the team is an odd number, then in all games:
 - a) *One of the teams has one more colour than the other.*
 - b) *For half number of players (rounded to the nearest integer) one colour is increased by 1 and for the other players decreased by 1.*
3. *No player plays the same colour three times in a row.*
4. *Each team in each round plays an equal number of games with white and black.*
This does not apply if the players in each team are 2.
If the number of players in the team is an odd number, then one colour is increased by 1, while in the next round this colour is decreased by 1.
5. *In the n-th round the player A1 plays with the player Bn.*
Player A1 changes color in the next round.
In the first round the player An plays with the player Bn.

Player:	Col	W/B	WW/BB
Player A1:	WBWBWB	3/3	0/0
Player A2:	BWBBWW	3/3	1/1
Player A3:	BWBWWB	3/3	1/0
Player A4:	WBWWBB	3/3	1/1
Player A5:	BWWBBW	3/3	1/1
Player A6:	WBBWBW	3/3	0/1
Player B1:	BWWBWB	3/3	1/0
Player B2:	WWBBWB	3/3	1/1
Player B3:	WBBWWB	3/3	1/1
Player B4:	BBWWBW	3/3	1/1
Player B5:	WBWBBW	3/3	0/1
Player B6:	BWBWBW	3/3	0/0
Round:	3 3 3 3 3 3		
Total WW/BB,	A: 4/4,	B: 4/4	

The problem is not easily solved if the number of players in the team divided by 4 gives a remainder 2 (6, 10, 14, ...).

One solution precedes another if the conditions in the order of priority are met:

A. After all rounds

1. The absolute difference of the number of players in a team who change colour in the next round minus the same of the other team is minimal.
2. The number of players changing colour in the next round is the maximum.

B. After all even number rounds

1. the absolute difference of the number of players in a team which have balanced colours minus the same of the other team is minimal.
2. The number of players with balanced colours is the maximum.

These requirements are stronger than the requirements listed at page 2.

Example:

Match on 6 board, Arbiters manual. Team A has 5 WW and 5 BB, while Team B has 3 WW and 3 BB.

Round 1 is B1-A1 B5-A2 A3-B4 A4-B2 A5-B3 B6-A6

It's the only pairing that does not start with A1-B1, and it does not follow a system where Ai meets Bi, for i=1...n, in round 1.

Match on 6 board, Wikipedia. Team A has 4 WW and 4 BB, and Team B has also 4 WW and 4 BB.

Round 1 A1-B1 B2-A2 B3-A3 A4-B4 B5-A5 A6-B6, thus this is a better pairing

Double round

The easiest way to play double round is to play the second half in reversed match order, and with opposite colours. This will ensure we will have no WWW or BBB in the color sequence.

Example, n=5:

```
Round 1:  A1-B1 A2-B2 A3-B3 B4-A4 B5-A5
Round 2:  B2-A1 B3-A2 B4-A3 A4-B5 A5-B1
Round 3:  A1-B3 A2-B4 B5-A3 B1-A4 A5-B2
Round 4:  B4-A1 B5-A2 A3-B1 A4-B2 B3-A5
Round 5:  A1-B5 B1-A2 B2-A3 A4-B3 A5-B4
Round 6:  B5-A1 A2-B1 A3-B2 B3-A4 B4-A5
Round 7:  A1-B4 A2-B5 B1-A3 B2-A4 A5-B3
Round 8:  B3-A1 B4-A2 A3-B5 A4-B1 B2-A5
Round 9:  A1-B2 A2-B3 A3-B4 B5-A4 B1-A5
Round 10: B1-A1 B2-A2 B3-A3 A4-B4 A5-B5
```

Player:	Col	W/B	WW/BB
=====			
Player A1:	WBWBWBWBWB	5/5	0/0
Player A2:	WBWBWBWBWB	5/5	1/1
Player A3:	WBWBWBWBWB	5/5	1/1
Player A4:	BWBWBWBWBW	5/5	1/1
Player A5:	BWBWBWBWBW	5/5	1/1
Player B1:	BBWBWBWBWB	5/5	1/1
Player B2:	BWBWBWBWBW	5/5	1/1
Player B3:	BWBWBWBWBW	5/5	0/0
Player B4:	WBWBWBWBWB	5/5	1/1
Player B5:	WBWBWBWBWB	5/5	1/1
Round:	3 2 3 2 3 2 3 2 3 2		
Total WW/BB	A: 4/4, B: 4/4		

Discussion

We must choice between the old Scheveningen system tables from the Arbiters manual, or the new definitions made by Bousios Hristos. The only difference is tables for 6 players, and for 10 players. There is no good reason for keeping the old tables, since they do not fit into the pattern for how the other pairings are formed. I will strongly recommend new tables made by Bousios Hristos.

Scheveningen tables

Match on 2 Boards

Round 1 A1-B1 A2-B2
Round 2 B2-A1 B1-A2

Match on 3 Boards

Round 1 A1-B1 A2-B2 B3-A3
Round 2 B2-A1 A2-B3 B1-A3
Round 3 A1-B3 B1-A2 A3-B2

Match on 4 Boards

Round 1 A1-B1 A2-B2 B3-A3 B4-A4
Round 2 B2-A1 B1-A2 A3-B4 A4-B3
Round 3 A1-B3 A2-B4 B1-A3 B2-A4
Round 4 B4-A1 B3-A2 A3-B2 A4-B1

Match on 5 Boards

Round 1 A1-B1 A2-B2 A3-B3 B4-A4 B5-A5
Round 2 B2-A1 B3-A2 B4-A3 A4-B5 A5-B1
Round 3 A1-B3 A2-B4 B5-A3 B1-A4 A5-B2
Round 4 B4-A1 B5-A2 A3-B1 A4-B2 B3-A5
Round 5 A1-B5 B1-A2 B2-A3 A4-B3 A5-B4

Match on 6 Boards

Round 1 A1-B1 B2-A2 B3-A3 A4-B4 B5-A5 A6-B6
Round 2 B2-A1 A2-B3 A3-B5 B6-A4 A5-B4 B1-A6
Round 3 A1-B3 B5-A2 B1-A3 A4-B2 A5-B6 B4-A6
Round 4 B4-A1 B6-A2 A3-B2 A4-B1 B3-A5 A6-B5
Round 5 A1-B5 A2-B4 A3-B6 B3-A4 B1-A5 B2-A6
Round 6 B6-A1 A2-B1 B4-A3 B5-A4 A5-B2 A6-B3

Match on 7 Boards

Round 1 A1-B1 A2-B2 A3-B3 A4-B4 B5-A5 B6-A6 B7-A7
Round 2 B2-A1 B3-A2 B4-A3 A4-B5 A5-B6 A6-B7 B1-A7
Round 3 A1-B3 A2-B4 A3-B5 B6-A4 B7-A5 B1-A6 A7-B2
Round 4 B4-A1 B5-A2 A3-B6 A4-B7 A5-B1 B2-A6 B3-A7
Round 5 A1-B5 A2-B6 B7-A3 B1-A4 B2-A5 A6-B3 A7-B4
Round 6 B6-A1 A2-B7 A3-B1 A4-B2 B3-A5 B4-A6 B5-A7
Round 7 A1-B7 B1-A2 B2-A3 B3-A4 A5-B4 A6-B5 A7-B6

Match on 8 Boards

Round 1 A1-B1 A2-B2 A3-B3 A4-B4 B5-A5 B6-A6 B7-A7 B8-A8
Round 2 B2-A1 B3-A2 B4-A3 B1-A4 A5-B6 A6-B7 A7-B8 A8-B5
Round 3 A1-B3 A2-B4 A3-B1 A4-B2 B7-A5 B8-A6 B5-A7 B6-A8
Round 4 B4-A1 B1-A2 B2-A3 B3-A4 A5-B8 A6-B5 A7-B6 A8-B7
Round 5 A1-B5 A2-B6 A3-B7 A4-B8 B1-A5 B2-A6 B3-A7 B4-A8
Round 6 B6-A1 B7-A2 B8-A3 B5-A4 A5-B2 A6-B3 A7-B4 A8-B1
Round 7 A1-B7 A2-B8 A3-B5 A4-B6 B3-A5 B4-A6 B1-A7 B2-A8
Round 8 B8-A1 B5-A2 B6-A3 B7-A4 A5-B4 A6-B1 A7-B2 A8-B3

Match on 9 Boards

Round 1 A1-B1 A2-B2 A3-B3 A4-B4 A5-B5 B6-A6 B7-A7 B8-A8 B9-A9
Round 2 B2-A1 B3-A2 B4-A3 B5-A4 A5-B6 A6-B7 A7-B8 A8-B9 B1-A9
Round 3 A1-B3 A2-B4 A3-B5 A4-B6 B7-A5 B8-A6 B9-A7 B1-A8 A9-B2
Round 4 B4-A1 B5-A2 B6-A3 A4-B7 A5-B8 A6-B9 A7-B1 B2-A8 B3-A9
Round 5 A1-B5 A2-B6 A3-B7 B8-A4 B9-A5 B1-A6 B2-A7 A8-B3 A9-B4
Round 6 B6-A1 B7-A2 A3-B8 A4-B9 A5-B1 A6-B2 B3-A7 B4-A8 B5-A9
Round 7 A1-B7 A2-B8 B9-A3 B1-A4 B2-A5 B3-A6 A7-B4 A8-B5 A9-B6
Round 8 B8-A1 A2-B9 A3-B1 A4-B2 A5-B3 B4-A6 B5-A7 B6-A8 B7-A9
Round 9 A1-B9 B1-A2 B2-A3 B3-A4 B4-A5 A6-B5 A7-B6 A8-B7 A9-B8

Match on 10 Boards

Round 1 A1-B1 A2-B2 A3-B3 A4-B4 B5-A5 B6-A6 B7-A7 A8-B8 B9-A9 B10-A10
Round 2 B2-A1 B1-A2 B8-A3 B3-A4 A5-B10 A6-B5 A7-B6 B4-A8 A9-B7 A10-B9
Round 3 A1-B3 A2-B8 A3-B4 A4-B10 B6-A5 B7-A6 B9-A7 A8-B1 B2-A9 B5-A10
Round 4 B4-A1 B3-A2 B10-A3 A4-B6 A5-B7 B8-A6 A7-B5 A8-B9 B1-A9 A10-B2
Round 5 A1-B5 A2-B4 B9-A3 B7-A4 B1-A5 A6-B10 B8-A7 B2-A8 A9-B3 A10-B6
Round 6 B6-A1 A2-B7 A3-B1 A4-B9 A5-B8 A6-B2 B10-A7 B5-A8 B4-A9 B3-A10
Round 7 A1-B7 B5-A2 B2-A3 B1-A4 B4-A5 B9-A6 A7-B3 A8-B10 A9-B6 A10-B8
Round 8 B8-A1 B6-A2 A3-B5 A4-B2 A5-B9 A6-B1 A7-B4 B3-A8 B10-A9 B7-A10
Round 9 A1-B9 A2-B10 A3-B7 B5-A4 B2-A5 B3-A6 B1-A7 A8-B6 A9-B8 B4-A10
Round 10 B10-A1 B9-A2 B6-A3 B8-A4 A5-B3 A6-B4 A7-B2 B7-A8 A9-B5 A10-B1

Match on 11 Boards

Round 1 A1-B1 A2-B2 A3-B3 A4-B4 A5-B5 A6-B6
B7-A7 B8-A8 B9-A9 B10-A10 B11-A11
Round 2 B2-A1 B3-A2 B4-A3 B5-A4 B6-A5 A6-B7
A7-B8 A8-B9 A9-B10 A10-B11 B1-A11
Round 3 A1-B3 A2-B4 A3-B5 A4-B6 A5-B7 B8-A6
B9-A7 B10-A8 B11-A9 B1-A10 A11-B2
Round 4 B4-A1 B5-A2 B6-A3 B7-A4 A5-B8 A6-B9
A7-B10 A8-B11 A9-B1 B2-A10 B3-A11
Round 5 A1-B5 A2-B6 A3-B7 A4-B8 B9-A5 B10-A6
B11-A7 B1-A8 B2-A9 A10-B3 A11-B4
Round 6 B6-A1 B7-A2 B8-A3 A4-B9 A5-B10 A6-B11
A7-B1 A8-B2 B3-A9 B4-A10 B5-A11
Round 7 A1-B7 A2-B8 A3-B9 B10-A4 B11-A5 B1-A6
B2-A7 B3-A8 A9-B4 A10-B5 A11-B6
Round 8 B8-A1 B9-A2 A3-B10 A4-B11 A5-B1 A6-B2
A7-B3 B4-A8 B5-A9 B6-A10 B7-A11
Round 9 A1-B9 A2-B10 B11-A3 B1-A4 B2-A5 B3-A6
B4-A7 A8-B5 A9-B6 A10-B7 A11-B8
Round 10 B10-A1 A2-B11 A3-B1 A4-B2 A5-B3 A6-B4
B5-A7 B6-A8 B7-A9 B8-A10 B9-A11
Round 11 A1-B11 B1-A2 B2-A3 B3-A4 B4-A5 B5-A6
A7-B6 A8-B7 A9-B8 A10-B9 A11-B10

Match on 12 Boards

Round 1	A1-B1	A2-B2	A3-B3	A4-B4	A5-B5	A6-B6	
	B7-A7	B8-A8	B9-A9	B10-A10	B11-A11	B12-A12	
Round 2	B2-A1	B3-A2	B4-A3	B5-A4	B6-A5	B1-A6	
	A7-B8	A8-B9	A9-B10	A10-B11	A11-B12	A12-B7	
Round 3	A1-B3	A2-B4	A3-B5	A4-B6	A5-B1	A6-B2	
	B9-A7	B10-A8	B11-A9	B12-A10	B7-A11	B8-A12	
Round 4	B4-A1	B5-A2	B6-A3	B1-A4	B2-A5	B3-A6	
	A7-B10	A8-B11	A9-B12	A10-B7	A11-B8	A12-B9	
Round 5	A1-B5	A2-B6	A3-B1	A4-B2	A5-B3	A6-B4	
	B11-A7	B12-A8	B7-A9	B8-A10	B9-A11	B10-A12	
Round 6	B6-A1	B1-A2	B2-A3	B3-A4	B4-A5	B5-A6	
	A7-B12	A8-B7	A9-B8	A10-B9	A11-B10	A12-B11	
Round 7	A1-B7	A2-B8	A3-B9	A4-B10	A5-B11	A6-B12	
	B1-A7	B2-A8	B3-A9	B4-A10	B5-A11	B6-A12	
Round 8	B8-A1	B9-A2	B10-A3	B11-A4	B12-A5	B7-A6	
	A7-B2	A8-B3	A9-B4	A10-B5	A11-B6	A12-B1	
Round 9	A1-B9	A2-B10	A3-B11	A4-B12	A5-B7	A6-B8	
	B3-A7	B4-A8	B5-A9	B6-A10	B1-A11	B2-A12	
Round 10	B10-A1	B11-A2	B12-A3	B7-A4	B8-A5	B9-A6	
	A7-B4	A8-B5	A9-B6	A10-B1	A11-B2	A12-B3	
Round 11	A1-B11	A2-B12	A3-B7	A4-B8	A5-B9	A6-B10	
	B5-A7	B6-A8	B1-A9	B2-A10	B3-A11	B4-A12	
Round 12	B12-A1	B7-A2	B8-A3	B9-A4	B10-A5	B11-A6	
	A7-B6	A8-B1	A9-B2	A10-B3	A11-B4	A12-B5	

Match on 13 Boards

Round 1	A1-B1	A2-B2	A3-B3	A4-B4	A5-B5	A6-B6	A7-B7
	B8-A8	B9-A9	B10-A10	B11-A11	B12-A12	B13-A13	
Round 2	B2-A1	B3-A2	B4-A3	B5-A4	B6-A5	B7-A6	A7-B8
	A8-B9	A9-B10	A10-B11	A11-B12	A12-B13	B1-A13	
Round 3	A1-B3	A2-B4	A3-B5	A4-B6	A5-B7	A6-B8	B9-A7
	B10-A8	B11-A9	B12-A10	B13-A11	B1-A12	A13-B2	
Round 4	B4-A1	B5-A2	B6-A3	B7-A4	B8-A5	A6-B9	A7-B10
	A8-B11	A9-B12	A10-B13	A11-B1	B2-A12	B3-A13	
Round 5	A1-B5	A2-B6	A3-B7	A4-B8	A5-B9	B10-A6	B11-A7
	B12-A8	B13-A9	B1-A10	B2-A11	A12-B3	A13-B4	
Round 6	B6-A1	B7-A2	B8-A3	B9-A4	A5-B10	A6-B11	A7-B12
	A8-B13	A9-B1	A10-B2	B3-A11	B4-A12	B5-A13	
Round 7	A1-B7	A2-B8	A3-B9	A4-B10	B11-A5	B12-A6	B13-A7
	B1-A8	B2-A9	B3-A10	A11-B4	A12-B5	A13-B6	
Round 8	B8-A1	B9-A2	B10-A3	A4-B11	A5-B12	A6-B13	A7-B1
	A8-B2	A9-B3	B4-A10	B5-A11	B6-A12	B7-A13	
Round 9	A1-B9	A2-B10	A3-B11	B12-A4	B13-A5	B1-A6	B2-A7
	B3-A8	B4-A9	A10-B5	A11-B6	A12-B7	A13-B8	
Round 10	B10-A1	B11-A2	A3-B12	A4-B13	A5-B1	A6-B2	A7-B3
	A8-B4	B5-A9	B6-A10	B7-A11	B8-A12	B9-A13	
Round 11	A1-B11	A2-B12	B13-A3	B1-A4	B2-A5	B3-A6	B4-A7
	B5-A8	A9-B6	A10-B7	A11-B8	A12-B9	A13-B10	
Round 12	B12-A1	A2-B13	A3-B1	A4-B2	A5-B3	A6-B4	A7-B5
	B6-A8	B7-A9	B8-A10	B9-A11	B10-A12	B11-A13	
Round 13	A1-B13	B1-A2	B2-A3	B3-A4	B4-A5	B5-A6	B6-A7
	A8-B7	A9-B8	A10-B9	A11-B10	A12-B11	A13-B12	

Double round match, 3 Boards

Round 1 A1-B1 A2-B2 B3-A3
Round 2 B2-A1 A2-B3 B1-A3
Round 3 A1-B3 B1-A2 A3-B2
Round 4 B3-A1 A2-B1 B2-A3
Round 5 A1-B2 B3-A2 A3-B1
Round 6 B1-A1 B2-A2 A3-B3

Double round match, 4 Boards

Round 1 A1-B1 A2-B2 B3-A3 B4-A4
Round 2 B2-A1 B1-A2 A3-B4 A4-B3
Round 3 A1-B3 A2-B4 B1-A3 B2-A4
Round 4 B4-A1 B3-A2 A3-B2 A4-B1
Round 5 A1-B4 A2-B3 B2-A3 B1-A4
Round 6 B3-A1 B4-A2 A3-B1 A4-B2
Round 7 A1-B2 A2-B1 B4-A3 B3-A4
Round 8 B1-A1 B2-A2 A3-B3 A4-B4

Double round match, 5 Boards

Round 1 A1-B1 A2-B2 A3-B3 B4-A4 B5-A5
Round 2 B2-A1 B3-A2 B4-A3 A4-B5 A5-B1
Round 3 A1-B3 A2-B4 B5-A3 B1-A4 A5-B2
Round 4 B4-A1 B5-A2 A3-B1 A4-B2 B3-A5
Round 5 A1-B5 B1-A2 B2-A3 A4-B3 A5-B4
Round 6 B5-A1 A2-B1 A3-B2 B3-A4 B4-A5
Round 7 A1-B4 A2-B5 B1-A3 B2-A4 A5-B3
Round 8 B3-A1 B4-A2 A3-B5 A4-B1 B2-A5
Round 9 A1-B2 A2-B3 A3-B4 B5-A4 B1-A5
Round 10 B1-A1 B2-A2 B3-A3 A4-B4 A5-B5

Source code

Source code made by Bousios Hristos in JavaScript. Modified to display the core of the algorithm.

```
var boarda, boardb, boardc, boardd, players

var sb6=[
[-1,2,3,-4,5,-6],
[2,-3,-5,6,-4,1],
[-3,5,1,-2,-6,4],
[4,6,-2,-1,3,-5],
[-5,-4,-6,3,1,2],
[6,-1,4,5,-2,-3]
]

var sb10=[
[-1,-2,-3,-4,5,6,7,-8,9,10],
[2,1,8,3,-10,-5,-6,4,-7,-9],
[-3,-8,-4,-10,6,7,9,-1,2,5],
[4,3,10,-6,-7,8,-5,-9,1,-2],
[-5,-4,9,7,1,-10,8,2,-3,-6],
[6,-7,-1,-9,-8,-2,10,5,4,3],
[-7,5,2,1,4,9,-3,-10,-6,-8],
[8,6,-5,-2,-9,-1,-4,3,10,7],
[-9,-10,-7,5,2,3,1,-6,-8,4],
[10,9,6,8,-3,-4,-2,7,-5,-1],
]

function solution(players){
  if(players<3 || isNaN(players)) players=2

  boarda=[]
  boardb=[]
  boardc=[]
  boardd=[]
  for(i=0; i<players; i++){
    boarda[i]=[]
    boardb[i]=[]
    boardc[i]=[]
    boardd[i]=[]
    for(j=0; j<players; j++){
      boarda[i][j]=j
      boardb[i][j]=null
      boardc[i][j]=null
      boardd[i][j]=null
    }
  }

  if(players&1){
    for(i=0; i<players; i++)
      for(j=0; j<players; j++)
        boardb[i][j]=(i+j)%players
    for(j=0; j<players; j++)
      boardc[0][j]=(j>(players>>1))
    for(i=1; i<players; i++)
      for(j=0; j<players; j++)
        boardc[i][j]=!boardc[i-1][(j+(i&1))%players]
  }
  else{ if(players!=6 && players!=10){
    var hplayers=(players>>1)
    for(i=0; i<hplayers; i++)
      for(j=0; j<hplayers; j++)
        boardb[i][j]=(i+j)%hplayers,
        boardb[i][j+hplayers]=(i+j)%hplayers+hplayers,
        boardb[i+hplayers][j]=(i+j)%hplayers+hplayers,
        boardb[i+hplayers][j+hplayers]=(i+j)%hplayers
  }
}
```

```

    if(players%4==2){
        if(players==6){
            for(i=0; i<players; i++){
                for(j=0; j<players; j++){
                    boardb[i][j]=Math.abs(sb6[i][j])-1,
                    boardc[i][j]=(sb6[i][j]>0)
                }
            }
        }
        else if(players==10){
            for(i=0; i<players; i++){
                for(j=0; j<players; j++){
                    boardb[i][j]=Math.abs(sb10[i][j])-1,
                    boardc[i][j]=(sb10[i][j]>0)
                }
            }
        }
        else{
            for(i=0; i<players; i++){
                for(j=0; j<players; j++){
                    if(i==(players>>1)-1 || i==(players>>1))
                        boardc[i][j]=i&1
                    else
                        boardc[i][j]=(j<(players>>1))?(i&1):(!(i&1))
                }
            }
        }
        else{
            for(i=0; i<players; i++){
                for(j=0; j<players; j++){
                    boardc[i][j]=(j<(players>>1))?(i&1):(!(i&1))
                }
            }
        }
        for(i=0; i<players; i++){
            for(j=0; j<players; j++){
                boardd[i][boardb[i][j]]=!boardc[i][j]
            }
        }
        display_tables(players)
    }
}

```

```

function display_tables(players){
    for(i=0; i<players; i++){
        let line = "Round "+(i+1) + " "
        for(j=0; j<players; j++){
            if(boardc[i][j])
                line += "B"+(boardb[i][j]+1)+"-A"+(boarda[i][j]+1) + " "
            else
                line += "A"+(boarda[i][j]+1)+"-B"+(boardb[i][j]+1) + " "
        }
        console.log(line)
    }
    console.log("")
}

```

```

solution(2)
solution(3)
solution(4)
solution(5)
solution(6)
solution(7)
solution(8)
solution(9)
solution(10)
solution(11)
solution(12)
solution(13)

```

