In a Round Robin tournament every team **plays every other team** .

There is a systematic approach to scheduling a Round Robin tournament. This method assumes that there are enough fields / pitches / courts so that all the games in a round can be played simultaneously. The technique is called the **polygon method** .

# Round Robin scheduling: Even number of teams.

Let N = number of teams in the tournament. There will be N -1 rounds (each team will play N-1 games). Since each team will play every other team once, **no team will be idle during any of the rounds.**

Let us schedule a round-robin tournament for 8 teams numbered from 1 to 8.

Draw a regular (N -1) sided polygon (i.e., a heptagon for 8 teams). Each vertex and the centre point represents one team.
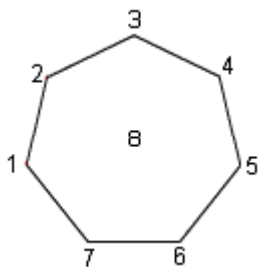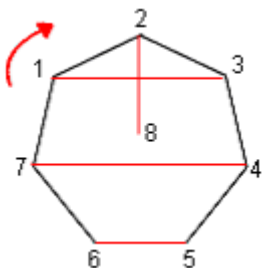

Draw horizontal stripes as shown below. Then, join the vertex that has been left out to the centre. Each segment represents teams playing each other in the first round.
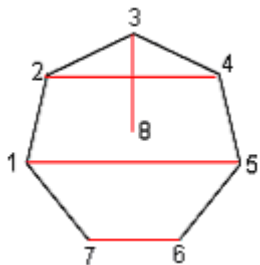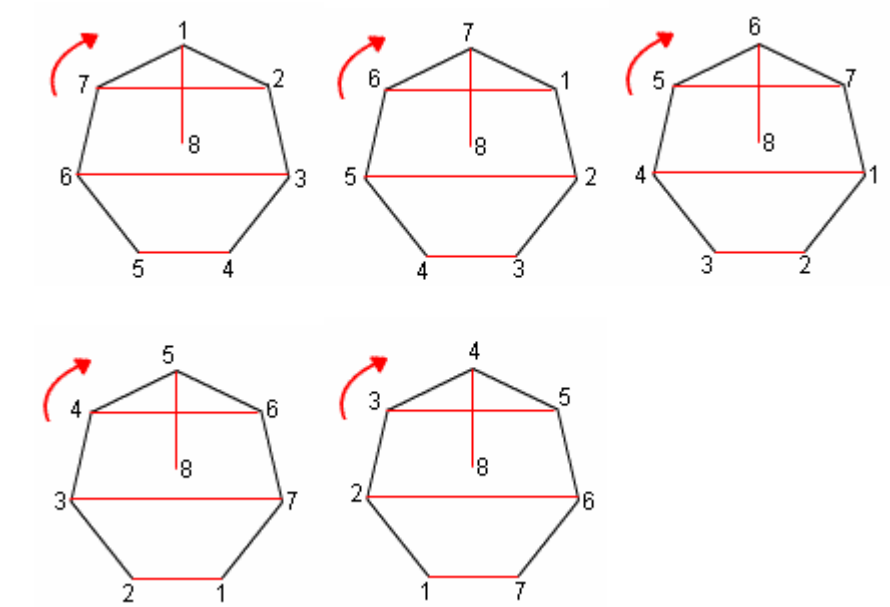

So (7, 6), (1, 5), (2, 4) and (3, 8) play in the first round.

Rotate the polygon 1/(N-1)th of a circle (i.e. one vertex point). The new segments represent the pairings for round two.

So (6, 5), (7, 4), (1, 3) and (2, 8) play the second round.

Continue rotating the polygon until it returns to its original position.

One more rotation will bring the polygon back to its original position.

If A, B, C and D are the fields / pitches / courts, the schedule could look like this:

Round	A	B	C	D
I	7, 6	1, 5	2, 4	3, 8
II	6, 5	7, 4	1, 3	2, 8
III	5, 4	6, 3	7, 2	1, 8
IV	4, 3	5, 2	6, 1	7, 8
V	3, 2	4, 1	5, 7	6, 8
VI	2, 1	3, 7	4, 6	5, 8
VII	1, 7	2, 6	3, 5	4, 8

We can also rotate the teams around so that each team plays in every field / pitch / court at least once (at present team 8 always plays in D).

Round	A	B	C	D
I	7, 6	1, 5	2, 4	3, 8
II	6, 5	7, 4	1, 3	2, 8
III	**1, 8**	6, 3	7, 2	**5, 4**
IV	4, 3	5, 2	**7, 8**	**6, 1**
V	3, 2	4, 1	5, 7	6, 8

| VI | 2, 1 | **5, 8** | 4, 6 | **3, 7** |
| VII | 1, 7 | 2, 6 | 3, 5 | 4, 8 |

Round Robin scheduling: Odd number of teams.

Let N = number of teams in the tournament. There will be N rounds (since each team will play every other team once, and **will be idle for exactly one round**).

Let us work out the schedule for 7 teams, numbering the teams from 1 to 7. Draw a regular N-gon (heptagon for 7 teams). Each vertex represents one team.
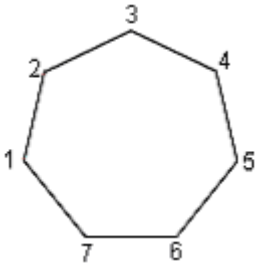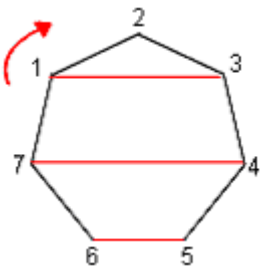

Draw horizontal stripes as shown below. The vertex that has been left out gives the idle team. Each segment represents teams playing each other in the first round.
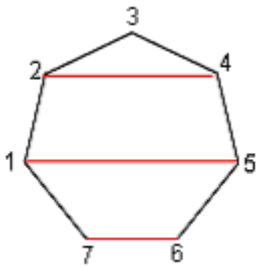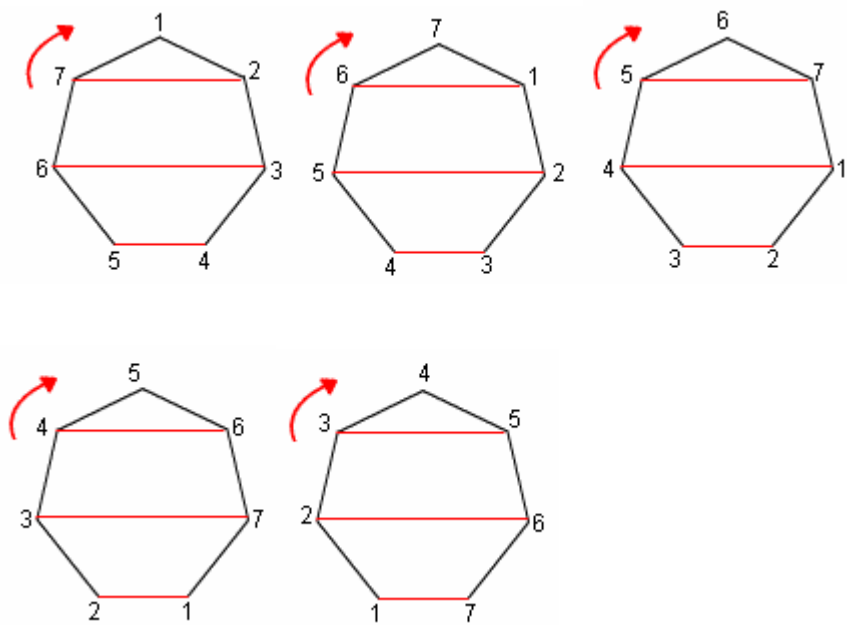

So (7, 6), (1, 5) and (2, 4) play in the first round.

Rotate the polygon 1/Nth of a circle (i.e. one vertex point.) The new segments represent the pairings for round two.

Continue rotating the polygon until it returns to its original position.

One more rotation will bring the polygon back to its original position. Therefore, the schedule could look like this:

Round	A	B	C
I	7, 6	1, 5	2, 4
II	6, 5	7, 4	1, 3
III	5, 4	6, 3	7, 2
IV	4, 3	5, 2	6, 1
V	3, 2	4, 1	5, 7
VI	2, 1	3, 7	4, 6
VII	1, 7	2, 6	3, 5

Why does this work?

The restriction that no vertex has more than one segment drawn to/from it ensures that no team is scheduled for more than one game in each round.

Restricting ourselves to horizontal stripes ensures that no segment is a rotation or reflection of another segment. This means that no pairing will be repeated in a future round.

Notice that in the case where N (no. of teams) was odd, by having only one idle team in each round, the tournament can be completed in the minimum number of rounds.

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