

# How to play and organise games?



## GENERAL INFORMATION

**Trainer:** Sándor Dobos



**Number of participants:** 5-25 people

**Language:** English

### Highlights:

Play games, have fun!  
Basic strategies for combinatorial games;  
Symmetry and its benefits  
NIM games and strategies.  
Grundy numbers, graphs of games  
Tournaments for 2,3,4,... players within a game  
Steiner triple systems  
Different models with small parameters

## COURSE CONTENT

### Description:

We will play and analyse two-player games. Many different and interesting games! Create strategies, learn NIM strategy. For games with finite positions define graph model and use Grundy numbers. Organising tournaments is not easy, specially if someone would like to do it in rounds. We are going to investigate this problem, to determine the possible parameters of a tournament if the number of participants of each game is a given (small) value

### Aims and objectives:

To play and enjoy games! To understand the logic and planning process of playing games. To be able to determine the winning positions, decide between possible moves the right one. To organise a tournament is a problem of everyday life (table tennis, chess or football tournament). To find the possible parameters, which allow to organise a proper championship, where each participants meet exactly once.

### Learning outcomes:

The participants will learn a lot about two aspects of games: (i) how to play them, build strategies (NIM, Grundy). (ii) how to organise a tournament (Steiner triple system, link with finite geometry).

### Target group:

High school teachers.

**Required language level of the participants:** English, B1

**Duration:** 35 lessons, 7 days

# Schedule\*



<b>SUNDAY</b>	<ul style="list-style-type: none"><li>• Get to know each other with trainers and the other participants and location of the course, warm up</li></ul>
<b>MONDAY</b>	<ul style="list-style-type: none"><li>• Introduction of games</li><li>• Bachet game, divisor game; organisation of a chess tournament with people</li></ul>
<b>TUESDAY</b>	<ul style="list-style-type: none"><li>• Symmetry games,</li><li>• Whytoff game;</li><li>• Tournament with 3 people in a game if each pair meet exactly once</li><li>• Find the possible number of participants</li></ul>
<b>WEDNESDAY</b>	<ul style="list-style-type: none"><li>• NIM strategy, sum of games;</li><li>• Tournament with 4 people in a game.</li><li>• How to organise tennis-double tournament?</li></ul>
<b>THURSDAY</b>	<ul style="list-style-type: none"><li>• Graph model of games,</li><li>• Grundy numbers;</li><li>• Algebra and geometry behind the structures of tournaments</li></ul>
<b>FRIDAY</b>	<ul style="list-style-type: none"><li>• Applications of the learned strategies;</li><li>• Connections of tournaments with latin squares and the Zarankiewicz problem</li></ul>
<b>SATURDAY</b>	<ul style="list-style-type: none"><li>• Summary, feedback</li><li>• Cultural activities around Rovinj</li><li>• Compulsory relationship building program, evaluation, handing over diplomas,</li><li>• Closing of the course</li></ul>

## \* Notes:

- the schedule describes likely activities but may be modified in accordance with the requests and needs of the participants;
- presentations of the participants' schools may be divided up and take place after the breaks on each day of the course.

## ADDITIONAL INFORMATION

### Certificates awarded:

Certificate of Attendance, Europass certificate and/or Learning agreement complement

**Price:** EUR including course, Erasmus+ documentation and a cultural activity

**Location:**

**Date:**



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