

Proposal for a Workshop on Symmetry of Plane Patterns

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Abstract

The workshop aims at giving some familiarity with the identification of symmetries of plane patterns and their classification with the help of an interactive application. This recent application works as an extension of Atractor's DVD [1] and has a competition version which allows two teams to test their experience and knowledge in the area. Several options allow the level of difficulty to be adapted to the experience/age of users.

The Workshop

The participant will be introduced to the use of an application with which it is possible to:

1. interactively generate patterns or friezes with symmetry types from a previously chosen list;
2. classify patterns or friezes which were created as mentioned in 1;
3. combine the actions described in 1. and 2. in a competition version involving two teams; a final report is automatically produced by the application, mentioning the correct and wrong answers and indicating the winner.

When a pattern/frieze is created (1.), the information about its symmetries is recorded in a coded way and when somebody uses the classifier (2.) later on, the application has access to this coded information and so it "knows" at each step if the user is marking the symmetries of the pattern/frieze correctly or not. Depending on the level of help chosen at the beginning, the application can correct any wrong step of the user immediately or just give a final report mentioning which conclusions are right and which ones are wrong (apart from these two extreme options, some intermediate choices are allowed).

The possible didactic use of the application was taken into account and a maximum level of help for a series of patterns can be forced. For instance, when a teacher starts teaching symmetry, s/he may wish to produce and put on the web a list of images of different patterns with maximum level of help allowed, so that her/his students can try to classify them more easily in a training process. But later on, if s/he wants to test the students, s/he will produce another list of patterns with restricted (or no) help allowed.

This application was already tested successfully at the easiest level with a few very small children. E.g. if the chosen options allow only generating friezes of two types (p111 and p1m1), it is very easy for the children to classify the friezes later, because they recognize easily if there is a "central" reflection line or not... See some pictures below.

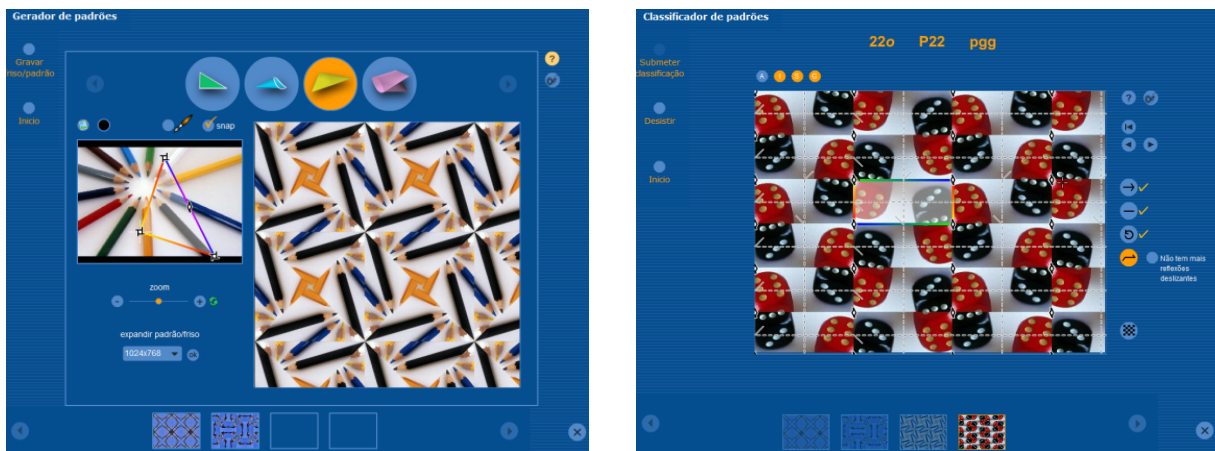
N.B. 1 – The Portuguese Mathematical Society decided to organize some "formation courses" for teachers in basic and secondary schools, based on Atractor's new application. At the beginning of May, Atractor will organize a workshop (several days) for the 6 teachers who will later on give such formation

courses. The present stable beta version of the application will be used. After this workshop, some adjustments may be introduced in the program if necessary and then a translation to English will be included.

N.B. 2. – Detailed instructions about the way to proceed are not given here, because they will be included (in English) in the application used for the workshop. They describe i) how to choose the right options to adapt to the particular situation and preparation of the user, ii) how to play in training mode and iii) how to organize a competition. (The program will allow competition mode via web, by using a system of folder sharing, e.g. dropbox).

[1] *Symmetry – the dynamical way (DVD)*, Atractor. 2009.

Some pictures



Competição - equipa A Vs equipa B

Carimbos possíveis:

Imagem do friso/padrão	Carimbo usado pelo gerador (A)	Carimbo obtido no classificador (B)	Certo/Errado	Observações
			✓	Parabéns!!
	'632 D632 p6m 4'2 D42 p4g	'632 D632 p6m 2'22 D222 cmm	✗	Primeiro erro detectado na escolha das rotações. Não foram marcadas todas as rotações que preservam o friso/padrão.
			✓	Parabéns!!
	'442 D442 p4m 2'22 D222 cmm	'442 D442 p4m 2'22 D222 cmm	✓	Parabéns!!

Figure 3: Example of final report for a test competition with just two patterns from each player