POLITECNICO DI MILANO
Alta Scuola Politecnica

Polygame: user manual

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Global change and sustainability
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1 Introduction

1.1 What is PolyGame

Polygame is a game which aims at making the players aware of the climate crisis and try to make them ponder about possible solution to the excessive CO_2 emissions.
The idea behind this game comes from the work of Robert H. Socolow and Stephen W. Pacala (described in [2] and [1]), which has been slightly revisited by Professors Renato Casagrandi and Giulia Fiorese. They have created a version of the game for the Spring School 2009 (*Global Change and Sustainability*) of Alta Scuola Politecnica.

1.2 Why PolyGame

PolyGame aims at making the players aware of the climate crisis and try to engage them through a game which make them ponder about possible solution to the excessive CO_2 emissions.
At the end of the game, players will hopefully not only have a broader knowledge of CO_2 emission solutions, but will also be aware of the climate crisis.

1.3 What is this document

This document is the user guide for the *Polygame* web application.
In the next sections we are going to describe in depth rules and users roles of this game:

- rules are described in section 2
- users roles are described in section 3

2 Rules of the game

The aim of this game is to gain a good understanding of the possible technologies that can reduce CO_2 emissions and to be able to come up with a good mix of those to act against the climate crisis.

Players can either take part in the game singularly or in a group. In both cases the game is divided in two phases:

Phase one It is the phase of the game when every single user and every group is assigned to a certain *wedge*. A *wedge* is a certain solution which can reduce CO_2 emissions by 1 MegaTon. Every group and every single user has to investigate the given wedge in order to find out pros and cons. At the end of this phase the group or the single user has to outline all the pros and cons in a *poster*, which should be described in front of the audience in a few minutes (the exact number of minutes is decided by the organizer). The purpose of the presentation is to make everybody aware of the possible solutions to reduce CO_2 emissions.

Phase two After the first phase every user might be assigned to a new group (while there might still be single user). Groups of phase two do not work a specific wedge but they have to come up with the best possible *plan* to reduce emissions using a mix of the wedges studied in the previous phase. The minimum reduction of CO_2 should be at least be 20 MegaTons so a minimum quantity of 20 wedges is required. Any wedge can be selected more than once and this allows a wide range of possible solutions (and also a wide margin for discussion).

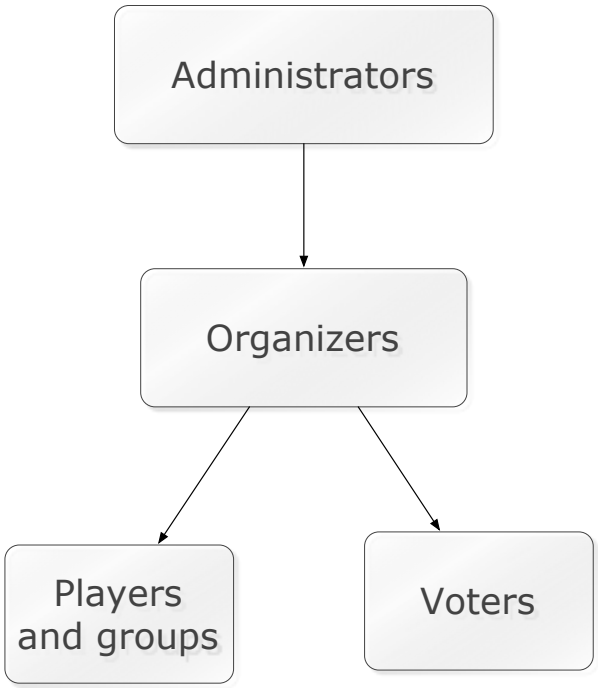
At the end of phase two plans are voted and the most voted becomes the *winner* of Polygame.
All comments left by voters to the voters are displayed.

3 Users roles

Polygame features different kind of users:

- Players
- Organizers
- Voters
- Administrators

One by one these roles will be explained in the next sections. An overview of the roles is shown in the following figures



3.1 Players

3.1.1 Introduction

Those are the most common users and are the ones who take part in the game. They are provided a password by the organizers. Players can take take part in the game in two different ways:

- singularly
- as part of a group

There are two different kinds of groups:

- groups of first phase or groups that study a certain wedge
- groups of second phase or groups that have to come up with a plan (choice of wedges)

Our web application provides maximum flexibility because a user can be part of different groups in different phases and, if needed, can compete singularly in either one or both phases.

3.1.2 Game

After logging in the user is presented with a web page which is dynamically updated depending on the current phase of the game.
Those are the possible phases:

Game not started The user is presented with the rules of the game and is warned that the game is not started

Phase 1 just started This phase is also known as *Wedge introduction* and it is the first phase of the game. The player is presented the topic regarding the wedge and she or he is given time to find a little more information about the topic.

Phase 1b This phase is also known as *Wedge description* and it is the phase in which the player is provided with a more detailed description of the wedge. He or she is also provided with a PDF describing... is given the chance to enter the solution.

Last part of phase 1 This phase is also known as *Wedge solution* and in this phase the player (either singularly or as part of a group) is given the chance to enter the poster which should summarize what has been found out about the given wedge. In particular he is given the chance to:

- enter pros
- enter cons
- enter additional notes

Poster presentation When phase one is over, a break is started. In such break every group (or every single user) is given a few minutes to present the developed poster in front of the audience. For more information about this, please see the Organizer section.

Wedge plan creation When the organizer decides so, the second phase is started and, if needed, the player is assigned to a new group. In this second phase the player (possibly along with her or his group-mates) has to come up with a plan to reduce emissions. In this phase users have access to the posters previously created. To summarize the reasons why players have chosen a certain mix of wedges, they are asked to create a short presentation of their solution: such short presentation will be available to voter and will certainly play an important role in their decision.

Plan choice After the game is ended, voters can pick their favorite plan. The plan which gets the more votes is then shown on the organizer page.

3.2 Organizers

3.2.1 Introduction

Organizers are a central kind of user: they are the creators of the game and for this reason they have a wide range of possible choices.
As for the players, organizers are presented with a webpage whose content changes depending on the current phase of the game.
Administrators provide the password to the organizers.

3.2.2 Game

The organizer has total control over the game: after creating the game she or he can start the game, can move between game phases, assign more time to a phase and end the game prematurely.

Game not created After logging in the organize is given the possibility of creating a new game. At this point she or he can choose several parameters of the game:

- Timeout before more information about the wedge are provided

- Timeout before the players are allowed to submit a solution
- Timeout before the players are allowed to submit (and, in case, edit) the poster
- Time provided for one poster presentation
- Time provided to come up with a plan to reduce emissions

Game not started In this phase the organizer can:

- Handle players creating new players, deleting them from the database, adding them to the game and removing them from the game
- Handle wedges, choosing the ones which should be part of the game. Please note that the number of wedges should equal the sum of the number of groups of the first phase and singular users
- Handle groups, creating new groups and selecting which players should be part of which group
- Handle voters creating new voters, deleting them from the database, adding them to the game and removing them from the game

Phase 1 After clicking on start game the organizer is always shown controls to move between phases and to assign more time to a phase. Moreover during all phase one the organizer is shown a table which summarize the status of the game. In particular the table shows, for every single player and every group:

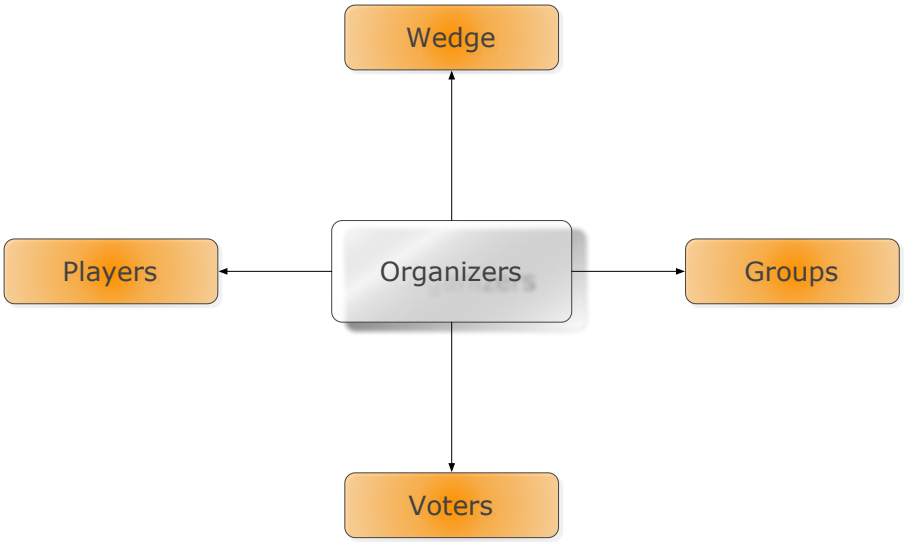
- the name of the single player or the name of the group
- whether they have attempted to provide a solution
- whether the solution is correct
- whether a poster has been submitted
- whether the submitted poster is complete (it has both pros and cons)

Poster presentation The poster presentation phase is entirely handled by the organizer, who chooses the poster to shown and provides a fixed amount of time to the presenter. After the time is elapsed the poster disappears.

Phase 2 After clicking on "start phase two" the organizer is shown a table which summarize the status of the current phase. In particular the table shows, for every single player and every group:

- the name of the single player or the name of the group
- whether they submitted a plan or not

Voting phase After the game ends and after all voters have provided their opinion, the organizer page shows the results of the voting. Please note that only the winner is shown and that comments provided to that plan are also shown.



3.3 Voters

Voters are created and chosen by the organizer. Their role starts right after the game ends. They are provided with a page that summarizes all the plans. For each plan a link to the presentation (which summarizes the reasons that have led to a certain plan) is also provided. Voters can pick the one and only one plan they prefer. Additionally they can also provide a comment.
Only comments referring to the winner plan will be shown (on the organizer's page).

3.4 Administrators

Administrators do not handle game as the organizers but they handle some core functionalities of the game. They can:

- create new organizers providing a username and a password
- create new wedges, which might be later selected by organizers for their own game

References

[1] Stephen W. Pacala and Robert H. Socolow. Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. *Science*, 305, August 2004.

[2] Stephen W. Pacala and Robert H. Socolow. A plan to keep carbon in check. *Scientific American*, September 2006.