Papyrus for gamers, let’s play modeling
Our Team

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# Motivations

**Augmenting the Model-Based Systems Engineering tools with self-training facilities.**

In many studies around Model-Based Systems Engineering (MBSE) adoption, *usability of tools is very often stressed as one of the key issues for the adoption of MBSE paradigms.*

We need to *reduce modeling learning curve* and encourage their users to persist with them despite the required initial efforts.
“THE USE OF GAME DESIGN ELEMENTS IN NON-GAME CONTEXTS” - S. DETERDING, 2011
# Solution

A **Gamified Software Modeling Environment**

We present a gamified software modeling environment realized to design games for specific training/learning goals.

Our approach caters to three principal stakeholders:

- **Gamification Expert**: who designs and develops appropriate gamification artifacts (i.e., game elements, mechanics and dynamics) in line with the learning goals;
- **Modeling Teaching Expert** (e.g., Teacher, Methodologist, or Tool Vendor) that in collaboration with the gamification expert defines the game including the expected pedagogical principles, the global learning goals and the suitable progression of learning steps with their intermediate learning goals;
- **End-Users** (i.e., Student, Language Expert, or Software Developer), that use the gamified version of the software modeling tool to learn modeling with a given tool or even enhance their modeling expertise level while gaming.
Model Comparator

Game Dashboard

Software Modeling Tool

Game Master

Gamification Design Framework

Gamification Engine
1- Game Dashboard

- **Login View** where students can enter their username and password.
- Access to **available games** and player status.
Students interact with Papyrus in the form of modeling operations to complete the exercises assigned for a certain game.
• Each **modeling game** is defined to target **specific learning objectives** keeping students motivated.

• **GDF**: model-driven gamification design framework.

• **Specification of gameful systems** and **automatic deploy** of game concepts and rules in the **gamification engine**.

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**Antonio Bucchiarone**, Antonio Cicchetti, Annapaola Marconi: 
**Exploiting Multi-level Modelling for Designing and Deploying Gameful Systems.** MoDELS 2019: 34-44
Open Source **DROOLS** rule engine based on **reactive computing models**.

It takes care of both **running games** by animating the logic as defined in GDF and **keeping updated the game status for all players**.

4- Gamification Engine
1. It monitors the game execution through notifications incoming from Papyrus and call the Model Comparator to evaluate modelling actions.

2. It sends the game results to the Gamification Engine.

3. It notifies the player's progress.
6- Model Comparator

• It is responsible **to assess the correctness of modelling actions or complete diagrams**, over a reference: the source diagram

• **Real-time evaluation**
  • Any action on the model triggers an evaluation request.

• **At the end of the exercise**
  • It compares both source diagram and player diagram to check the differences.
The purpose of this game is to teach you how to use the UML class diagram editor of Papyrus. This way you can conceptualize your best ideas and benefit a computational form of your knowledge.

www.papygame.com/challenges
And now, let’s play...