Master's Degree in Engineering in Management Science
Sapienza Università di Roma

Process Management and Mining

A.A. 2021/2022

Exam rules and guidelines for projects

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Last update : 18/11/2021

Exam

- One practical **project** to be held in groups of 2-3 students, or – in special cases – individually.
  - It can be carried out during the exam dates or, alternatively, asking an appointment to the teacher.
- An **oral discussion** consisting of a list of questions and exercises related to the course topics.
  - It **must be** carried out during the exam dates.

Practical Project

- Students are strongly encouraged to propose their **own idea** for projects.
  - **Send an email to the teacher to ask for the assignment of a project (do not start performing a project before you have it assigned).**
- The project must cover the phases of process modeling/simulation/rpa/automation/execution/mining.
- Projects consist of **concretely using the tools** investigated during the course through one or more realistic case studies.
- A **presentation** of the project (possibly performed with slides) is required. Estimated duration: **15-20 minutes**.
- The presentation should also include a **working demo** of the developed project, performed in front of the teacher.

1. Modeling phase

slides: Process Modeling with BPMN

- Once the description of a procedure is validated by the teacher, students can start modeling the associated process model in BPMN.
- The use of the tool BPMN.io is highly recommended (see the instructions on the web page).
- An appropriate model should consist of:
  - 2 or 3 pools.
  - the **process model of a single pool** and the message exchanged with the other pools (considered as black-boxes).
  - around **30 flow objects** (events, gateways, activities).
  - only the **relevant business objects** for the process, if any.
  - **At least an exceptional situation** to be modeled with error/message/timer events or with an event sub-process.

2. Simulation phase

slides: Process Analysis

Once the process model in BPMN is ready, use Bizagi Modeler and run the Simulation feature by configuring the required elements of a simulation scenario:

- Processing times of activities
- Conditional branching probabilities
- Arrival rate of process instances and probability distribution
- Resource classes
  - Name and size of the resource class (how many resources belong to it)
  - Cost per time unit of a resource in the class
  - Availability of the class (working calendar for employees)
- Assignment of activities to resource classes

3. Robotic Process Automation phase

slides: RPA and UIPath

Starting from the process model in BPMN, select an activity that can be emulated using a RPA tool (UiPath is recommended).

- Identify the main user interface (UI) actions required to emulate the activity on the UI of a PC.
- Use UIPath to model the flowchart representing the concrete behaviour of the activity in terms of UI actions.
- Generate a SW robot that emulates the execution of the routine underlying the flowchart.
- Define a short example to show the feasability of your SW robot.

4. Execution phase

lectures on Process Execution

- At this point, the process model used for the simulation phase can be executed through Bizagi Studio.
- To understand how to properly enact a process with Bizagi Studio, it is strongly recommended to perform at home the tutorial:
  - **My First Process** in Bizagi studio

- **Note that:**
  - For the execution phase, you can extract a relevant fragment of the process and enact it (it is not required to execute the entire process). A fragment with around 5-6 activities and at least a XOR is OK.
  - It is required to implement just human tasks and/or script tasks and to show how (form) data are passed from one task to the next one.

5. Mining phase
slides: Process Mining

- Finally, starting again from the process model used for the simulation phase, students can generate an event log of the process (1000 traces are enough).
  - The generation can be performed using tools like BIMP
  - To use BIMP, export your process in the «BPMN» format using BPMN.io or Bizagi Modeler (via the Export Menu).
- Once generated the event log, the students will run:
  - DISCO, that helps to describe the proper behavior of the process.
  - At least two among the discovery algorithms available on ProM, to obtain a Petri Net version of the model (in “PNML” format).
  - The trace aligner on ProM, to identify the deviations between the model discovered with the discovery algorithms and the event log.