



Wrocław
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Event-based Control – Project

Task 5: FMS controller

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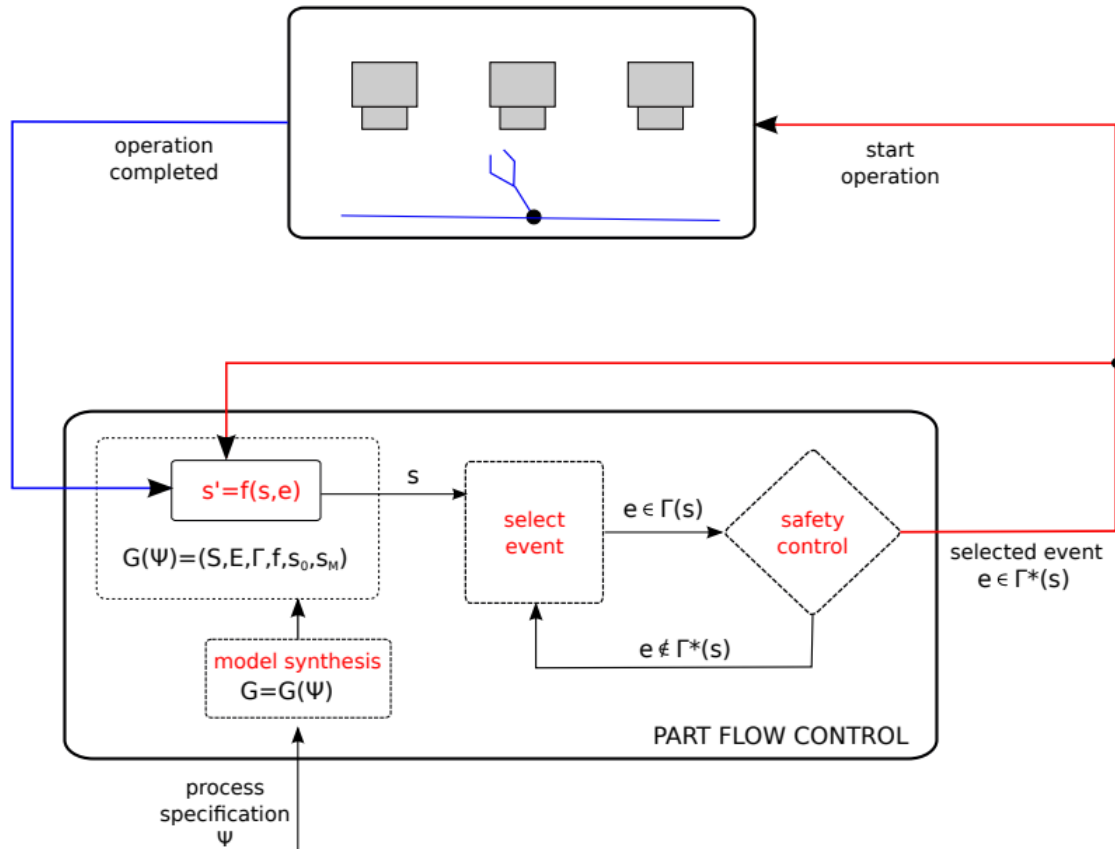


Figure. 1: Exemplary approach

Introduction

Current report contains solution of task 5 on project of Event-based Control cours. This task was done via using Python programming language and Snakes toolbox which belongs to it. The task consisted of developing controller for a flexible manufacturing cell consisting of one transport robot and 5 machines. (fig. 1).

1 Model

1.1 Main model

Main system model with 5 robots is presented on figure 1.

1.2 Simulator

Simulator was developed in order to manage simulation process. Simulator contains following instances:

- Net,
- Transition Fired,
- Transition Disabled,
- Process Operations,
- Operation Duration,

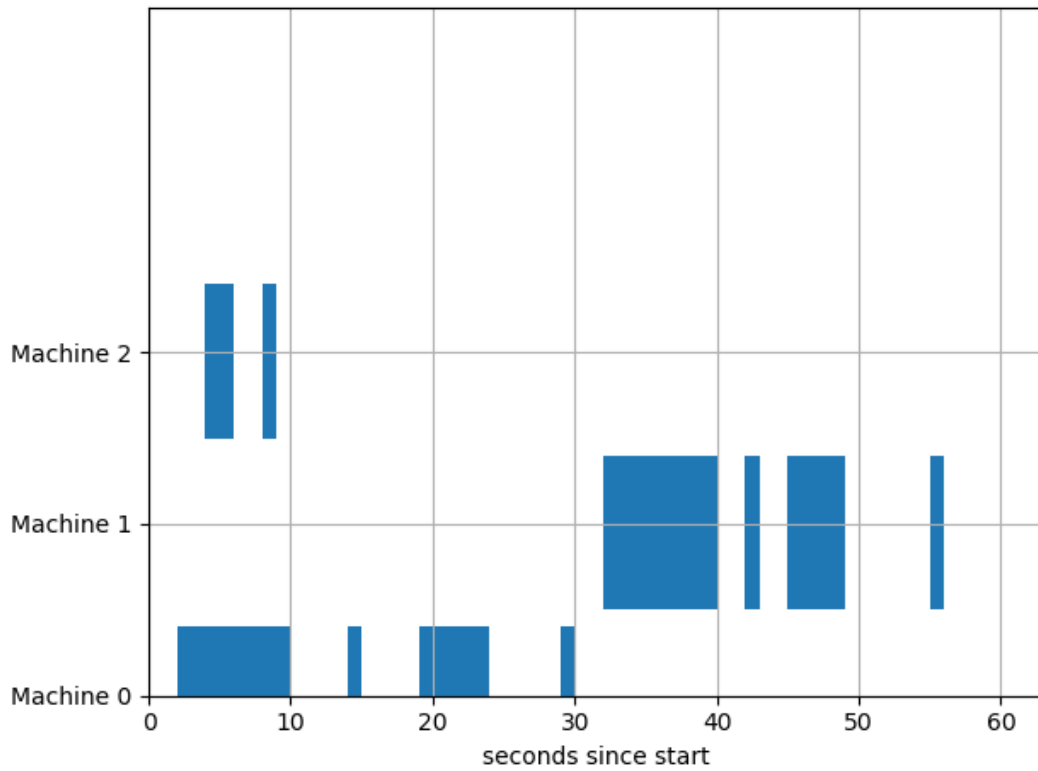


Figure. 2: Simulation

- Progress Timers,
- Started Processes,
- Number Of Parts

which store manufacturing cell configuration and current state. Given class allows to initiate P/T net with all required resources and transitions.

1.3 Controller

The controller design, which proceeds permissions on successive transitions, and grants permissions to most significant ones. Permissions are granted first of all to transitions with highest priority. Priorities are stored in class in following order with growing priorities.

- Process Finish Priority,
- Operation Finish Priority,
- Operation Begin Priority,
- Operation Prepare Priority

2 Simulation

The simulation results of designed model are presented on figure 2. Simulation time was established equal to 60s. Plot shows the states in which machines was in individual time points: free or busy. Configuration of cell is showed on figure 3.



Figure. 3: Configuration