CSCI910 – Software Requirements, Specifications and Formal Methods

Tutorial 8

Objectives

- Get familiar with Coloured Petri Net and CPN IDE

Design (Coloured) Petri Nets to model the oven system, and try to implement it with the CPN IDE.

Information about the CPN IDE:

- Official Website of CPN IDE: https://cpnide.org/
- CPN Tools online Tutorials:
  https://www.youtube.com/watch?v=38g1jMvNi6Q&list=PL24010632B8286DBC&index=4

NOTE: CPN IDE is only for Windows, but you can use it in a virtual environment if you use Mac or Linux. Here is the link to the free version of VirtualBox (https://www.virtualbox.org/).

Exercise 1:

Design a PN for the oven based on the following description. You can also add extra states (places) based on the following descriptions or some reasonable assumptions.

State	Description
Waiting	The oven is waiting for input. The display shows the current time.
Half power	The oven power is set to 300 watts. The display shows 'Half power'.
Full power	The oven power is set to 600 watts. The display shows 'Full power'.
Set time	The cooking time is set to the user's input value. The display shows the cooking time selected and is updated as the time is set.
Disabled	Oven operation is disabled for safety. Interior oven light is on. Display shows 'Not ready'.
Enabled	Oven operation is enabled. Interior oven light is off. Display shows 'Ready to cook'.
Operation	Oven in operation. Interior oven light is on. Display shows the timer countdown. On completion of cooking, the buzzer is sounded for 5 seconds. Oven light is on. Display shows 'Cooking complete' while buzzer is sounding.

The following description gives information about events (transitions) that make the oven's states change. You can also add more transitions based on your assumptions.

Events	Description
Half power	The user has pressed the half power button
Full power	The user has pressed the full power button
Timer	The user has pressed one of the timer buttons
Number	The user has pressed a numeric key
Door open	The oven door switch is not closed
Door closed	The oven door switch is closed
Start	The user has pressed the start button
Cancel	The user has pressed the cancel button