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2. Embedded Systems Lab Exercises

DVD Player (10 Points)

1. **Task:**
   Design a *DVD Player* using Dave. The player consists of the following components:

   - Power Button
   - Player Control Buttons (play, next chapter, previous chapter)
   - Eject Button
   - Display Panel
   - a DVD

   The DVD interacts with player through following external inputs/outputs:

   - POWER (turns the DVD-player on or off) [input]
   - EJECT (open / close the DVD-player) [input]
   - PLAY (plays DVD) [input]
   - NEXT (moves the reader to the next chapter) [input]
   - PREVIOUS (moves the reader to the previous chapter) [input]
   - EODVD (End of DVD) [output]

   In the player you have following internal inputs/outputs:

   - ON/OFF (signalizes that DVD-player is on or off)
   - OPEN/CLOSED (signalizes that DVD-player is open or closed)
   - NO_DVD (signalizes that there is no DVD in the player or that DVD is not valid)
   - DVD_OK (signalizes that a valid DVD is read)
   - START (signalizes that DVD-player started playing a DVD)
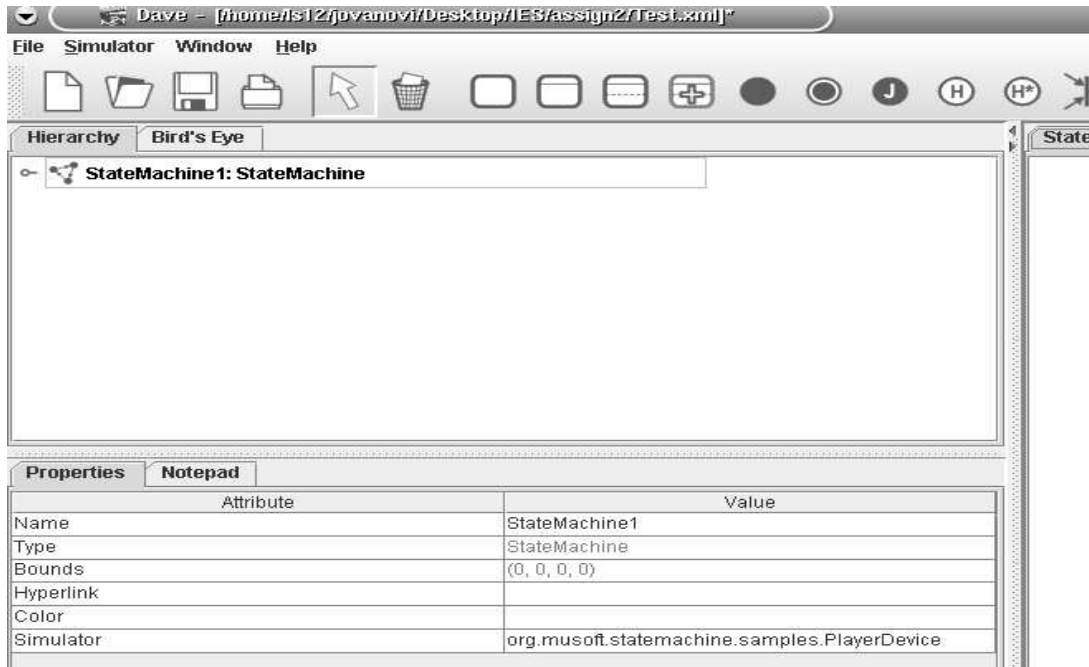   - STOPPED (signalizes that DVD-player stopped playing a DVD)

- CONTINUE (signalizes that DVD-player continues playing a DVD)
- PREVIOUS_CHAPTER (signalizes that previous chapter is read)
- NEXT_CHAPTER (signalizes that next chapter is read)
- header (Magic Number)
- cnum (number of chapters on DVD)
- chapter (actual chapter number)
- play (boolean variable which signalizes if DVD-player is playing a DVD or not)
- time / rtime (Total time elapsed / remaining time of a chapter)
- dmin / tmin (represents minutes: duration of chapter / elapsed time)
- dsec / tsec (represents seconds: duration of chapter / elapsed time)
- th (represents hour of the total time)

Exercise:

- Complete the system by designing a state chart for the control activities
- Simulate the whole system

Hints:

- Dave can only run this simulation if you click on the *Properties* window and enter:
  org.musoft.statemachine.samples.PlayerDevice in the value field of *Simulator*.

- Here is a picture of the DVD-simulator:

The system is recognizing a valid DVD if the header is set to 1234. There should be no more than 16 chapters on the DVD and the duration of a chapter should be no more than 10 minutes.