The State Diagram and Property Checker Plugin

Installation Steps:

1. Install JIVE following instructions given at https://cse.buffalo.edu/jive/download.html
    Tutorials on its usage are given at: https://cse.buffalo.edu/jive/tutorials.html

2. Install *PlantUML* as an Eclipse plugin from: http://hallvard.github.io/plantuml

3. Install *GraphViz* on your computer from: http://www.graphviz.org/download. Scroll down to "Executable Packages" where you can find links for Linux, Mac, and Windows.

    Note: *GraphViz* should be installed as a regular application on your computer, *not* as an Eclipse plugin.

4. Install the *State Diagram and Property Checker* plugin by first downloading:

    Property_Checker_May_18_2020.zip

    Unzip the file to obtain the directory Property_Checker_May_18_2020.

5. Install it as an Eclipse plugin as follows:

    Help➔Install New Software➔Add➔Local➔*<select* Property_Checker_May_18_2020>

6. Uncheck "Group Items by Category". Follow the prompts and install.

    Sample Java programs are given in this directory. Note that MessagePassing.jar is needed for circular buffer and readers-writers example.

For the Property Checker (and State Diagram) view:

1. You can bring up the Property Checker (or State Diagram) view by doing

    Window ➔Show View ➔ Other ➔ JIVE ➔ Property Checker (or State Diagram)

2. To use the Property Checker (and State Diagram), you must first export a .csv file from the Execution Trace view after running a Java program to completion. This view is at

    Window ➔Show View ➔Execution Trace

3. In the Property Checker (or State Diagram) view, first browse and select the exported .csv file, then add one or more fields from the drop-down menu, and draw the state diagram.

For the Property Checker view:

To check properties, enter abbreviations for the selected fields in the Abbreviations text-box and enter properties in the Properties text-box, and press Validate.   We present two examples of properties below.

(i) Readers-Writers Example:

Fields to be Added: Database:1.r, Database:1.w

Abbreviations: Database:1.r = r, Database:1.w = w

// Basic policy – mutual exclusion of readers and writers, with concurrency for readers

```
G [ (r > 0 -> w = 0) &&
   (w > 0  -> r = 0) &&
   (w = 0 || w = 1)
 ]
```

Multiple properties can be entered, separated by semi-colons.

(ii) *Dining Philosophers Example*

Fields to be Added: Philo:1.state,Philo:2.state,Philo:3.state,Philo:4.state,Philo:5.state

Abbreviations: Philo:1.state=p1, Philo:2.state=p2, Philo:3.state=p3, Philo:4.state=p4,Philo:5.state=p5

// Basic Safety Property – adjacent philosophers are not eating

```
 G [ (p1 == "E" -> p2 != "E") &&
    (p2 == "E" -> p3 != "E") &&
    (p3 == "E" -> p4 != "E") &&
    (p4 == "E" -> p5 != "E") &&
    (p5 == "E" -> p1 != "E")
  ]
```

End of Instructions