Modeling for the watering system

Introduction

This note introduces how to learn a watering system MTheory using a relational data.

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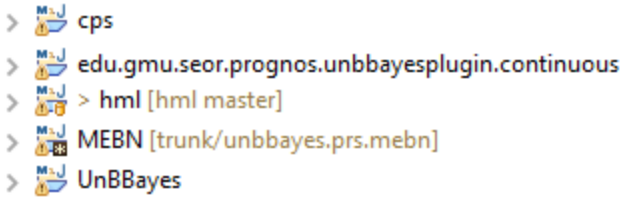
1. Installing the HML JAVA project

For this example, install the HML project, four projects edu.gmu.seor.prognos.unbbayesplugin.continous, cps, MEBN, and UnBBayes.

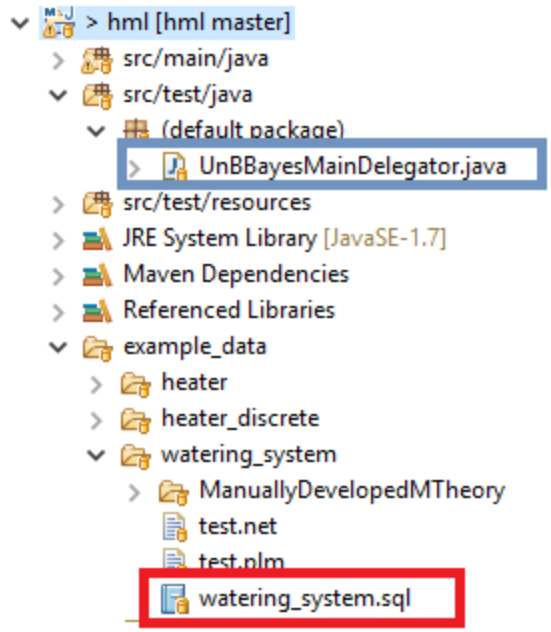
https://github.com/HML-UnBBayes/hml.git



If successfully these are installed, we can see five projects as shown in the above figure.

2. Importing a water system relational data into MySQL

The HML JAVA project includes a water system relational data.
By using “watering_system.sql” in the red box, we can create the water system relational data in MySQL.



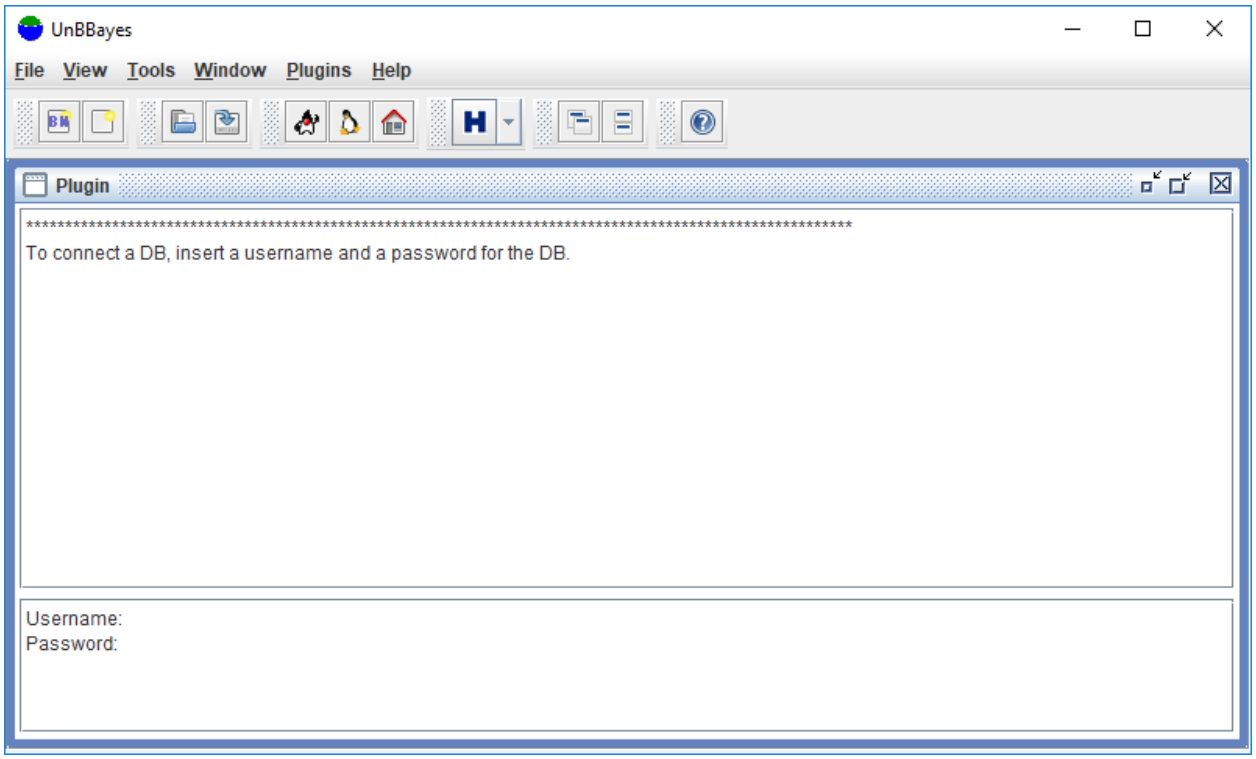
3. Executing HML-UnBBayes

To execute HML-UnBBayes, use the “UnBBayesMainDelegator.java” file in the blue box in the above figure.

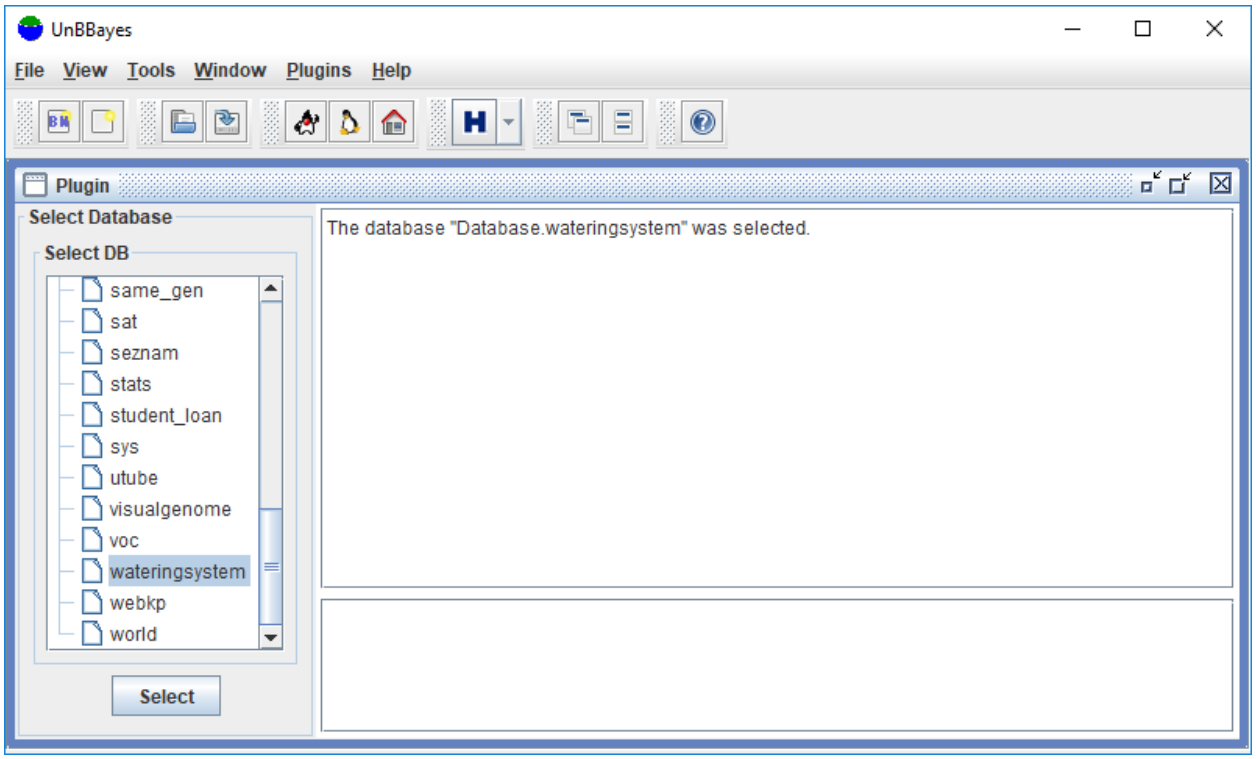
4. Learning the WateringSystem MTheory

To learn the WateringSystem MTheory, click the button “H” in HML-UnBBayes.

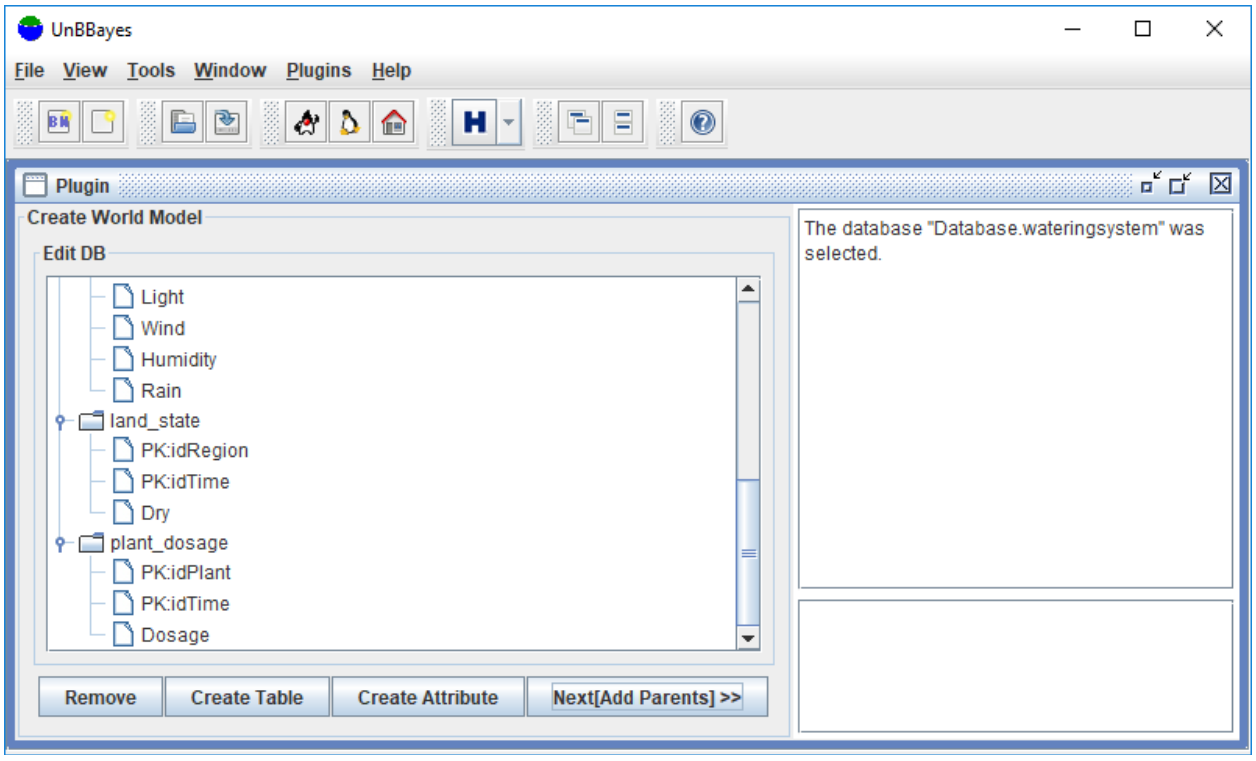
Insert the username and password for your MySQL.



Select the database “wateringsystem”.



Click the button “Next[Add Parents]>>”.

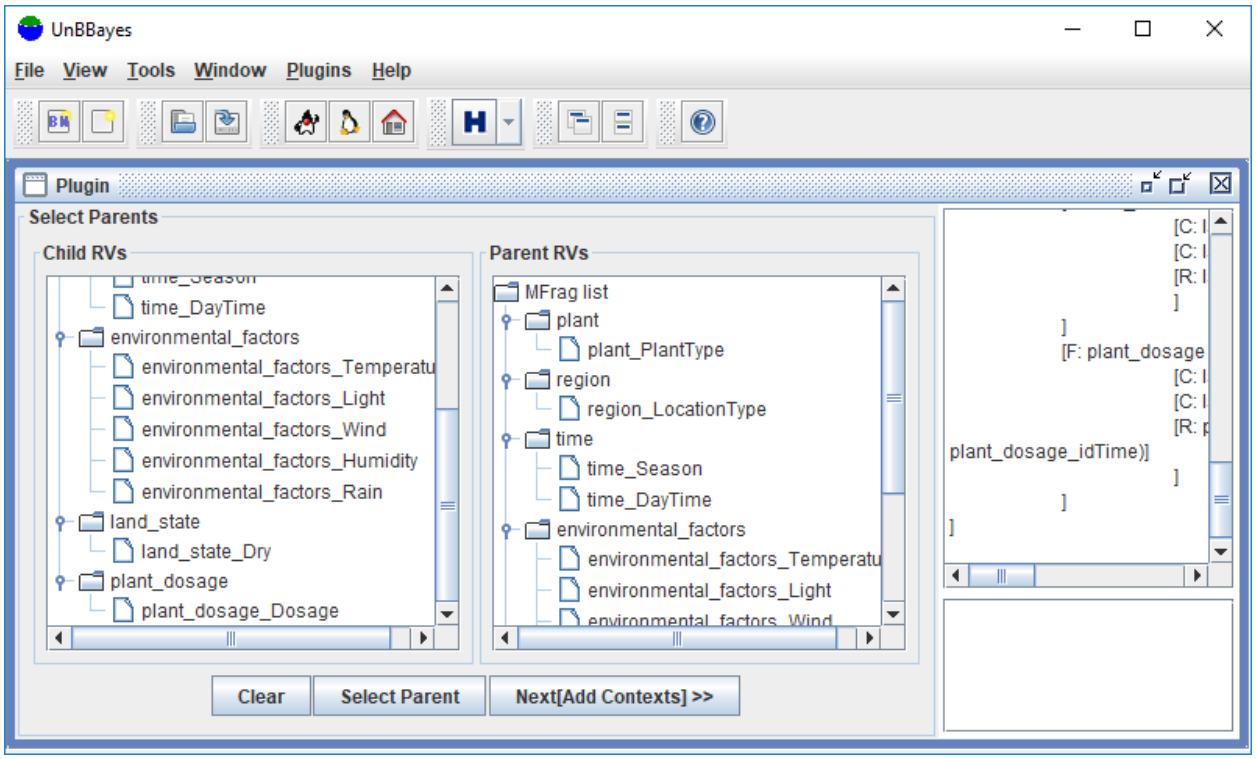


Click the item “land_state_Dry” in the tree view Child RVs.

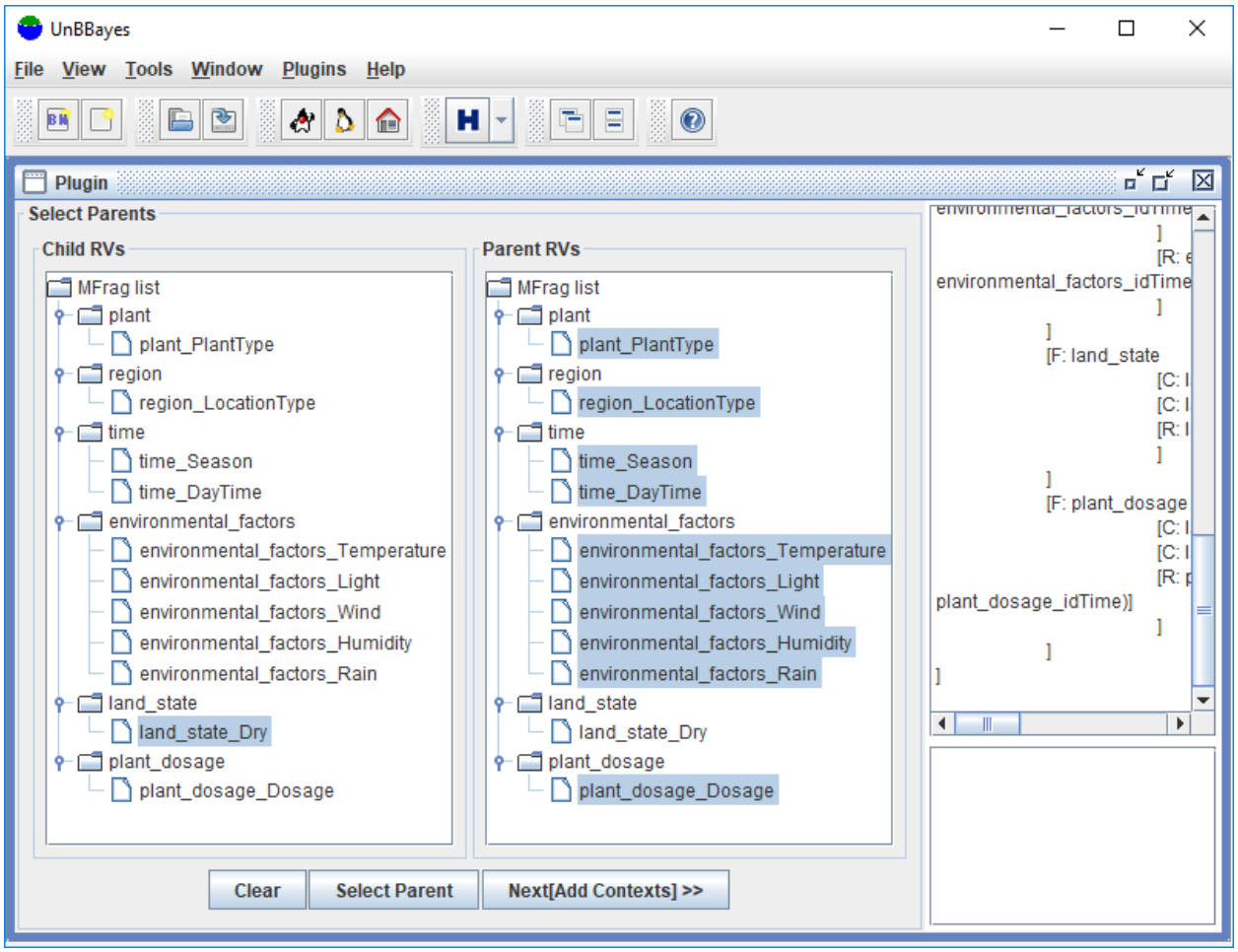
Also, click the following items in the tree view Parent RVs.

- plant_PlantType
- region_LocationType
- time_Season
- time_DayTime
- environmental_factors_Temperature
- environmental_factors_Light
- environmental_factors_Wind
- environmental_factors_Humidity
- environmental_factors_Rain
- plant_dosage_Dosage

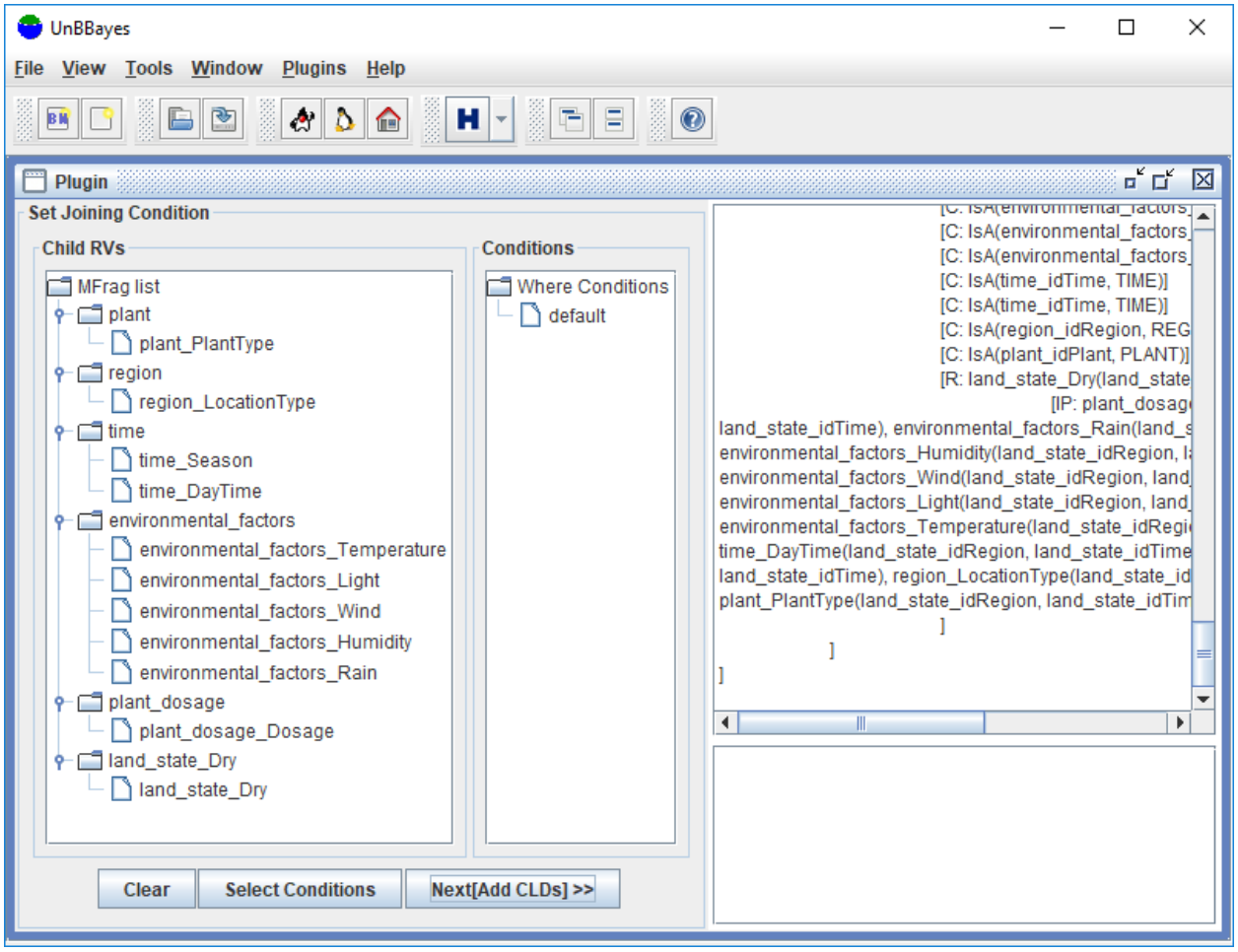
Click the button “Select Parent”.



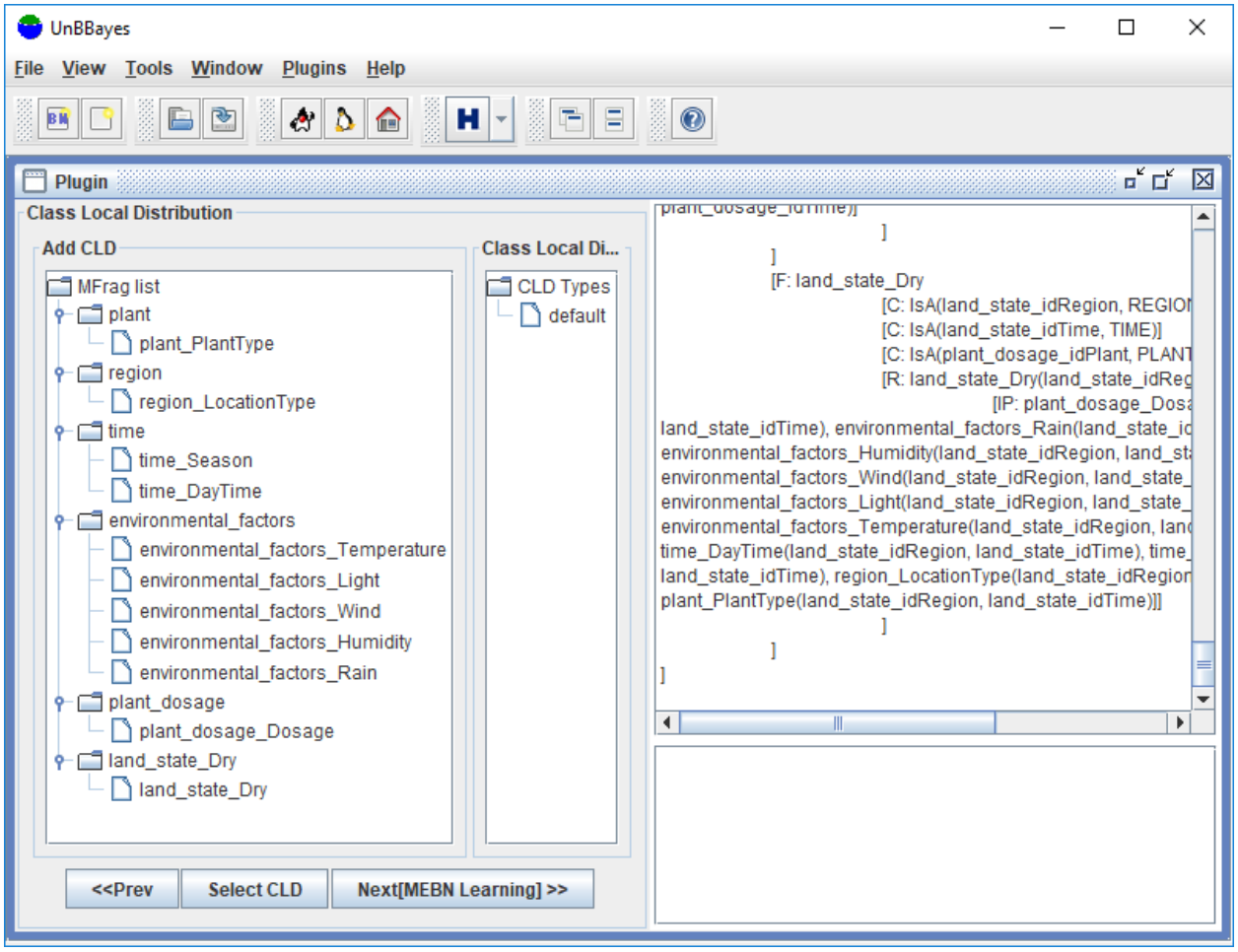
Click the button “Next[Add Contexts]>>”.



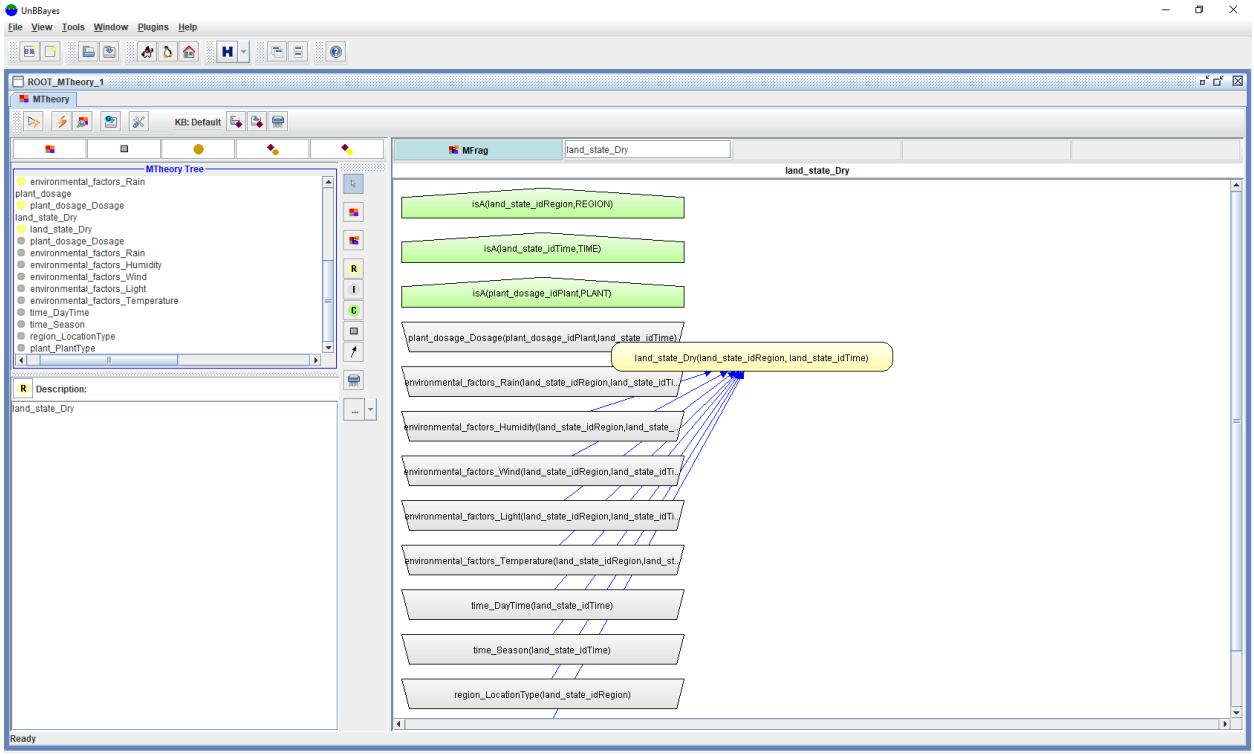
Click the button “Next[CLDs]>>”.



Click the button “Next[MEBN Learning]>>”.



Then we can see a learned MTheory.

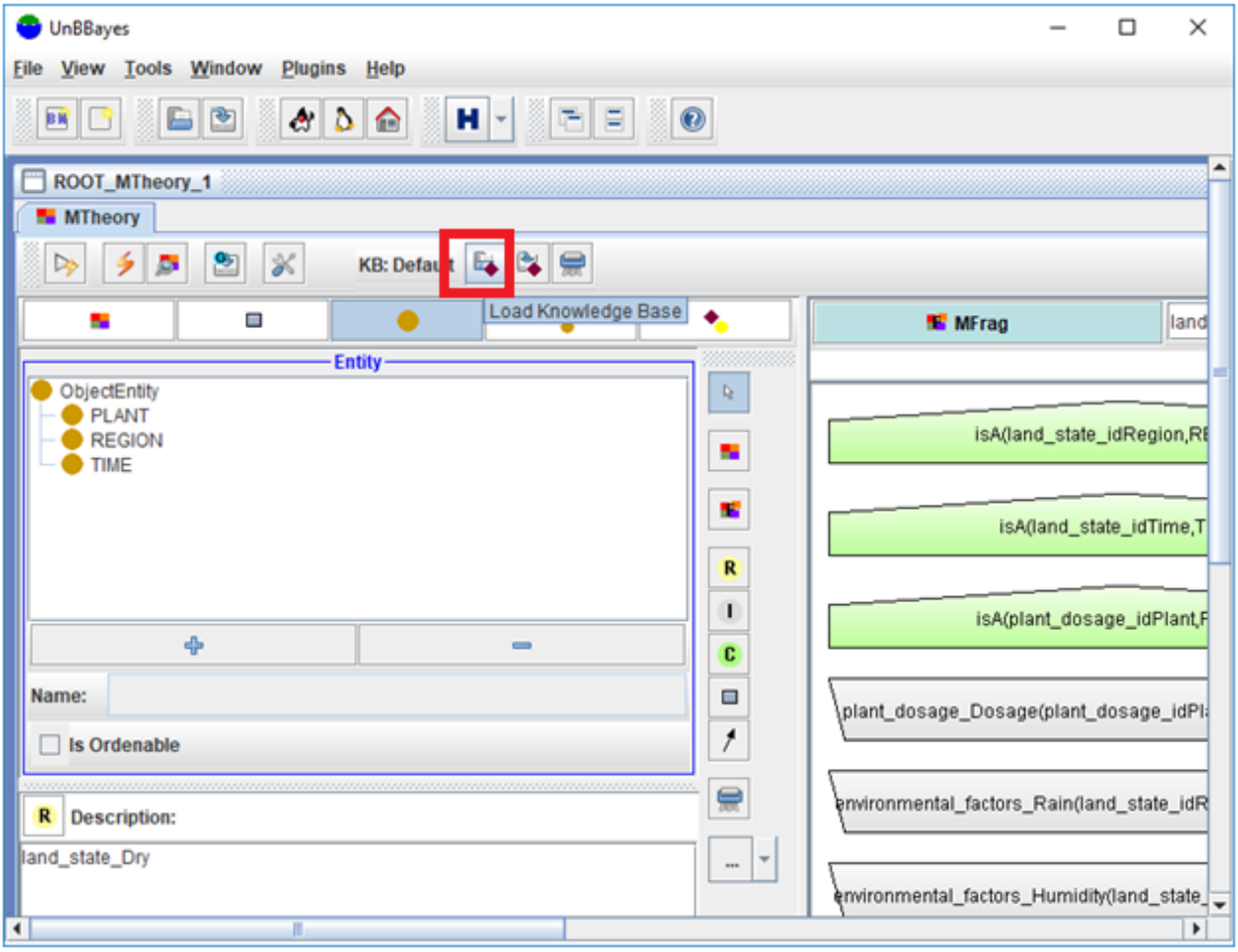


5. Reasoning the WateringSystem MTheory

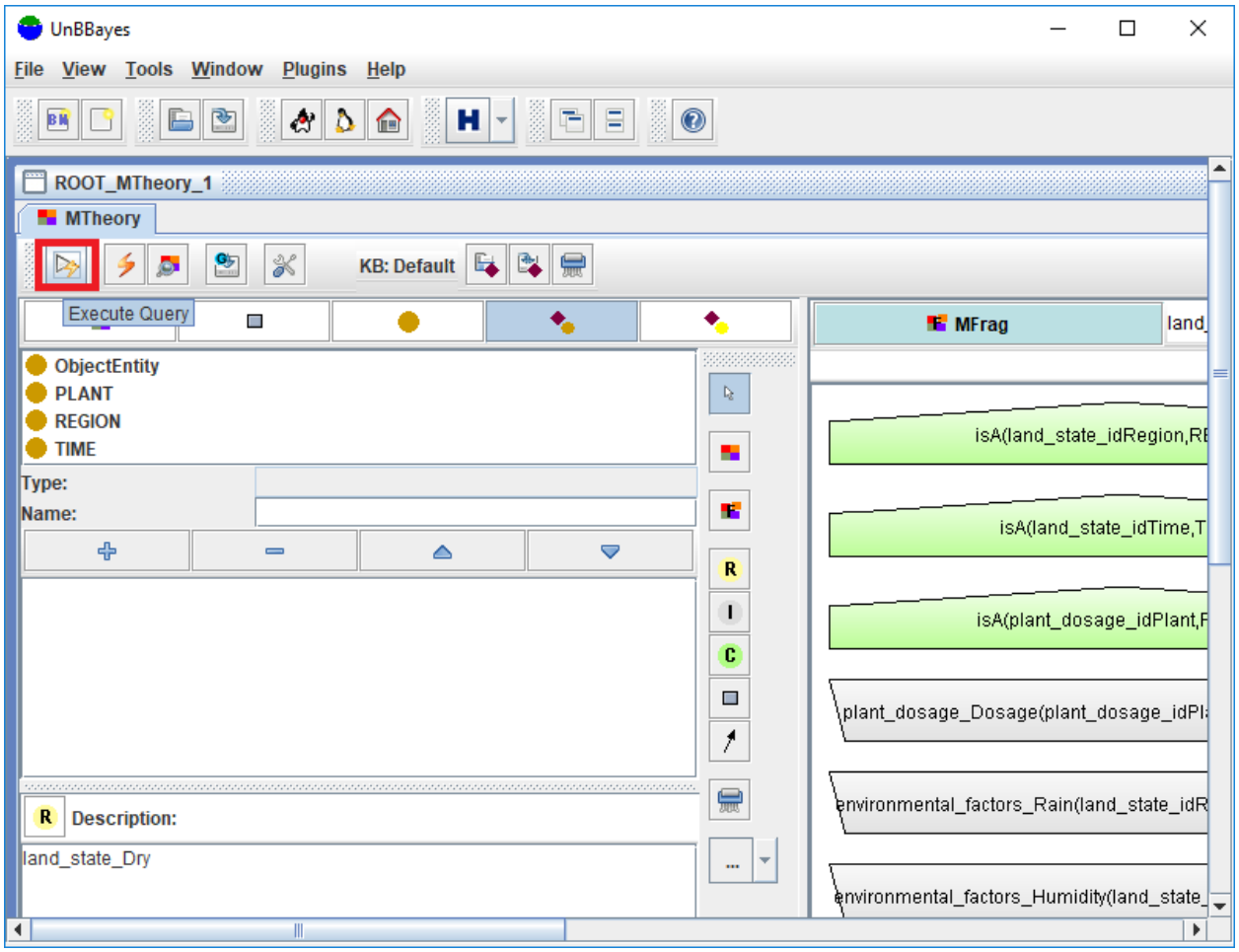
To reason about the node “land_state_Dry”, we need to set knowledge base (KB).
We can find a sample KB in the following folder.

example_data/watering_system/test.plm

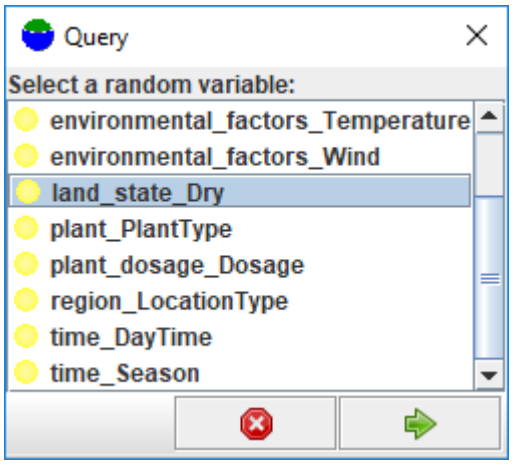
Click the button “Load Knowledge Base” and load the file “test.plm”.



To query the node “land_state_Dry”, click the button “Execute Query”.

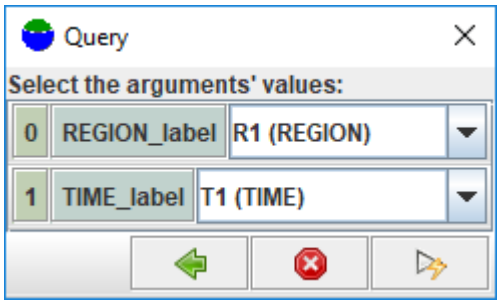


Select the item “land_state_Dry”.



Select the entity instant R1 for REGION_label and the entity instance T1 for the TIME_label.

Then click the button “Query”.



Then, we can see a reasoned SSBN from the WateringSystem MTheory.