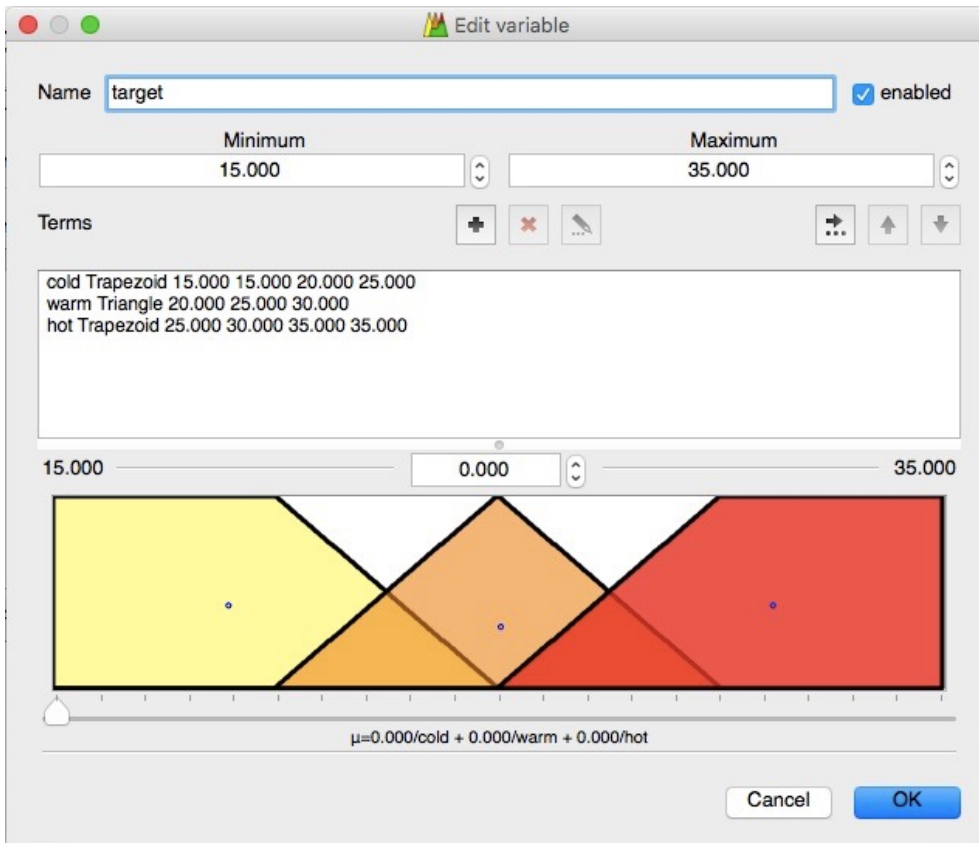
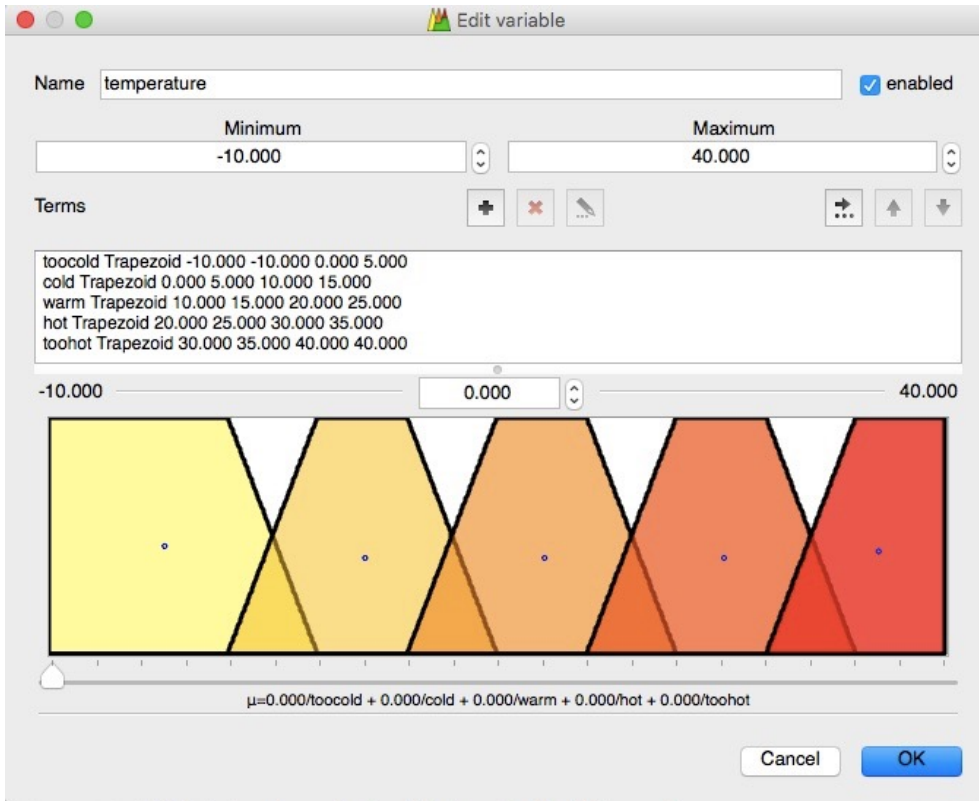


Lab 2 - Fuzzy Logic Air Conditioner

1. Install *qt fuzzy lite version 4.0* from <http://www.fuzzylite.com/downloads>
2. Create a new project called "Air Conditioner"
3. Create the following inputs and membership functions



4. Create the following outputs

Edit variable

Name: ☒ enabled

Minimum: Maximum:

Terms:

```
cool Triangle 0.000 0.250 0.500
nochange Triangle 0.250 0.500 0.750
heat Triangle 0.500 0.750 1.000
```

0.000 1.000

$\mu = 0.000/\text{cool} + 0.000/\text{nochange} + 0.000/\text{heat}$

Output:

Default:

Lock: ☐ Range ☐ Valid

Defuzzifier:

Accumulation:

Accuracy:

5. Write the following rules for the system

if (temperature is toocold) then command is heat

if (temperature is toohot) then command is cool

if (temperature is toocold or temperature is cold) and (target is warm) then command is heat

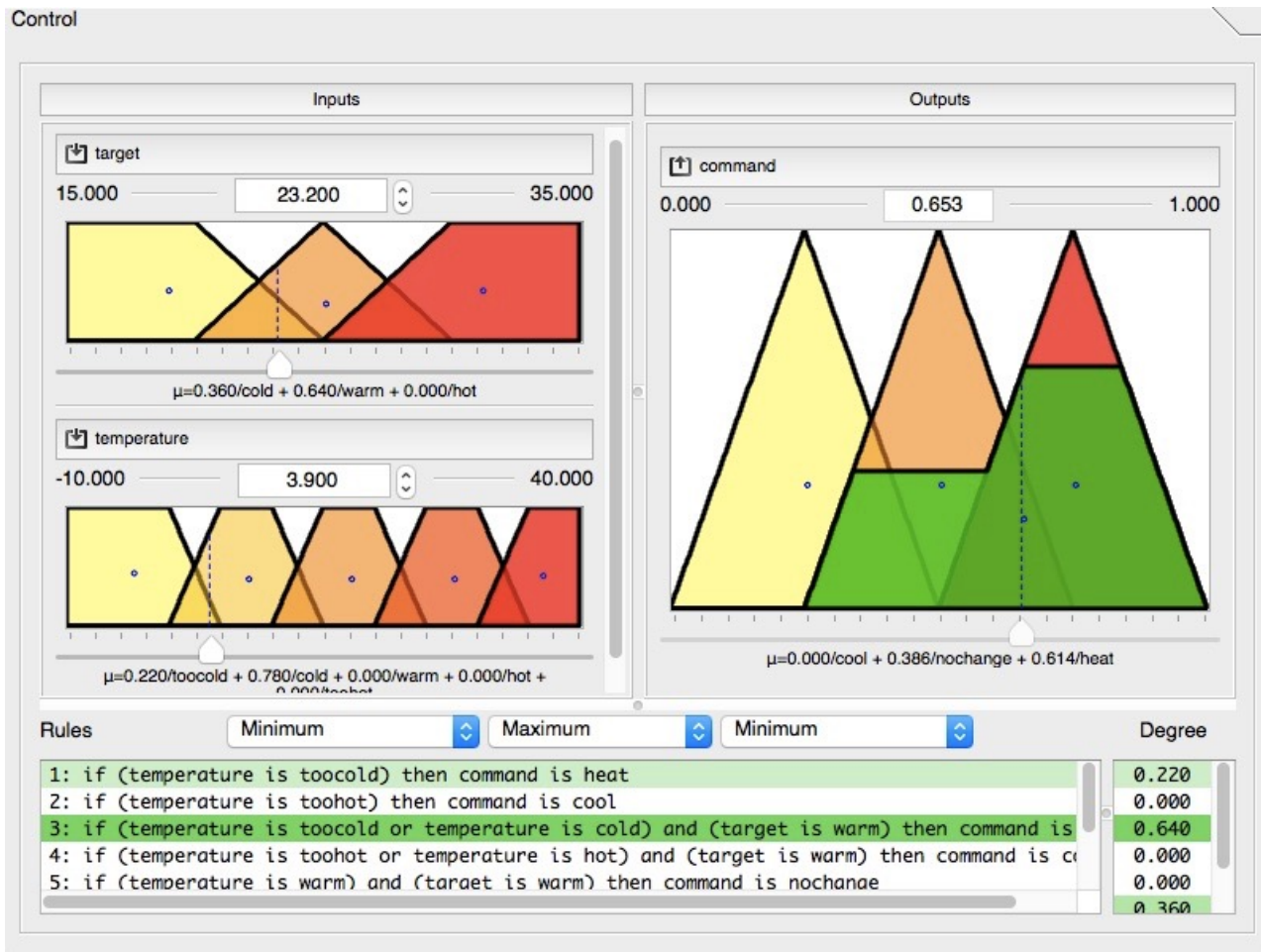
if (temperature is toohot or temperature is hot) and (target is warm) then command is cool

if (temperature is warm) and (target is warm) then command is nochange

if (temperature is cold) and (target is cold) then command is nochange

if (temperature is hot) and (target is hot) then command is nochange

6. Test the system to ensure it gives the correct output.



7. Save your project and export the Fuzzy Logic as a Java source code file.
File -> Export to...->jfuzzylite

The screenshot shows the 'Export engine to' dialog box with the 'jfuzzylite (Java):' option selected. The dialog displays the generated Java source code for the fuzzy logic engine.

```
Engine engine = new Engine();
engine.setName("Air Conditioner");

InputVariable inputVariable1 = new InputVariable();
inputVariable1.setEnabled(true);
inputVariable1.setName("target");
inputVariable1.setRange(15.000, 35.000);
inputVariable1.addTerm(new Trapezoid("cold", 15.000, 15.000, 20.000, 25.000));
inputVariable1.addTerm(new Trapezoid("warm", 20.000, 25.000, 30.000, 35.000));
inputVariable1.addTerm(new Trapezoid("hot", 25.000, 30.000, 35.000, 35.000));
engine.addInputVariable(inputVariable1);

InputVariable inputVariable2 = new InputVariable();
inputVariable2.setEnabled(true);
inputVariable2.setName("temperature");
inputVariable2.setRange(-10.000, 40.000);
inputVariable2.addTerm(new Trapezoid("toocold", -10.000, -10.000, 0.000, 5.000));
inputVariable2.addTerm(new Trapezoid("cold", 0.000, 5.000, 10.000, 15.000));
inputVariable2.addTerm(new Trapezoid("warm", 10.000, 15.000, 20.000, 25.000));
inputVariable2.addTerm(new Trapezoid("hot", 20.000, 25.000, 30.000, 35.000));
inputVariable2.addTerm(new Trapezoid("toohot", 30.000, 35.000, 40.000, 40.000));
engine.addInputVariable(inputVariable2);

OutputVariable outputVariable = new OutputVariable();
outputVariable.setEnabled(true);
outputVariable.setName("command");
outputVariable.setRange(0.000, 1.000);
```

An 'OK' button is visible at the bottom right of the dialog.