

This is a script of a hypothetical user interacting with the system through a dialog file interface. The file is available on the demo installation with the name `demo_interaction.dialog`, where the queries used in the script are saved but commented out. The dialog file can be used to run the queries as you follow the script. In this hypothetical interaction, in addition to a prognostic queries, the user inspects the equations used in the resulting models, retrieves equations that compute a given variable, and enters a new equation in the middle of the dialog interaction.

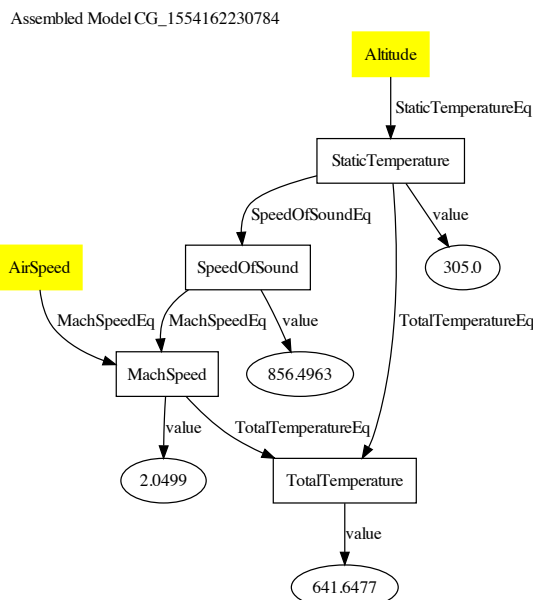
The user begins by asking the query:

what is the ^value of TotalTemperature when the ^value of Altitude is 60000?

Upon hitting enter, the system displays the results:

```
CM: "'Model','Variable','Mean','StdDev'
'CG_1554162230784','StaticTemperature','305.0','0.0'
'CG_1554162230784','SpeedOfSound','856.496351422468','1.1368683772161603e-13'
'CG_1554162230784','MachSpeed','2.049989357931622','1.147327238957548'
'CG_1554162230784','TotalTemperature','641.647785814098','286.84079435435933'".
```

The system also opens a browser tab and displays a visualization of the model:



Suppose that upon inspection of the results, the user notices that the temperature value appears lower than expected. She then decides to ask what equations were used in the model and what assumptions they make. The user can do this by executing the query:

Ask ShowModelEquations: [CG_1554162230784].

```
CM: "'Equation','Assumptions'
'http://aske.ge.com/hypersonics#StaticTemperatureEq','altitude < 36152'
'http://aske.ge.com/hypersonics#SpeedOfSoundEq',null
'http://aske.ge.com/hypersonics#MachSpeedEq',null
```

```
'http://aske.ge.com/hypersonics#TotalTemperatureEq',null".
```

Here, the value CG_1554162230784 is a computational graph (model) ID created by the system and returned together with the computed values in previous query.

This shows that the equation for StaticTemperature assumes that the altitude is less than 36152ft. She then asks to see all available equations in the knowledge graph by asking:

Ask **ShowEquationsReturningType: [StaticTemperature]**.

```
CM: "'eqID' = 'http://aske.ge.com/hypersonics#StaticTemperatureEq',  
      'InputTypes' = 'http://aske.ge.com/hypersonics#Altitude',  
      'expression' = '518.6-3.56 * altitude /1000.0',  
      'Assumptions' = 'altitude < 36152'".
```

This shows that the equation that was used in her model is the only one available in the current state of knowledge base. Suppose that she happens to know that in the stratosphere (altitudes higher than 36152ft but lower than around 82000ft) the atmospheric temperature is essentially a constant 390 degrees (Rankin), so she decides to add a new equation for StaticTemperature for this case (the equation can be typed right on the dialog interface and will be used in subsequent queries, but it will not persist in the knowledge graph. The user can also enter the equation definition in one of the semantic models, e.g., hypersonics.sadl in which case the equation will be stored permanently):

```
StaticTemperatureEqStratosphere is a StaticTemperatureEquation  
sciknow:input (a Argument argType Altitude argName "altitude")  
sciknow:output (a StaticTemperature)  
expression (a Script with script "390", with language Text)  
assumption "altitude > 36152 && altitude < 82000".
```

Now she tries her original query again:

what is the ^value of TotalTemperature when the ^value of Altitude is 60000?

```
CM: "'Model','Variable','Mean','StdDev'  
'CG_1554162614111','StaticTemperature','305.0','0.0'  
'CG_1554162614111','SpeedOfSound','856.496351422468','1.1368683772161603e-13'  
'CG_1554162614111','MachSpeed','2.0633826042934857','1.138116089986865'  
'CG_1554162614111','TotalTemperature','643.7242163652653','291.8014118129058'
```

```
'Model','Variable','Mean','StdDev'  
'CG_1554162614455','StaticTemperature','390.0','0.0'  
'CG_1554162614455','SpeedOfSound','968.5184561999836','2.2737367544323206e-13'  
'CG_1554162614455','MachSpeed','1.8167032286445401','1.0321884285613596'  
'CG_1554162614455','TotalTemperature','730.5342386958303','292.60536434940866'".
```

As expected, now there are two models and two answers. As a sanity check, she queries the equations used by each model:

Ask **ShowModelEquations: [CG_1554162614111]**.

```
CM: "'Equation','Assumptions'  
'http://aske.ge.com/hypersonics#StaticTemperatureEq','altitude < 36152'  
'http://aske.ge.com/hypersonics#SpeedOfSoundEq',null
```

```
'http://aske.ge.com/hypersonics#MachSpeedEq',null
'http://aske.ge.com/hypersonics#TotalTemperatureEq',null".
Ask ShowModelEquations: [CG_1554162614455].
CM: "'Equation','Assumptions'
'http://aske.ge.com/demo_interaction#StaticTemperatureEqStratosphere','altitude >
36152 && altitude < 82000'
'http://aske.ge.com/hypersonics#SpeedOfSoundEq',null
'http://aske.ge.com/hypersonics#MachSpeedEq',null
'http://aske.ge.com/hypersonics#TotalTemperatureEq',null".
```