# ME 24-688 – Week 5
# Project 3 – iLogic Part 2

Carnegie Mellon University

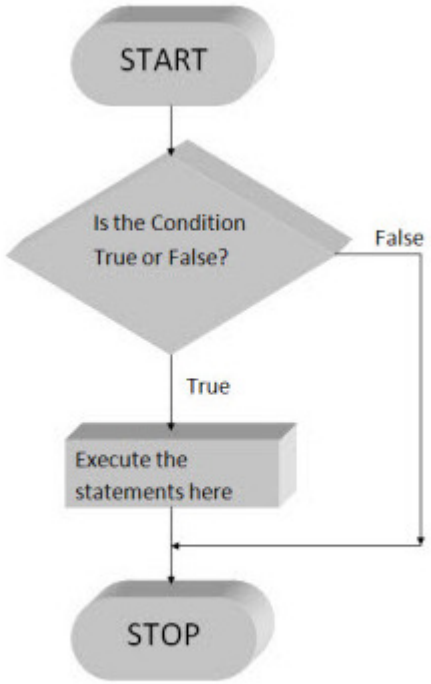
# 1 Use of Conditional Statements

## 1.1 Overview

Conditional statements help you perform actions based on specific criteria.

For example: Consider a situation where a set of instructions needs to be performed if a condition is true. In case the condition is false, a different set of instructions needs to be performed. You can use conditional statements in such a scenario to perform one set of actions if the condition is true and another set of actions if the condition is false.

### If-Then Statement




The working of an **if-then** conditional statement

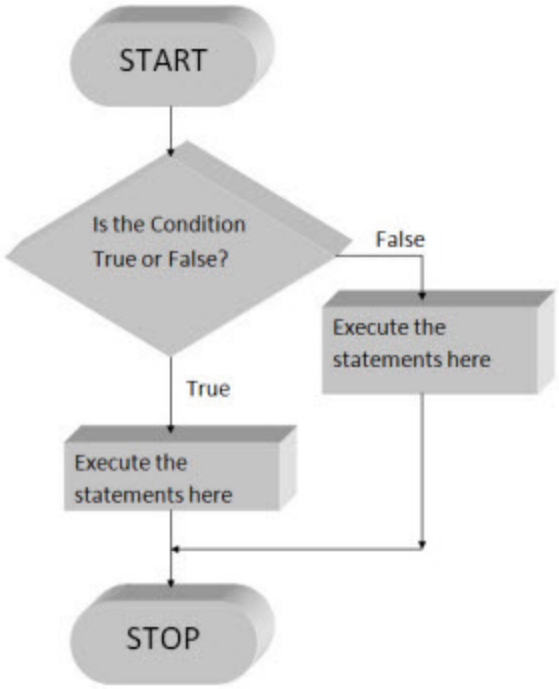
The **If-Then** statement is used when you need to perform an action or a set of actions only when certain criteria or conditions are met. In case the condition is not met, no action is to be performed.

In an **If-Then** statement, you can limit an action, or a set of actions to be performed, only if a condition is true, and no action is performed if the condition is false.

Example with syntax:

```
If Length = "long" Then
   Boxsize = 10.0
End If
```

## If-Then-Else Statement




The working of an **if-then-else** conditional statement

The **If-Then-Else** statement is used when you need to perform an action or a set of actions when a certain criteria or conditions are met and another set of actions in case that particular criteria/conditions are not met.

Example with syntax:

```
If Length = "long" Then
   Boxsize = 10.0
Else
   Boxsize = 6.0
End If
```

The **End If** statement closes the **If** loop and the program resumes.

## Single line If statement

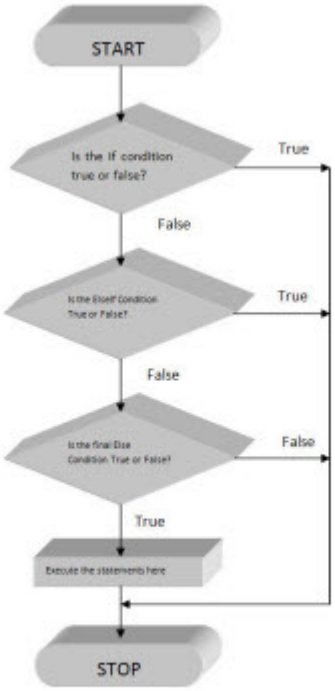
The general form of using an **If** statement is in its block form along with an **End If**. However, you can also use the **If** statement in one single line. The **End If** statement is not used while using the single line **If** statement.

Example with syntax:

```
If Width < 100 Then MessageBox.Show("Width value entered is very small", "Low Value Warning")
If Density < 1000 Then volume = 60 Else volume = 30
```

## If-Then-ElseIf statement

The **If-Then-ElseIf** or the extended block **If** statement allows you to insert an additional condition between the 'If' and the 'Else' parts of the code. The keyword to be used is 'ElseIf'.




The working of an **If-Then-ElseIf** conditional statement

**Using an If-Then-ElseIf statement**

Example with syntax:

```
If Liquid = "Water" Then
   Density = 1000
      ElseIf Liquid = "Turpentine" Then
             Density = 868.20
      ElseIf Liquid = "Kerosene" Then
             Density = 817.15
End If
```

**Without Using an If-Then-ElseIf statement**

Example with syntax:

```
If Liquid = "Water" Then
   Density = 1000
Else
      If    Liquid = "Turpentine" Then
            Density = 868.20
      Else
            If    Liquid = "Kerosene" Then
                  Density = 817.15
            End If
      End If
End If
```

## Boolean Variables in conditional statements

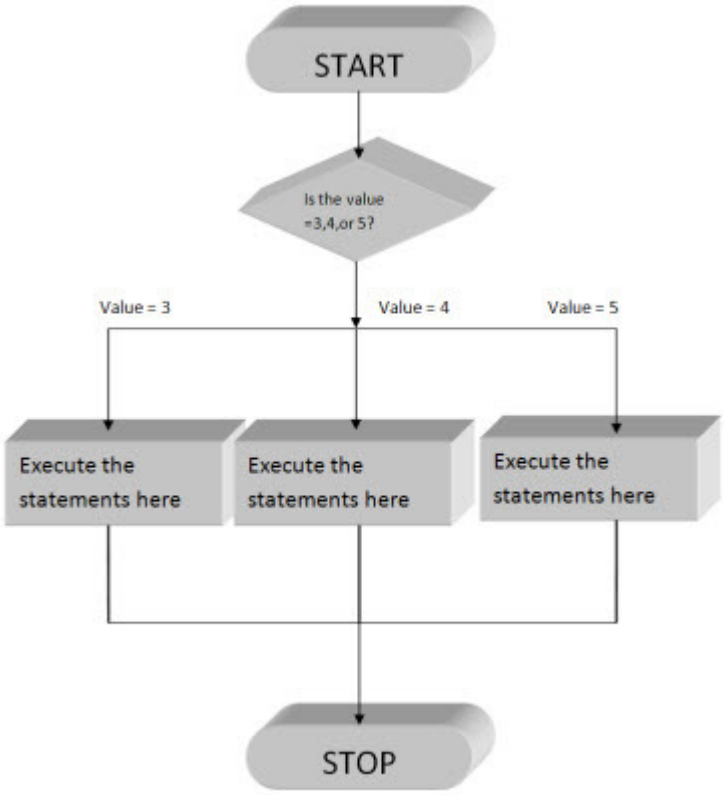
A Boolean variable has either a 'true' or a 'false' value associated with it. These are used in relational expressions to check for a specific characteristic and perform an action.

```
If Feature.IsActive("Inch Thread") Then
      Feature.ThreadDesignation("Inch Thread") = "7/16-14 UNC"
End If

If Feature.IsActive("Metric Thread") Then
      Feature.ThreadDesignation("Metric Thread") = "M10x1.5"
End If
```

## Select Case statement

A **Select Case** statement provides the user with a variety of options by specifying an expression to be tested.

The **Case** statements that follow in the code compare other expressions to the test expression. The comparison of other expressions is based on its sequence in the program. The first expression that fulfills the test condition (as per the sequence), has its action executed. Once an action is executed, the program moves to the **End Select** statement. It is good practice in a **Select Case** statement to use a final **Case Else** to handle faulty user input.



Example with syntax:

```
Select Case Liquid

      Case "Water"
            Density = 1000
      Case "Turpentine"
            Density = 868.20
      Case "Kerosene"
            Density = 817.15

Case Else

      Density = 0
      MessageBox.Show("Not a valid material", "Warning")

End Select
```

The **Select Case** statement can also be used without an association with specific variables. It can be used to work with other conditions (such as Boolean conditions) as shown below:

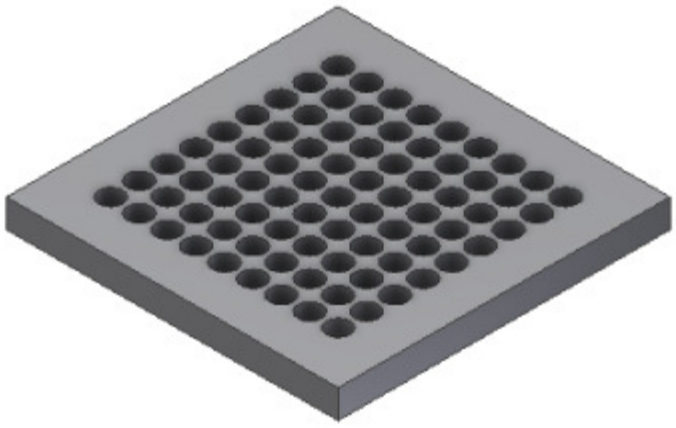
Example with syntax:

```
Select Case True

      Case Viscosity >= 5
            Density = Viscosity + 10
            Volume = 100/Density
      Case Viscosity < 5
            Density = Viscosity + 5
            Volume = 50/Density
End Select
```

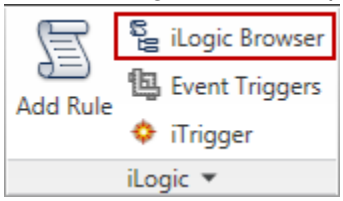
## 1.2 Project: Use Conditional Statements

1. Using the *iLogic Projects.ipj*

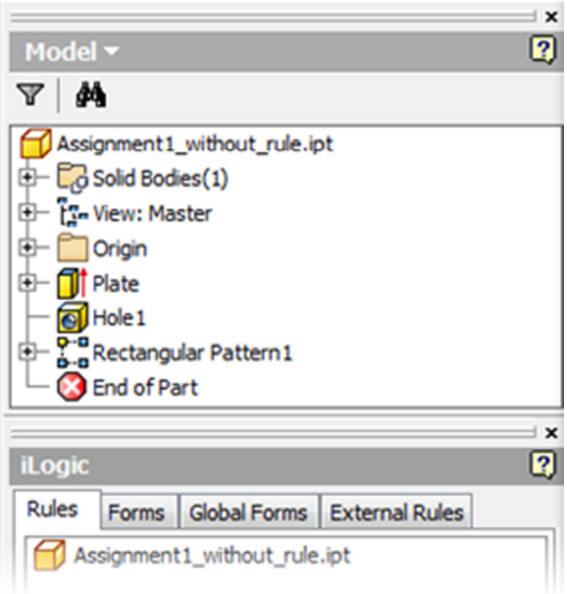
2. Open the *Assignment1_without_rule.ipt* file.



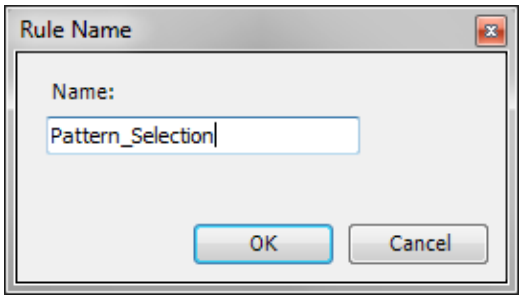
3. In the **Manage** tab, from the **iLogic** tab, click the **Rule Browser**.
   - The iLogic Browser appears.



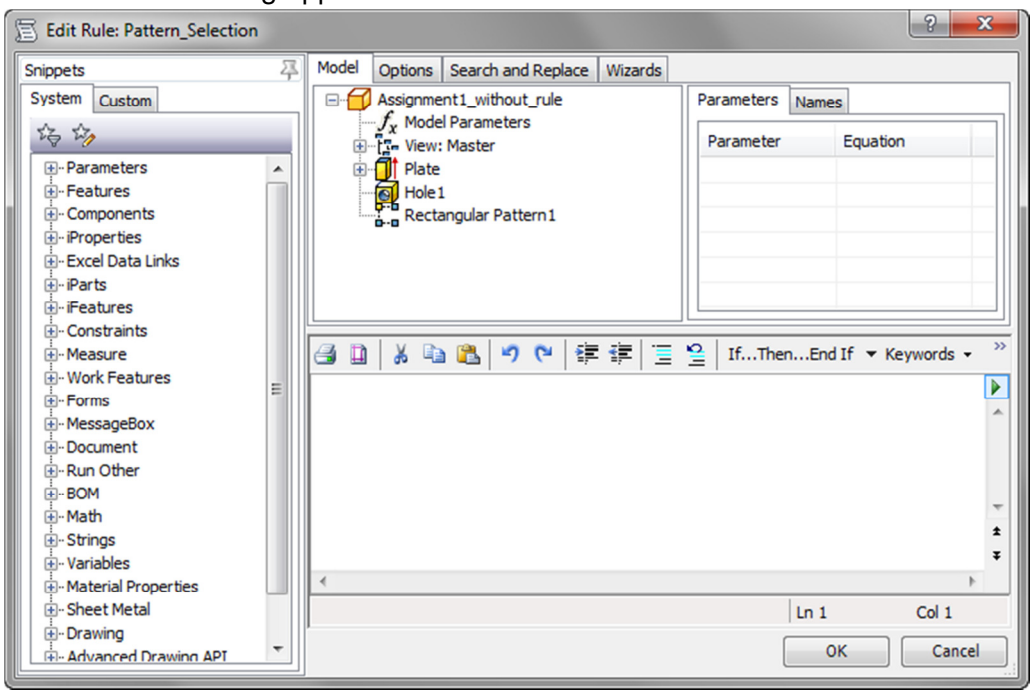

4. Dock the Rule Browser below the Model Browser.



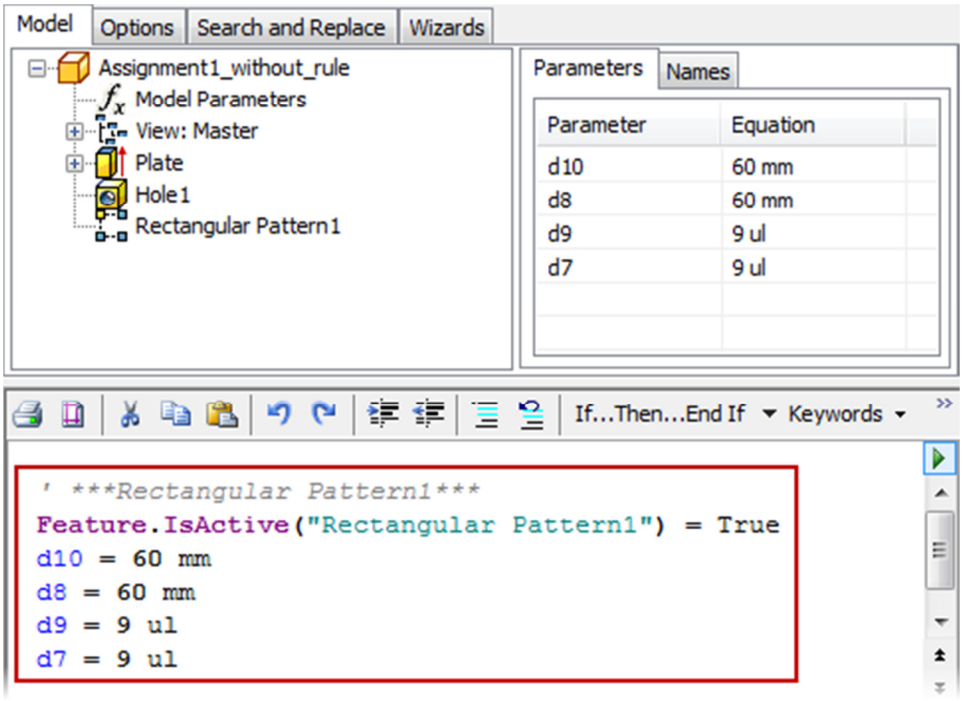
5. In the **Manage** ribbon, from the **iLogic** tab, click **Add Rule**
   - The **Rule Name** dialog appears.
   - Enter **Pattern_Selection.**




6. The **Edit Rule** dialog appears.



7. In the **Edit Rule** dialog, from the **Model** tab, right-click on **Rectangular Pattern1**.
   - The **Capture Current State** option appears.
   - The **Model** and **User** parameters and features appear in the program space.
   - Click **Ok** to save and exit the rule.



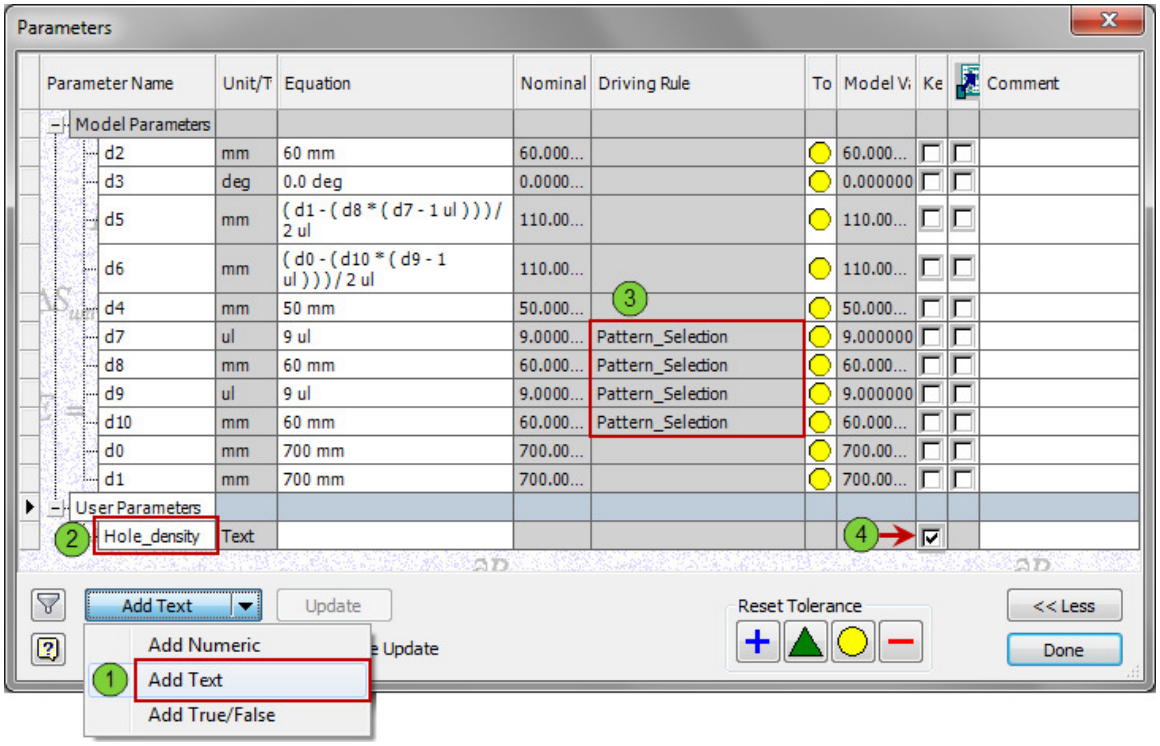
8. **Add Text** parameter named **Hole_density**. The parameter is displayed.
   In the **Manage** tab, click **Parameters**. The **Parameters** dialog box appears.

   (1) In the **Parameters** dialog, select **Add Text**. A new user parameter slot is created.

   (2) Place the cursor in the **Parameter Name** section and name it as **Hole_density**

   (3) Note that **Pattern_selection** shows up in the **Driving Rule** column for all the parameters due to the **Capture Current State** performed in a previous step.

   (4) Place a check mark in the **Key** column in the **Hole_density** row

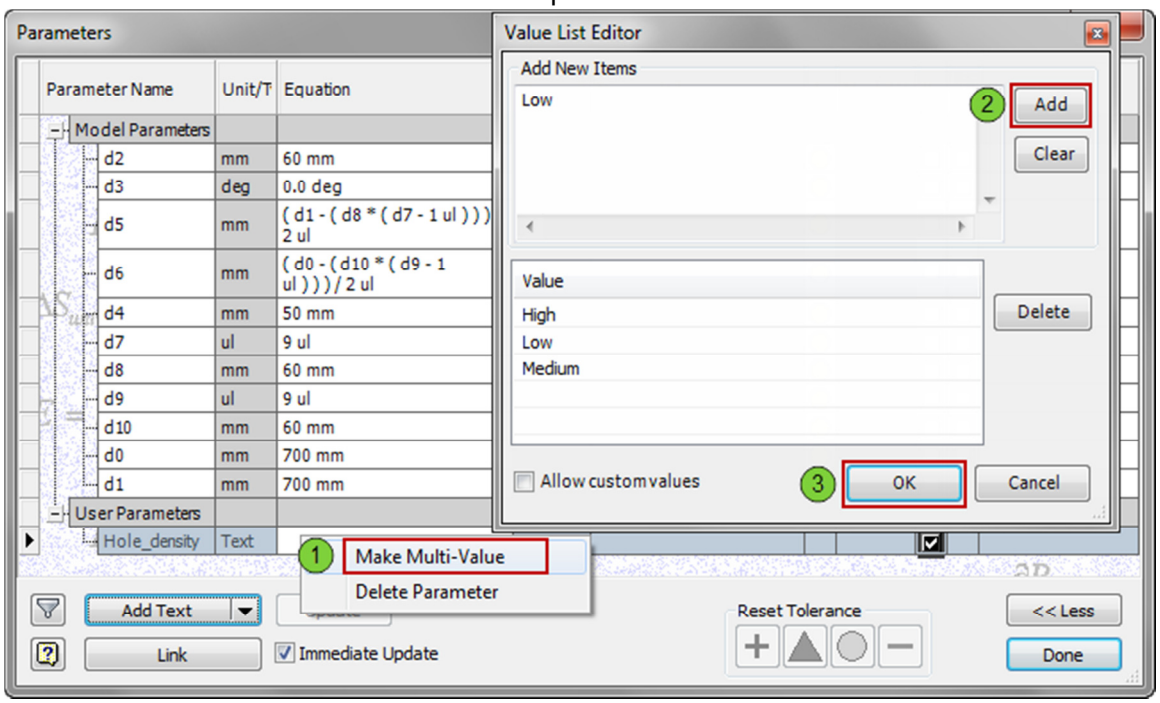


**9.** Right click **Hole_density** and select **Make Multi-Value** and add the value items **Low, Medium** and **High**

1 Right-click the **Equation** section and select **Make Multi-Value**. The **Value List Editor** dialog appears.

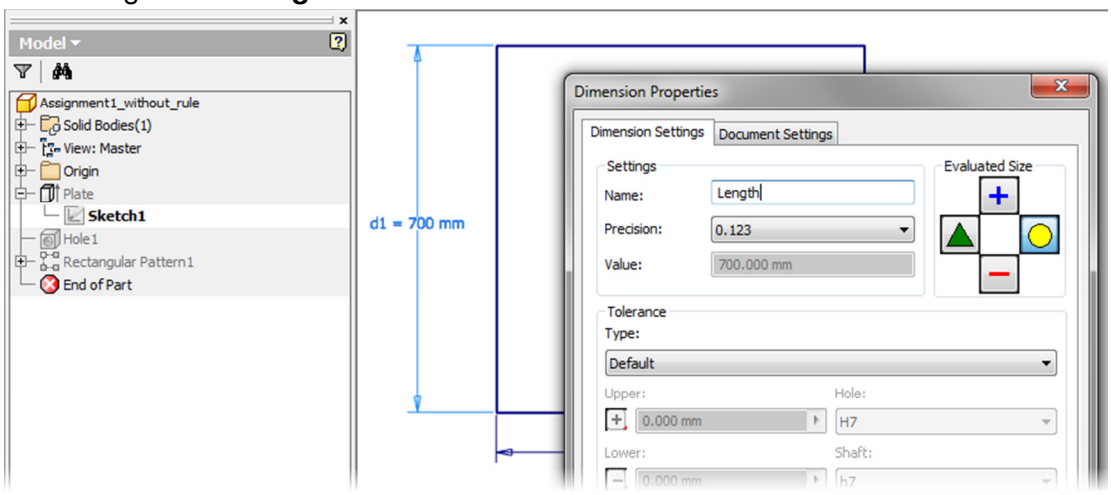
2 In the **Add New Items** group, enter '`Low`', '`Medium`' and '`High`' and click **Add**. The values are displayed in the **Value** group box.

3 Click **OK**. You have added a new user parameter



**10.** Modify the parameter in **Sketch1**.

- Change **d0** to **Width**
- Change **d1** to **Length**

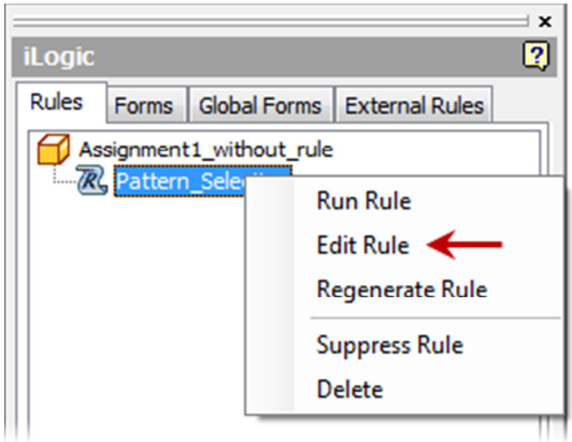



**11.** In the **Manage** tab, click **Parameters**. The **Parameters** dialog box appears.

- Change **d7** to **RowQuantity**
- Change **d8** to **RowSpacing**
- Change **d9** to **ColumnQuantity**
- Change **d10** to **ColumnSpacing**
- Click **Done**

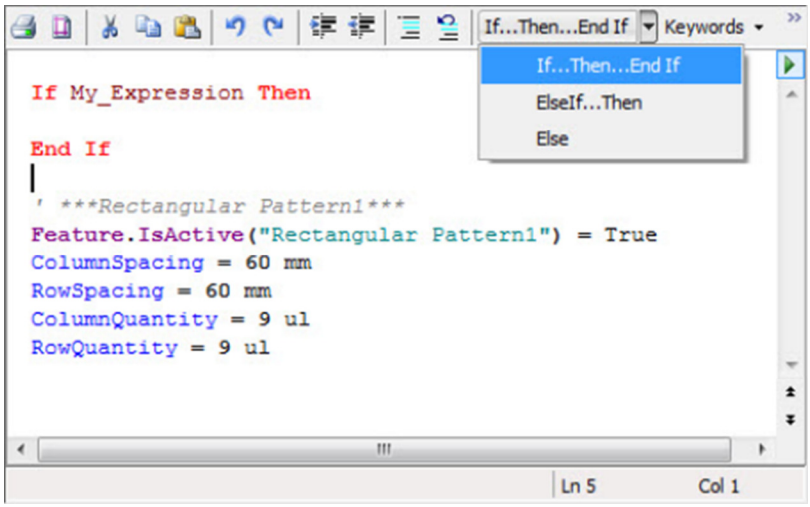
**12.** Right click on **Pattern_selection** and select **Edit Rule**.

- **NOTE:** All changes made to the parameter names in the previous step are reflected in the rules



**13.** Use the If...Then...End If conditional statement from the panel above the program space to insert conditions in the rule.

- Place an If...Then...End If **If** statement.
- Change `My_Expression` to **Hole_density = "Low"**
- Set **ColumnSpacing** equal to **160 mm**
- Set **RowSpacing** equal to **160 mm**
- Set **ColumnQuantity** equal to **4 ul**
- Set **RowQuantity** equal to **4 ul**

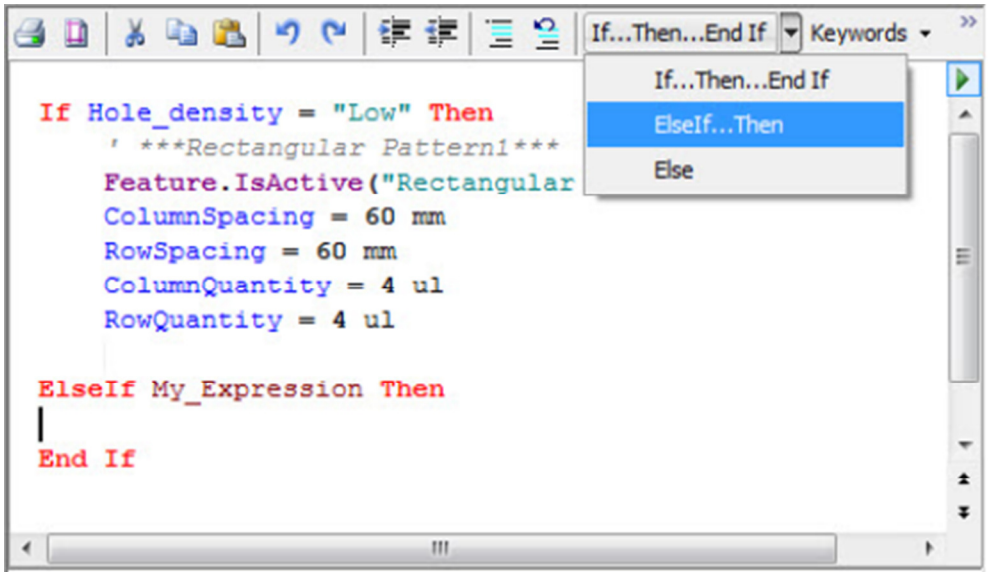



```
If Hole_density = "Low"  Then
      ' ***Rectangular Pattern1***
      Feature.IsActive("Rectangular Pattern1") = True
      ColumnSpacing = 160 mm
      RowSpacing = 160 mm
      ColumnQuantity = 4 ul
      RowQuantity = 4 ul
End If
```

**14.** Add a **UpdateAfterChange** snippet

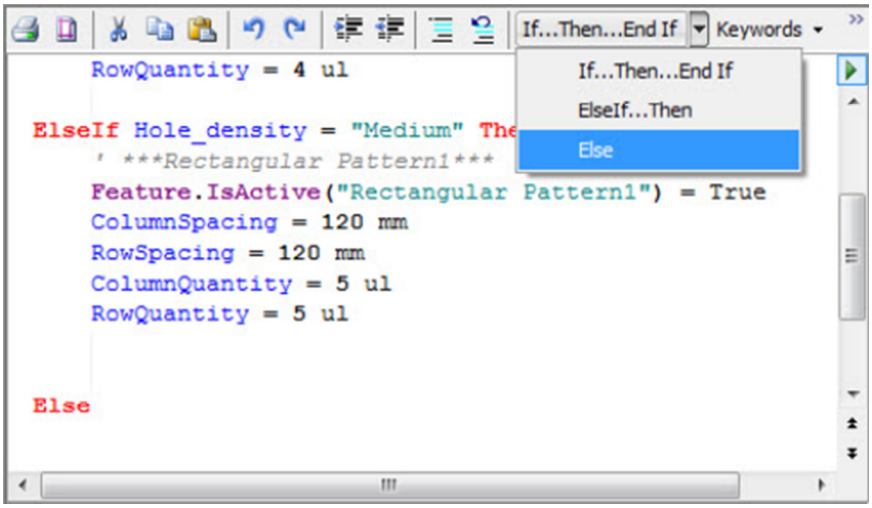
- In the **Snippets** menu, expand the **Parameters** snippet
- Double click on **UpdateAfterChange** snippet.
- The **UpdateAfterChange** snippet is displayed in the program space.

15. Use the **ElseIf...Then** conditional statement from the panel above the program space to insert conditions in the rule.
    - Place an **ElseIf...Then** statement.
    - Change **My_Expression** to **Hole_density = "Medium"**
    - Set **ColumnSpacing** equal to **120 mm**
    - Set **RowSpacing** equal to **120 mm**
    - Set **ColumnQuantity** equal to **5 ul**
    - Set **RowQuantity** equal to **5 ul**
    - Add the **UpdateAfterChange** snippet




```
If Hole_density = "Low" Then
      ' ***Rectangular Pattern1***
      Feature.IsActive("Rectangular Pattern1") = True
      ColumnSpacing = 160 mm
      RowSpacing = 160 mm
      ColumnQuantity = 4 ul
      RowQuantity = 4 ul
      Parameter.UpdateAfterChange = True
ElseIf Hole_density = "Medium" Then
      ' ***Rectangular Pattern1***
      Feature.IsActive("Rectangular Pattern1") = True
      ColumnSpacing = 120 mm
      RowSpacing = 120 mm
      ColumnQuantity = 5 ul
      RowQuantity = 5 ul
      Parameter.UpdateAfterChange = True
End If
```

16. Use the **Else** conditional statement from the panel above the program space to insert conditions in the rule.
    - Place an **Else** statement.
    - Set **ColumnSpacing** equal to `60 mm`
    - Set **RowSpacing** equal to `60 mm`
    - Set **ColumnQuantity** equal to `9 ul`
    - Set **RowQuantity** equal to `9 ul`
    - Add the **UpdateAfterChange** snippet



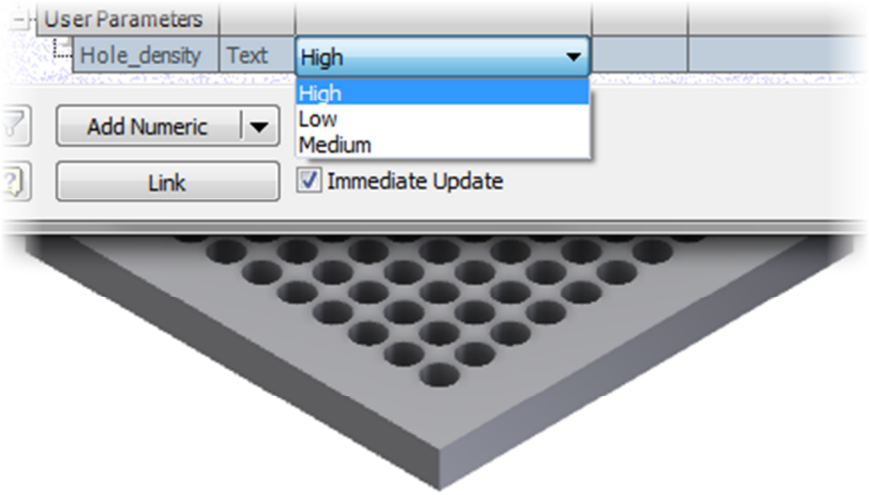

```
If Hole_density = "Low" Then
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 160 mm
	RowSpacing = 160 mm
	ColumnQuantity = 4 ul
	RowQuantity = 4 ul
	Parameter.UpdateAfterChange = True
ElseIf Hole_density = "Medium" Then
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 120 mm
	RowSpacing = 120 mm
	ColumnQuantity = 5 ul
	RowQuantity = 5 ul
	Parameter.UpdateAfterChange = True
Else
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 60 mm
	RowSpacing = 60 mm
	ColumnQuantity = 9 ul
	RowQuantity = 9 ul
	Parameter.UpdateAfterChange = True
End If
```

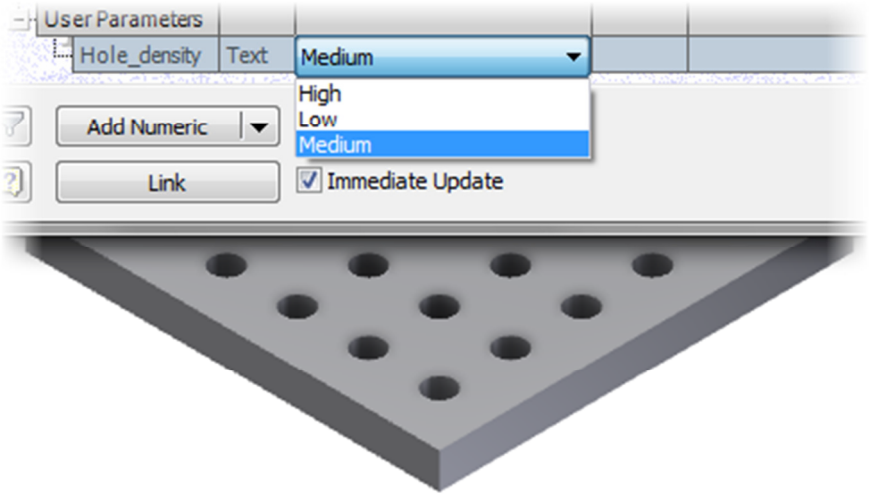
**17.** Add a Comment at the beginning of the Rule describing what the Rule does. Refer to the image to compare if the rule you created matches.

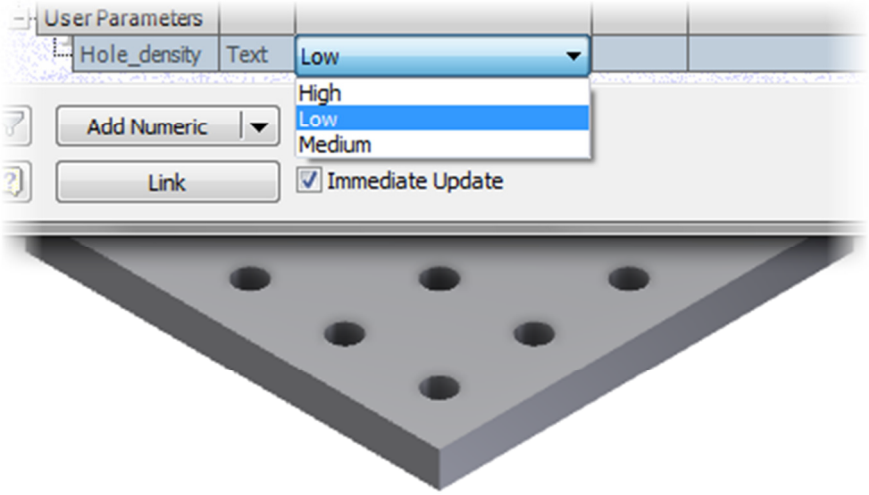
```
'The execution of this rule enables you to choose between 3 values of
hole density
'- High, Medium, and Low through a list box

If Hole_density = "Low" Then
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 160 mm
	RowSpacing = 160 mm
	ColumnQuantity = 4 ul
	RowQuantity = 4 ul
	Parameter.UpdateAfterChange = True
ElseIf Hole_density = "Medium" Then
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 120 mm
	RowSpacing = 120 mm
	ColumnQuantity = 5 ul
	RowQuantity = 5 ul
	Parameter.UpdateAfterChange = True
Else
	' ***Rectangular Pattern1***
	Feature.IsActive("Rectangular Pattern1") = True
	ColumnSpacing = 60 mm
	RowSpacing = 60 mm
	ColumnQuantity = 9 ul
	RowQuantity = 9 ul
	Parameter.UpdateAfterChange = True
End If
```

**18.** Change the **Hole_density** parameter in the **Parameters** dialog Box.

- Select **Medium** from the pull down menu.
- Select **Low** from the pull down menu.



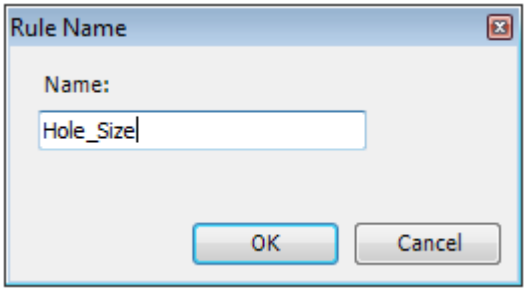
## 1.3 Project: Use iLogic Wizards

**19.** In the **Manage** tab, click **Parameters**. The **Parameters** dialog box appears.

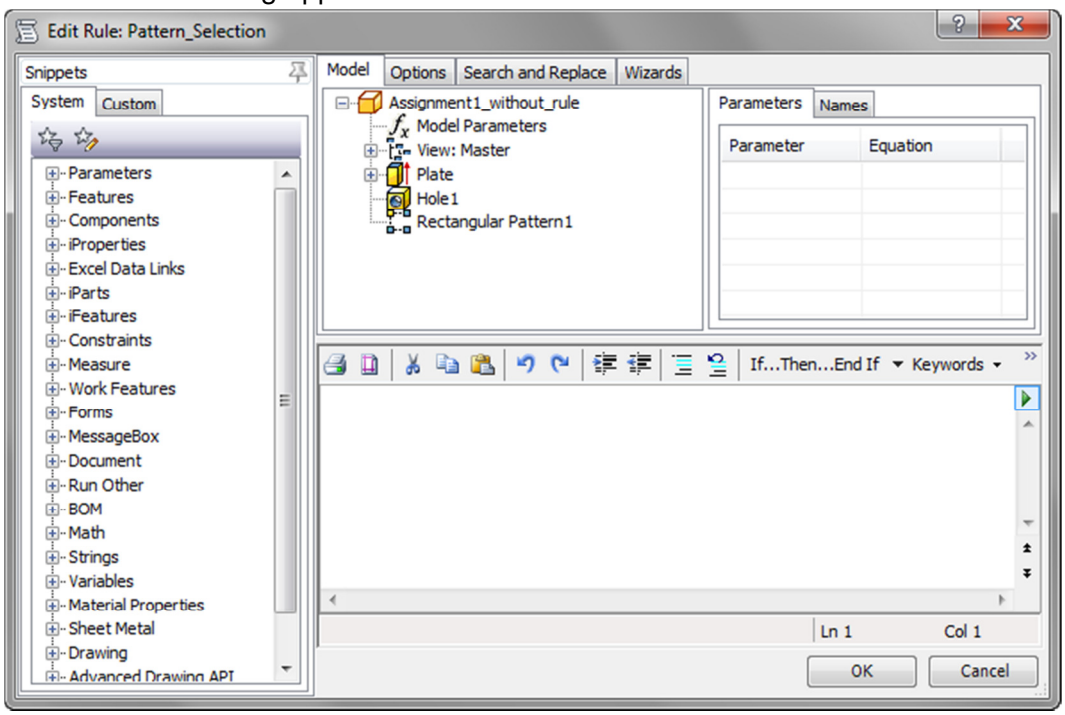
- Change **d2** to **Thickness**
- Change **d4** to **HoleDiameter**
- Click **Done**

**20.** In the **Manage** ribbon, from the **iLogic** tab, click **Add Rule**

- The **Rule Name** dialog appears.
- Enter **Hole_Size.**

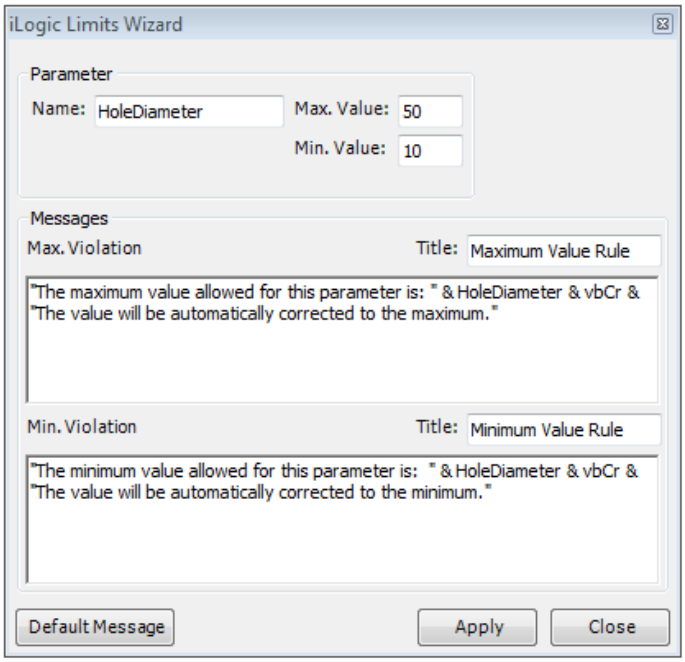



**21.** The **Edit Rule** dialog appears.

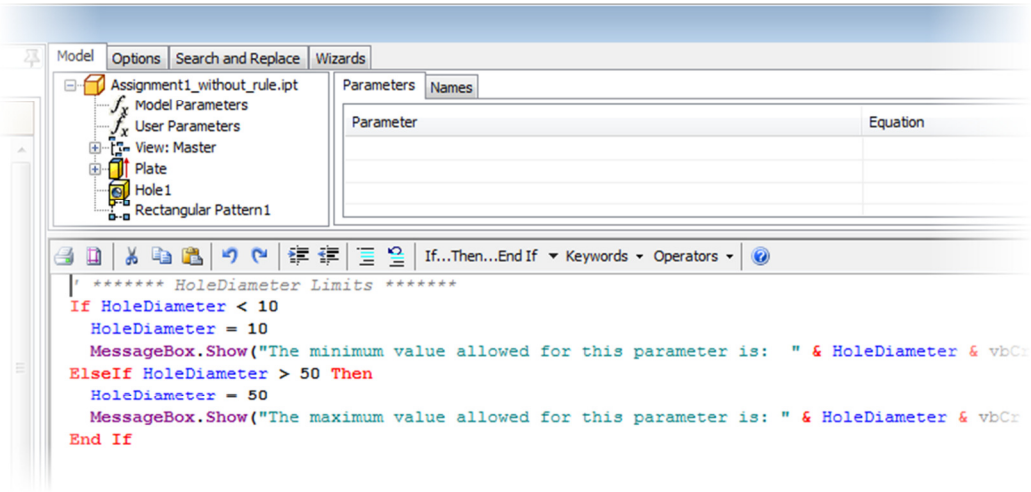


**22.** In the **Edit Rule** dialog box, from the **Wizards** tab, click on **Parameter Limits**.

- The **iLogic Limits Wizard** dialog box appears.
- Enter **Name** equal to **HoleDiameter**.
- Enter **Max. Value** equal to **50**.
- Enter **Min. Value** equal to **10**.



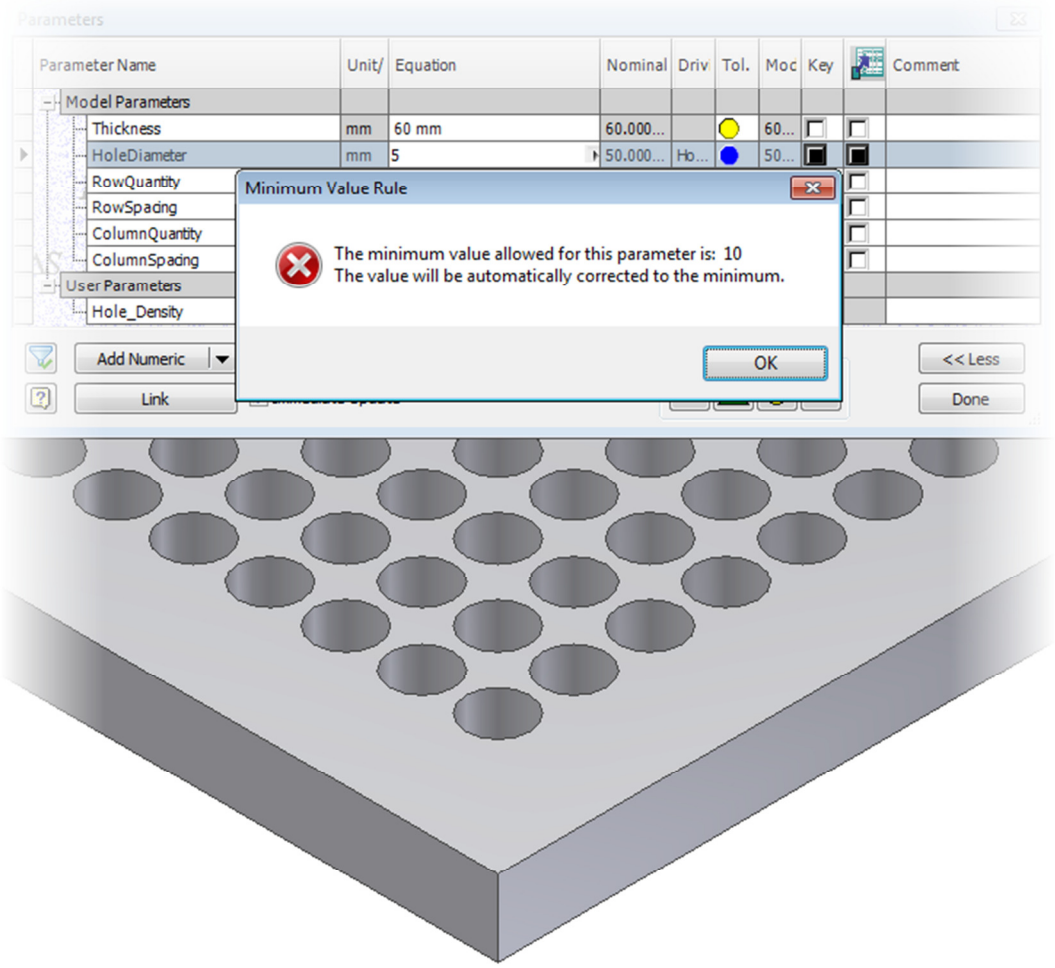

- Click **Apply**.
- An **If-Then-Else** statement is generated in the program space according to the parameters entered in the wizard.



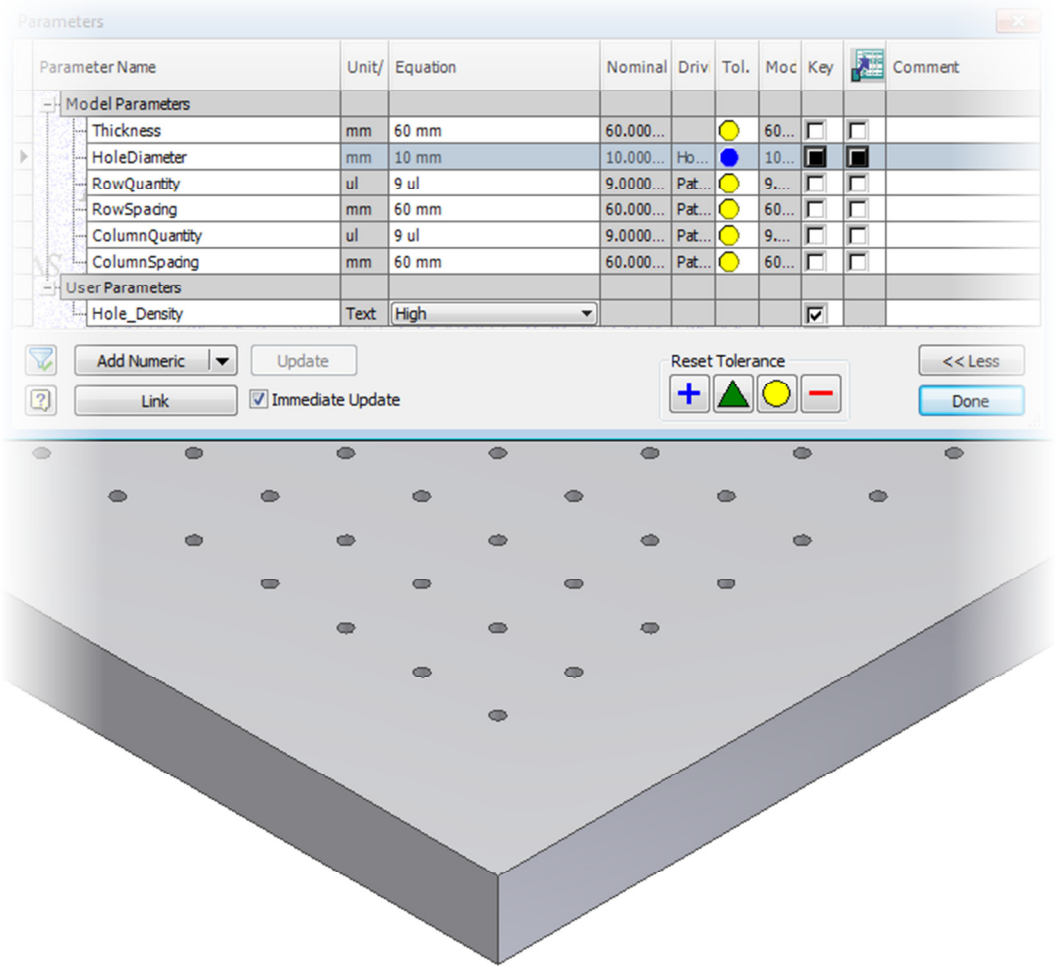

- Click **Close** to exit the wizard.
- Click **Ok** to save and exit the rule.

**23.** Change the **HoleDiameter** parameter in the **Parameters** dialog box.

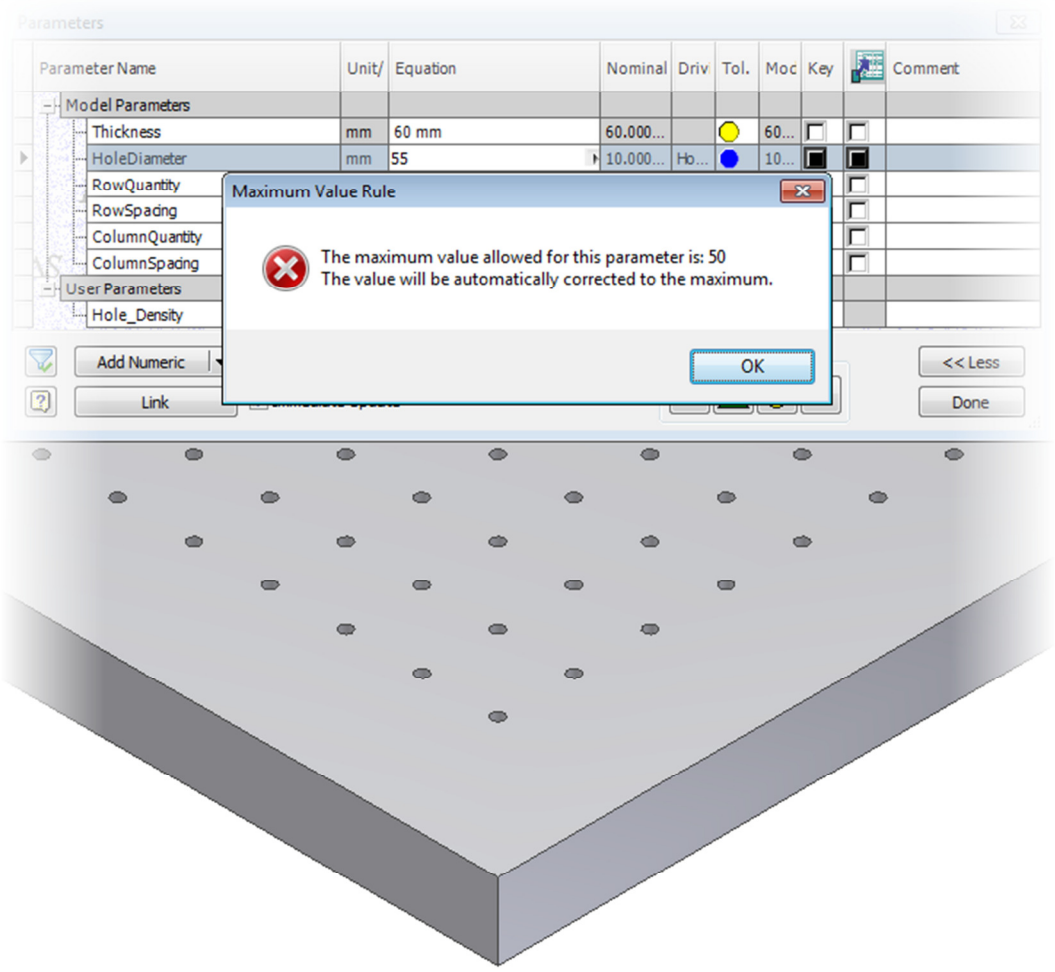
- Set **HoleDiameter** to **5**.
- The **Minimum Value Rule** warning dialog is displayed.



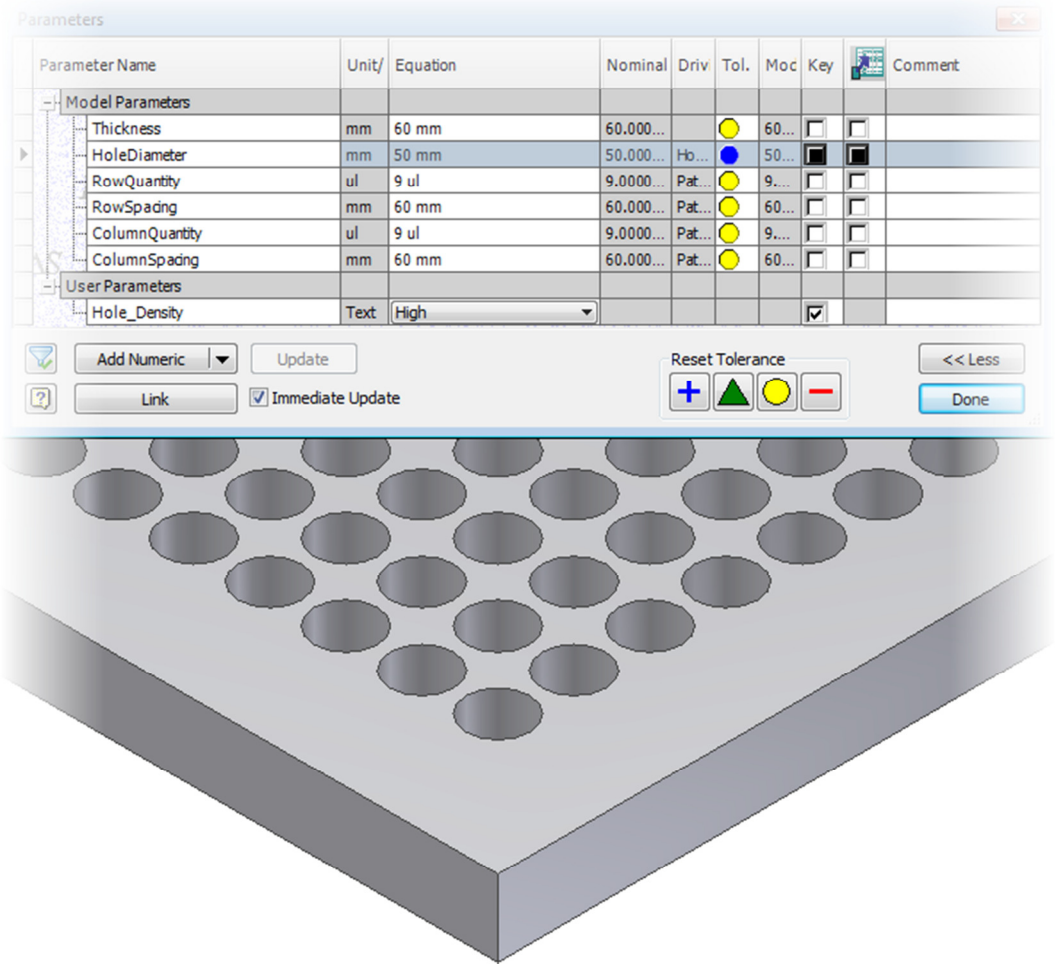
- Click **OK**.
- The **HoleDiameter** parameter is reset to the minimum value and the model is updated accordingly.



- Set **HoleDiameter** to **55**.
- The **Maximum Value Rule** warning dialog is displayed.



- Click **OK**.
- The **HoleDiameter** parameter is reset to the maximum value and the model is updated accordingly.




**24.** Close the file. Do NOT save.

- The File result has been provided… it is named *Assignment1_with_rule.ipt*