Debugging/Bug Reporting Exercise

In this exercise, you are given a failure symptom that Pex's behavior is not consistent with what one may expect, and you are asked to diagnosis to report a suspected failure-inducing condition (of the code in the PUT) for causing such failure symptom.

**Failure symptom:** At the end of Pex's exploration of the PUT, Pex turns a symbolic input (a parameter of the parameterized unit test) into a concrete value. In particular, after running Pex against the code below, the following two entries of the test-data table show that the mid value is not symbolic while all the other entries show that mid is symbolic.

<table>
<thead>
<tr>
<th>Mid Value</th>
<th>&quot;Mid is symbolic?: False; Path Condition: return mid == 0;&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&quot;Mid is symbolic?: False; Path Condition: return mid == 0;&quot;</td>
</tr>
<tr>
<td>int.MaxValue</td>
<td>&quot;Mid is symbolic?: False; Path Condition: return mid == int.MaxValue;&quot;</td>
</tr>
</tbody>
</table>

To reproduce the symptom, conduct the following two steps:

- **Step 1.** Click [http://pex4fun.com/default.aspx?language=CSharp&sample=_Template](http://pex4fun.com/default.aspx?language=CSharp&sample=_Template) (or keep clicking the "New" menu as the last one near the top to get to the mode of "The code is a puzzle.", not the mode of "This puzzle is an interactive Coding Duel.", as indicated by the line above the code editing box)
- **Step 2.** Make sure that you include the following code snippet in the code editing box:

```csharp
using System;
using Microsoft.Pex.Framework;
using Microsoft.Pex.Framework.Settings;

[PexClass]
public class Program
{
    [PexMethod(TestEmissionFilter=PexTestEmissionFilter.All)]
    public static string testMethod(int mid)
    {
        bool flag = true;
        string queryText = "SELECT Role FROM Users WHERE MID =" + mid + " AND ROLE = 'teacher';";
        if (queryText.Length > 57)
            flag = false;
        return "Mid is symbolic?: " + PexSymbolicValue.IsSymbolic<int>(mid) + "; Path Condition: " + PexSymbolicValue.GetPathConditionString();
    }
}
```