Using Visual Studio for Concept Location

This lab covers Concept Location using regular expressions commonly called grep (grepCL) and Concept Location using Dependency Search (CLDS). In Visual Studio 2013, the most useful tools for concept location are:

1) Quick Find (grepCL)
2) Find in Files (grepCL)
3) Go to definition (CLDS)
4) Find all references (CLDS)
5) View Call Hierarchy (CLDS)
6) Class View (CLDS)

Quick Find **(Ctrl+F)** and ***Find in Files*** **(Ctrl+Shift+F)** allow searches commonly called grep. They will search in the source code and comments. To use regular expressions, select the checkbox in the Find options in *Find in Files* tool (Figure 1). Another difference between *Quick Find* and *Find in Files* is the way the search results are displayed. In *Quick Find* developers navigate from one result to another by clicking the Find Next button. *Find in Files* displays all the results in a separate window, and developers can then choose which results they want to inspect in more details. The last row of the results contains statistics about the search.

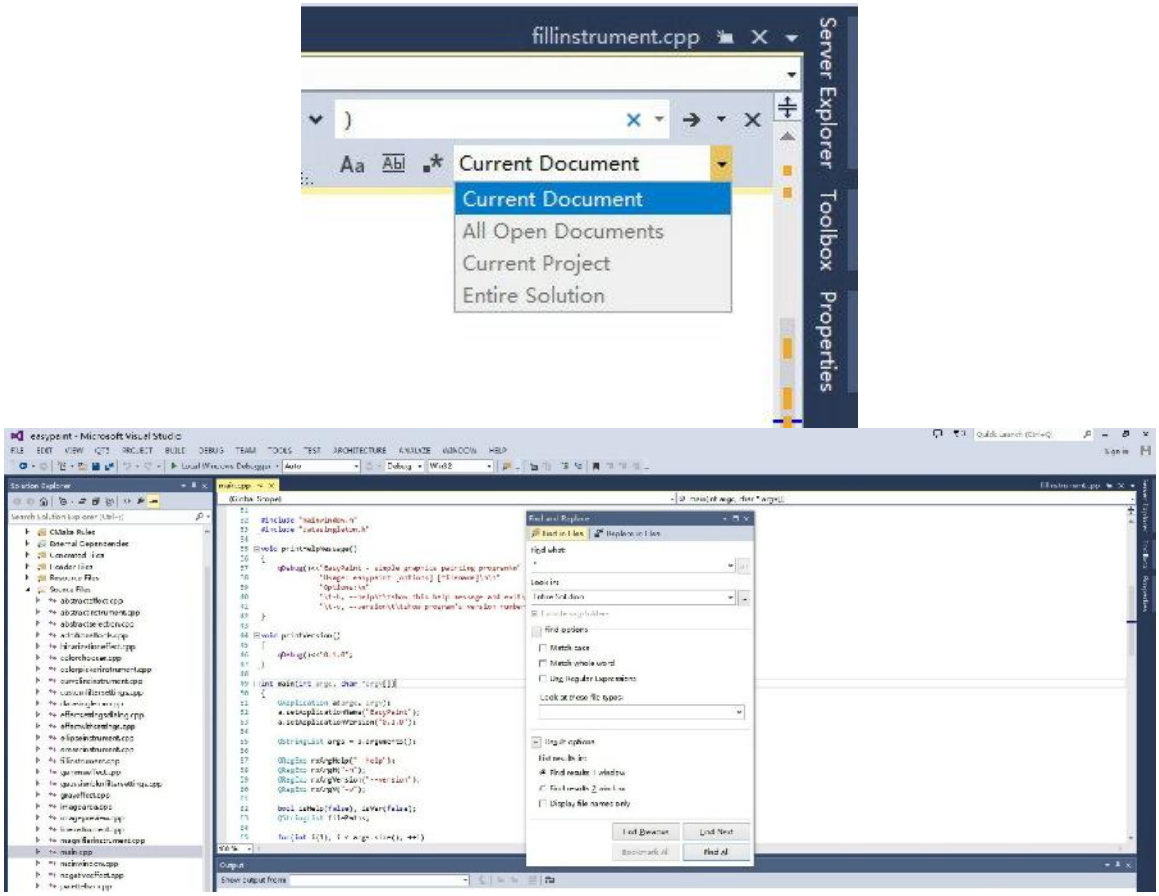

Figure 1 Quick Find and Find in Files tools in Visual Studio

Go To Definition/Go To Declaration finds the location where a method, class, or field is defined. To use this tool right click on a class, method, or field name and select “Go To Definition” from the menu (Figure 2).

Find All References. For a selected class, method, or class field, it finds all the places where the method or field is used or referred. To use this tool, right click on a class, method, or field name and select “Find All References” option (Figure 2).

View Call Hierarchy allows developers to browse through the clients (callees – methods that call the method M) and suppliers (callers – methods that are called by a method M) of a selected method M. To use this tool, right click on a method, select “View Call Hierarchy” option (Figure 2).

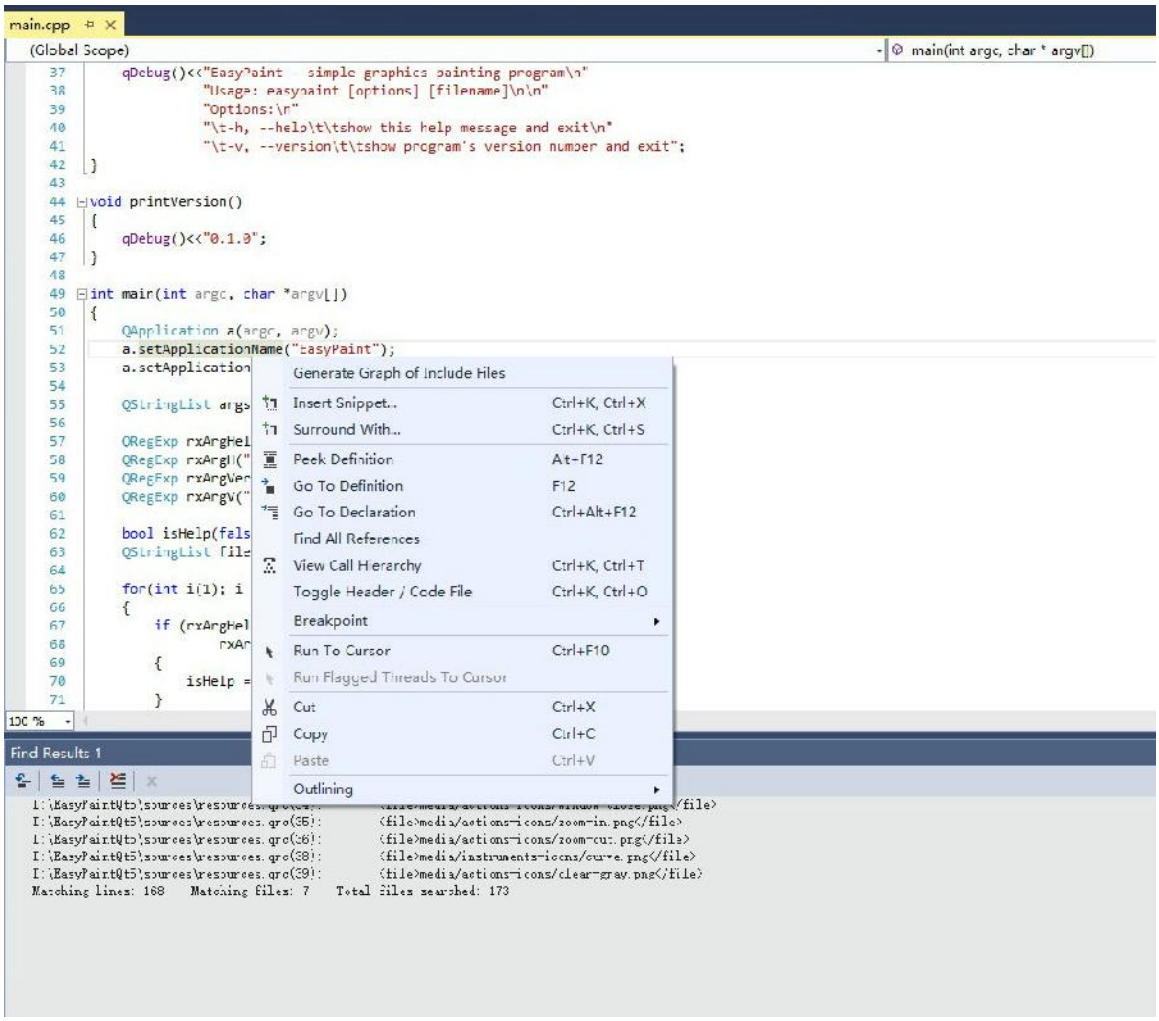

Figure 2: Go To Definition, Find all References, View Call Hierarchy in Visual Studio

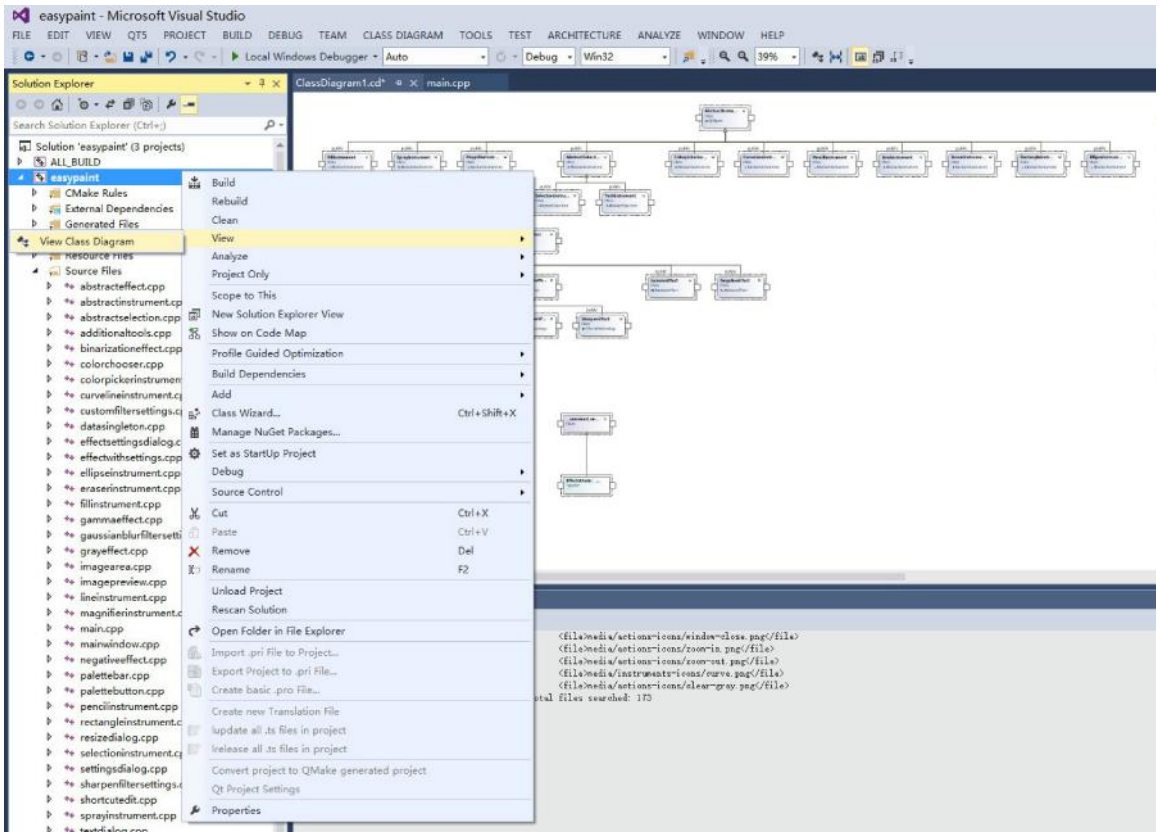

Figure 3. Class View in Visual Studio

Class View presents an overview of the project at the class level. Developers can view the methods and fields for each class. Using the option View Class Diagram, developers can construct and visualize a class diagram with only inheritance and some association relationships. You can drag and drop to view classes in the diagram. To view the parent of a class, right click on that class and select “Show Base Classes” option. To view an association between classes, right click on a class field and select “Show as Association” option.

Using Visual Studio for Impact Analysis

In Visual Studio 2013, the most useful tools for impact analysis are:

1) Go to definition
2) Find all references
3) View Call Hierarchy
4) Class View

We have already described these tools in the Concept Location part. The premise of impact analysis is that developers have located a class/struct/method/field that will change in response to a change request. As opposed to concept location, in impact analysis, developers need to find **the full extent of the change**, i.e. they need to construct the impact set as the set of all the files/classes/structs/methods/fields that might be affected by the

change. The change can propagate through dependencies which are: inheritance, aggregation, method calls, etc.

Impact Analysis (IA) starts where concept location ended. The initial impact set contains the class identified (aka. the “located” classes) during concept location; developers add incrementally potential impacted classes until **all the neighbors of the classes in the impact set are visited**. Note that in IA the programmer should inspect both clients and suppliers of an impacted class.