Programming for Engineers I
Creating a New Project in Visual Studio

Attique Dawood

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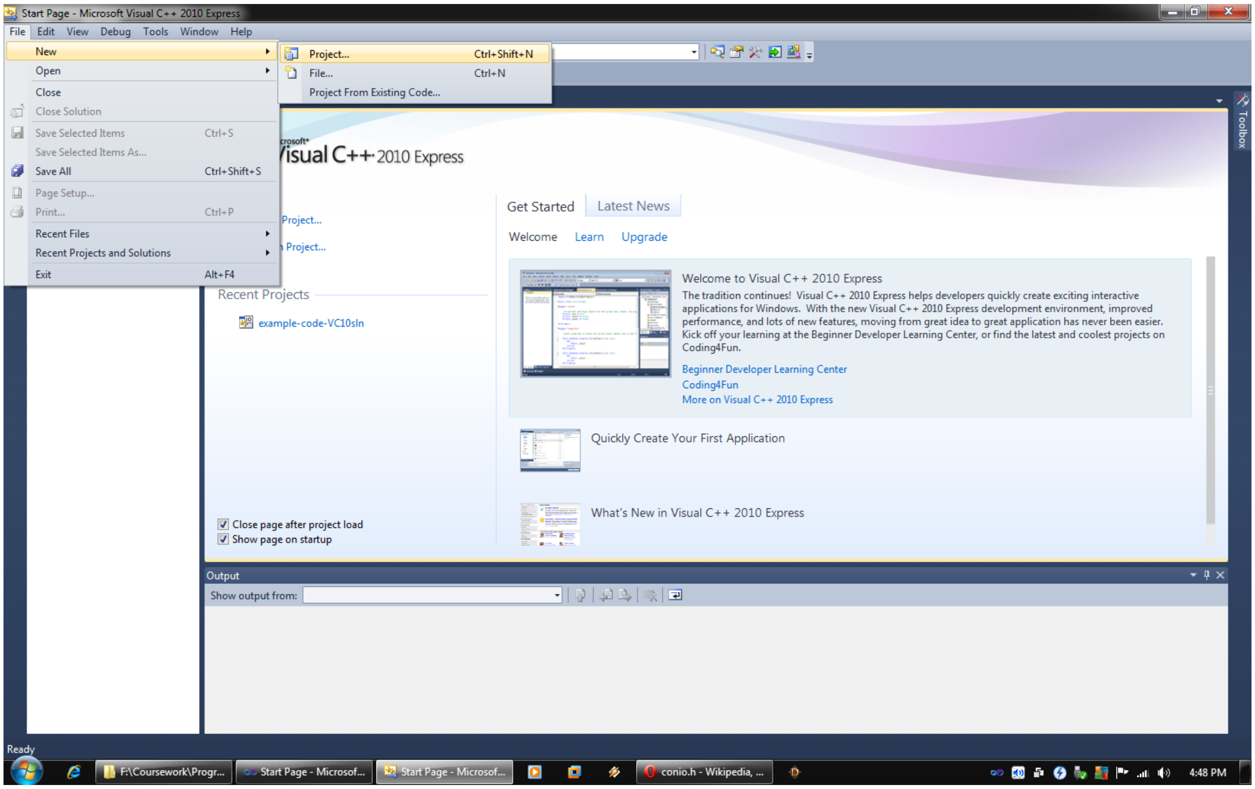
1 Solution and Projects

In Visual Studio 2003–2010 a *project* must be created before the code can be compiled into an executable (exe). A project will produce exactly one exe therefore every project must contain at least one code/.cpp file and a `main()` function. Projects are contained in something called a *solution*. A solution may contain more than one projects. Projects *must* be part of a solution even if there is only one project in a solution. Projects or code/.cpp files cannot be compiled separately.

2 Creating a New Solution and Project

2.1 New Project Dialog

In Visual Studio navigate to `File > New > Project`. A dialog box containing additional options will appear.



Welcome to Visual C++ 2010 Express

The tradition continues! Visual C++ 2010 Express helps developers quickly create exciting interactive applications for Windows. With the new Visual C++ 2010 Express development environment, improved performance, and lots of new features, moving from great idea to great application has never been easier. Kick off your learning at the Beginner Developer Learning Center, or find the latest and coolest projects on Coding4Fun.

Beginner Developer Learning Center
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More on Visual C++ 2010 Express

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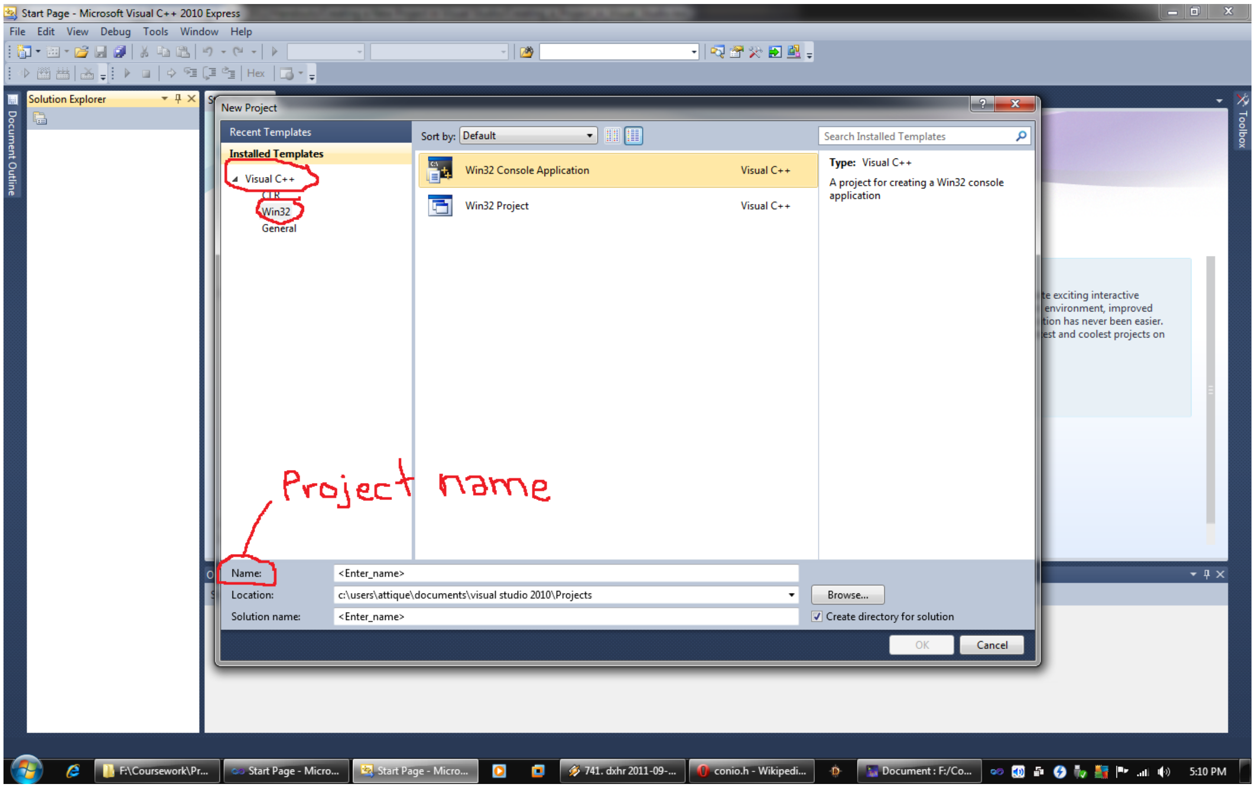
Figure 1: Creating a new project and solution



Type: Visual C++

A project for creating a Win32 console application

Name: <Enter_name>

Location: c:\users\attique\documents\visual studio 2010\Projects

Solution name: <Enter_name>

☑ Create directory for solution

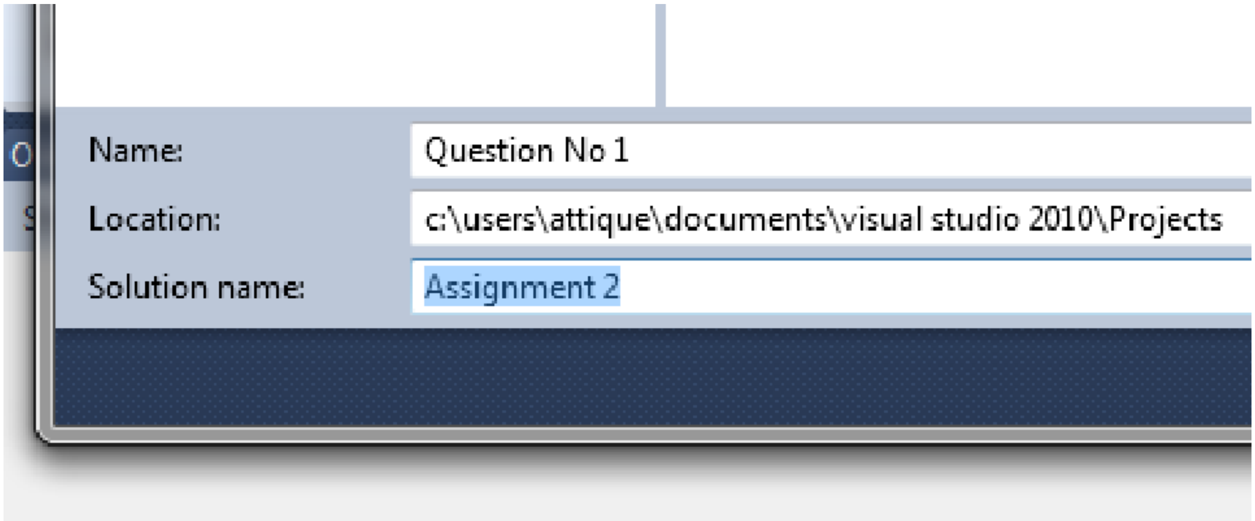
Figure 2: New Project Dialog Box

Make sure you select `Visual C++ > Win32` from the template options on the left and `Win32 Console Application` from the additional list of projects.

2.2 Naming Your Solution and Project

Most assignments require you to submit multiple programs or code/.cpp files for each exercise or question. It is a good idea to create a single solution for assignment. For each exercise or question in an assignment you can create a separate project. You have the option to build (or compile) projects in a solution at once. Also, when you open a solution file (.sln) all projects within that solution will be visible and can be managed.

For this example, we will assume that we are required to submit three programs (or exercises) from Assignment No. 2. We will name our project as `Question No 1` and the solution will be called `Assignment 2`. Notice the location or path for the solution. Your solutions are by default created in the `My Documents` folder.



Name: Question No 1

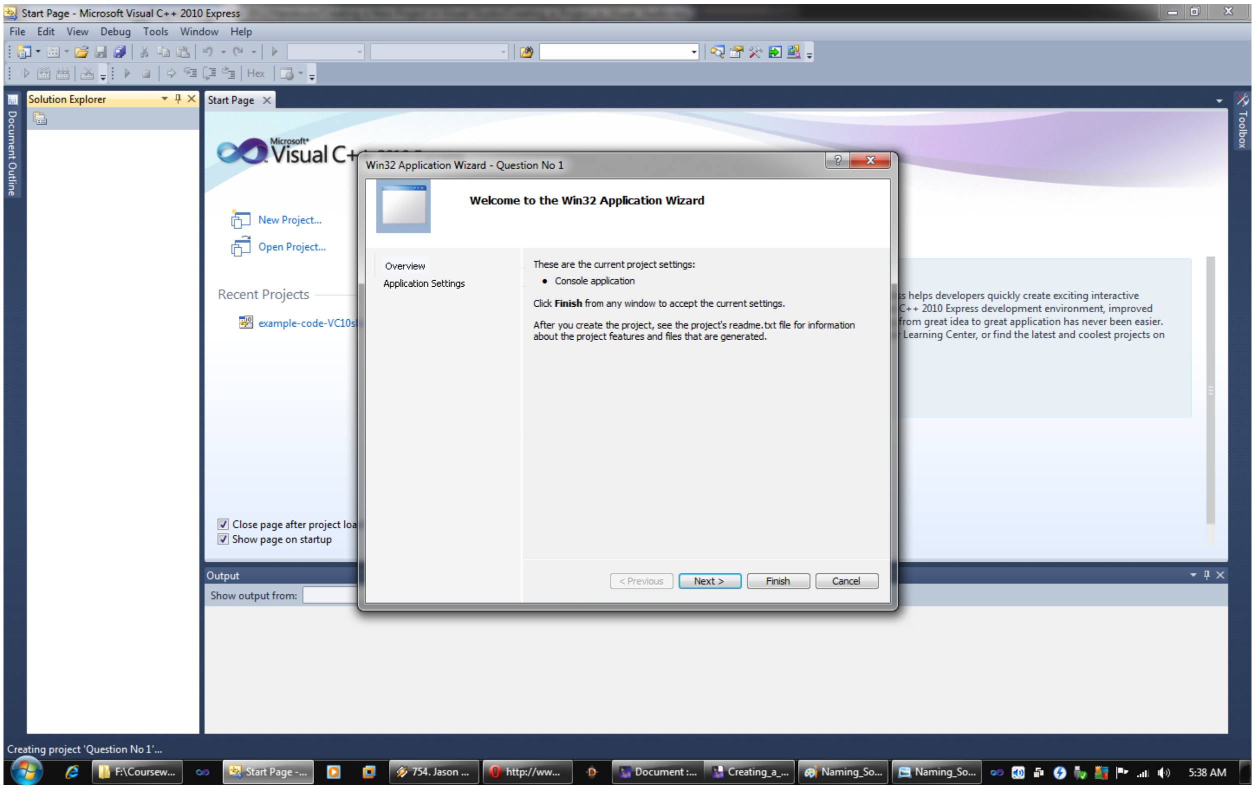
Location: c:\users\attique\documents\visual studio 2010\Projects

Solution name: Assignment 2

Figure 3: Project name, solution name and path/location

2.3 Application Settings

Click `OK` and `Win32 Application Wizard` will open. From here you ***must*** check `Empty Project` before proceeding. In the `Application Type` make sure `Console Application` is checked. Click `Finish` and your solution will be created.



Win32 Application Wizard - Question No 1

Welcome to the Win32 Application Wizard

These are the current project settings:

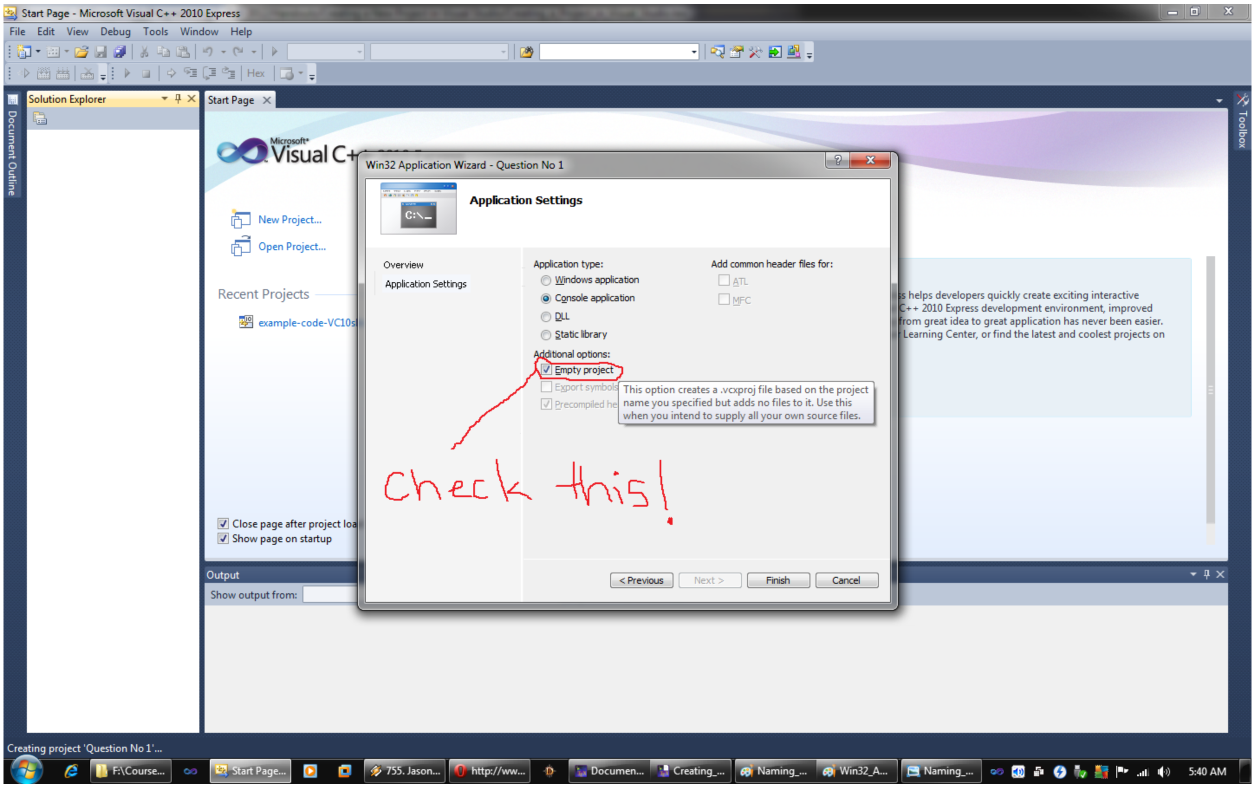
- Console application

Click **Finish** from any window to accept the current settings.

After you create the project, see the project's readme.txt file for information about the project features and files that are generated.

Creating project 'Question No 1'...

Figure 4: Win32 Application Wizard



Win32 Application Wizard - Question No 1

Application Settings

Application type:
○ Windows application
● Console application
○ DLL
○ Static library

Add common header files for:
□ ATL
□ MFC

Additional options:
☑ Empty project
□ Export symbols
☑ Precompiled header

This option creates a .vcxproj file based on the project name you specified but adds no files to it. Use this when you intend to supply all your own source files.

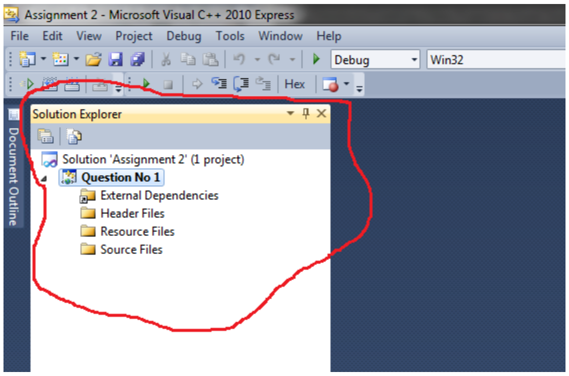
Check this!

Figure 5: Creating an empty project

3 Building/Compiling and Running Your Program

3.1 Solution Explorer

After creating your solution/project make sure that `Solution Explorer` is visible. If it is hidden, enable it by navigating to `View > Other Windows > Solution Explorer`[1] or with the short-cut key `Ctrl+Alt+L`. Solution Explorer gives an overview of your solution. You can view all the projects and code files contained in your solution space and navigate between different files and projects.



Assignment 2 - Microsoft Visual C++ 2010 Express
File Edit View Project Debug Tools Window Help
Debug
Win32
Hex
Solution Explorer
Document Outline
Solution 'Assignment 2' (1 project)
Question No 1
External Dependencies
Header Files
Resource Files
Source Files

Figure 6: The Solution Explorer Window

[1] The instructions may vary depending on the layout of Visual Studio. By default Visual C++ 2010 Express Edition has *Basic Layout*. You can change that to *Expert Layout* by navigating to `Tools > Settings > Expert Settings`.

3.2 Adding Files to Project

Before you start writing your code you need to add the .cpp source file to your project. Right-click the `Source Files` folder from Solution Explorer and `Add` a `New Item`. A new dialog box will appear. Make sure you select `C++ File (.cpp)` from the list of items. Name your file and click `Add`.

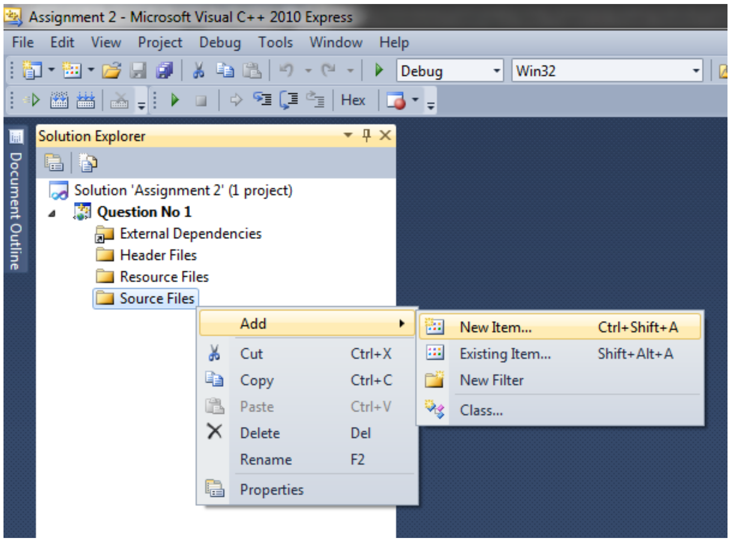
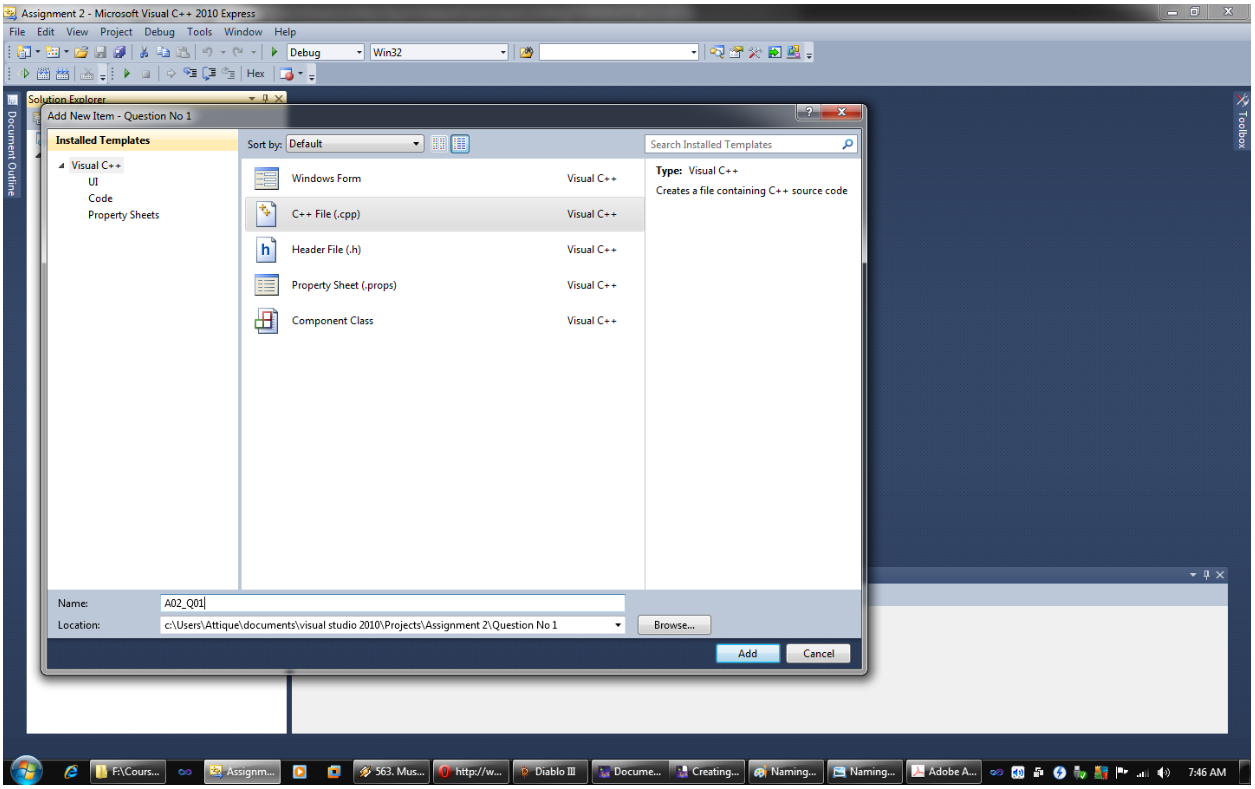


Figure 7: Adding new items to project



Type: Visual C++

Creates a file containing C++ source code

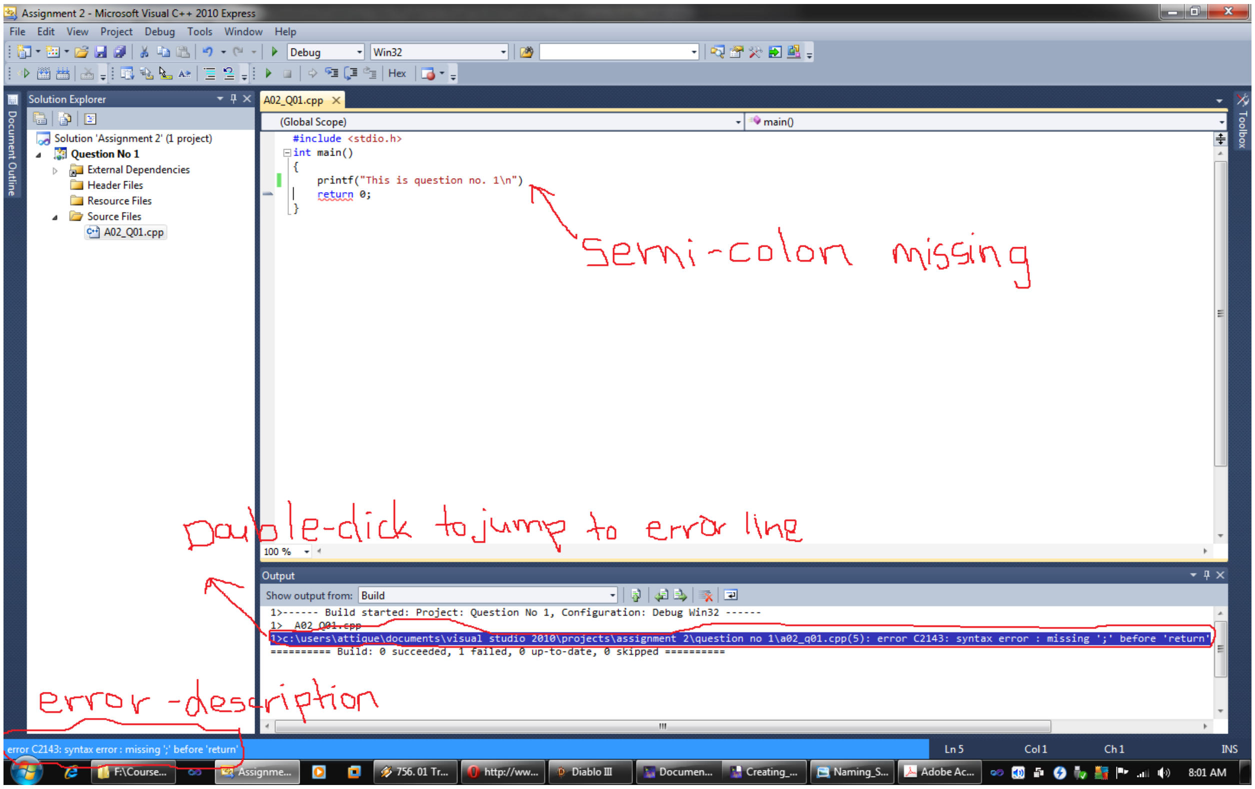
Name: A02_Q01

Location: c:\Users\Attique\documents\visual studio 2010\Projects\Assignment 2\Question No 1

Figure 8: Adding a C++ File (.cpp)

3.3 Navigating Through Errors

The solution can be built (compiled) using the F7. If build is successful, you will get the appropriate message in the output window. Otherwise, a description of all errors will be displayed in `Output` window. You can navigate through error and warning messages with F4 key. A convenient way to navigate errors is to use the `Error List`. You can bring it up by `View > Other Windows > Error List`.

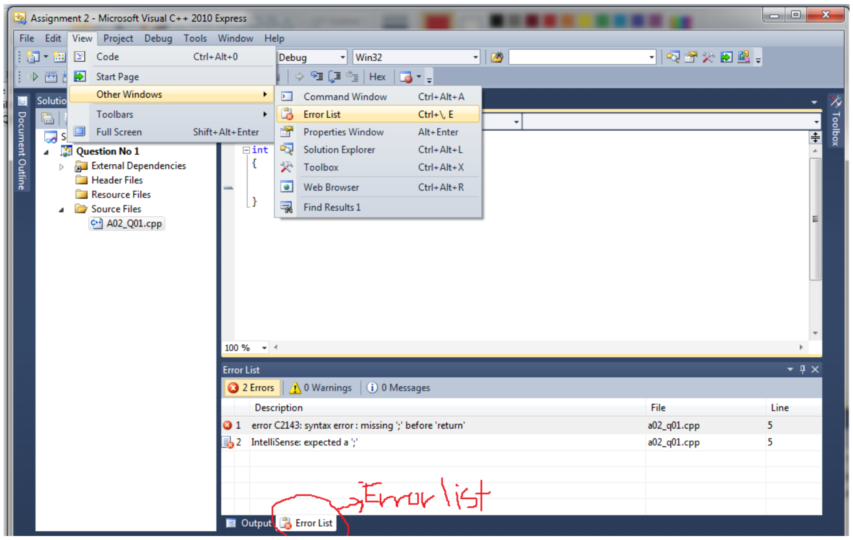


```
#include <stdio.h>
int main()
{
    printf("This is question no. 1\n")
    return 0;
}
```

```
1>------ Build started: Project: Question No 1, Configuration: Debug Win32 ------
1>  A02_Q01.cpp
1>c:\users\attique\documents\visual studio 2010\projects\assignment 2\question no 1\a02_q01.cpp(5): error C2143: syntax error : missing ';' before 'return'
========== Build: 0 succeeded, 1 failed, 0 up-to-date, 0 skipped ==========
```

error C2143: syntax error : missing ';' before 'return'

Figure 9: Error(s) during build

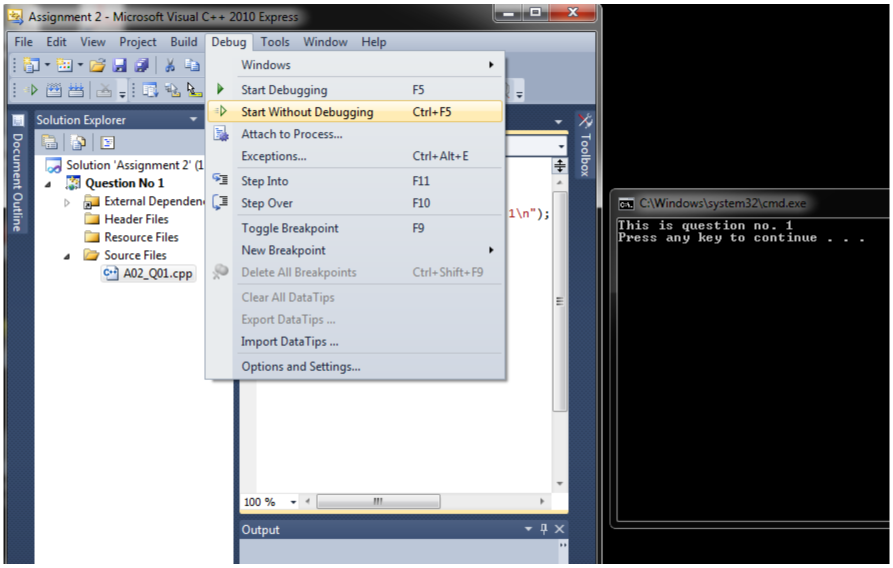


	Description	File	Line
1	error C2143: syntax error : missing ';' before 'return'	a02_q01.cpp	5
2	IntelliSense: expected a ';'	a02_q01.cpp	5

Figure 10: Displaying the Error List

3.4 Program Execution and Debugging

After a successful Build you can test your program by either running the executable (Start without Debugging, Ctrl+F5) or start debugger (F5). Debugger will stop only at any Breakpoints in the program and will exit if there aren't any breakpoints or no input directives. To single-step through your program in debug mode use the Step Over key (F10). Breakpoints can be placed by moving the cursor to desired line in your code and pressing the F9 key. Pressing F9 again will remove an already existing breakpoint.



```
This is question no. 1
Press any key to continue . . .
```

Figure 11: Program execution

4 Adding New Projects to an Existing Solution

We're now going to add a new project to our solution and name it Question No 2. In the Solution Explorer window right-click on solution name and add a new project. Follow the steps from Section 2 for creating a new empty project of type Win32 Consolte Application.

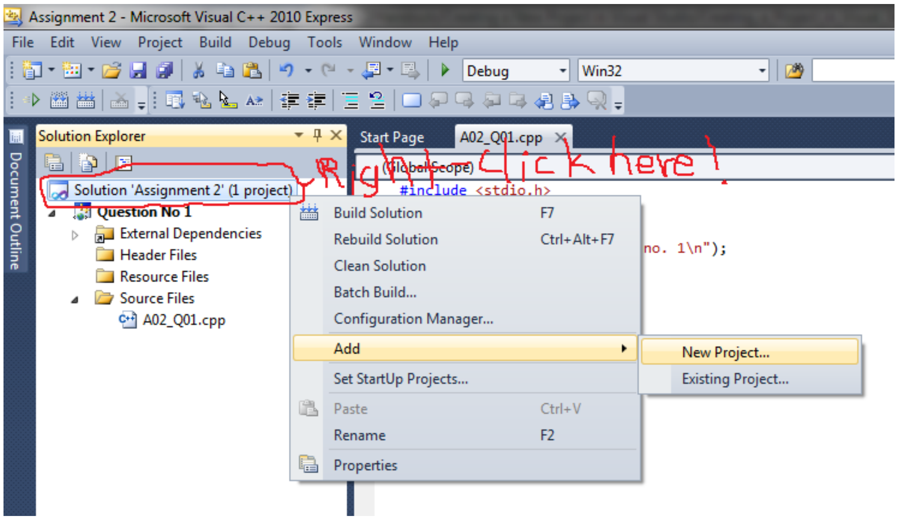
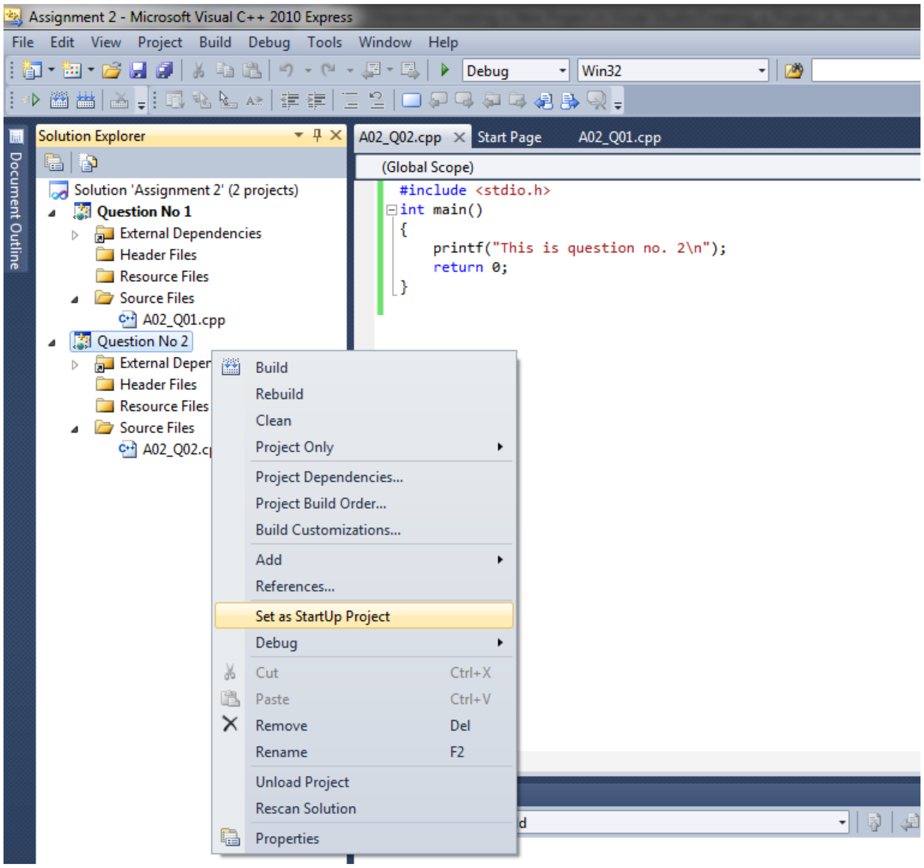


Figure 12: Adding new projects to solution

Add a C++ source file (.cpp) to your project following the steps in Section 3.2. We'll name our file `A02_Q02.cpp` here. Before you can compile and run your new project you must set it as `Active Project`. This can be done by right-clicking the project name (Question No 2 in this case) and selecting `Set as StartUp Project` from the drop down menu. Active project name will be in **bold**. Figure 14 shows the complete solution space with output window and `Question No 2` selected as active project.



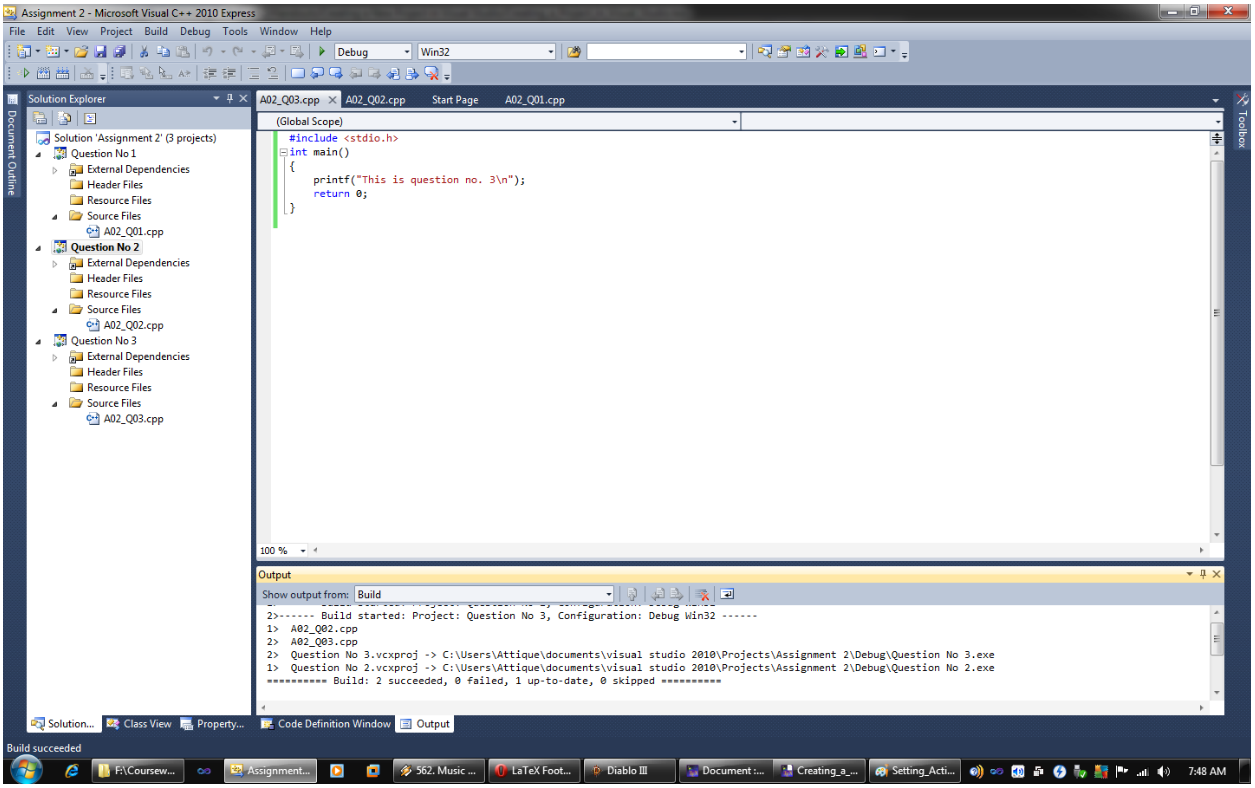
```
#include <stdio.h>
int main()
{
    printf("This is question no. 2\n");
    return 0;
}
```

Figure 13: Setting active project

5 Transferring Solutions

In order to transfer your work you need to copy the whole solution folder located in the `My Documents` folder. The solution folder contains a `[Solution Name].sln` file. You can open your solution by double-clicking on this file, provided that Visual Studio is installed on that particular computer.

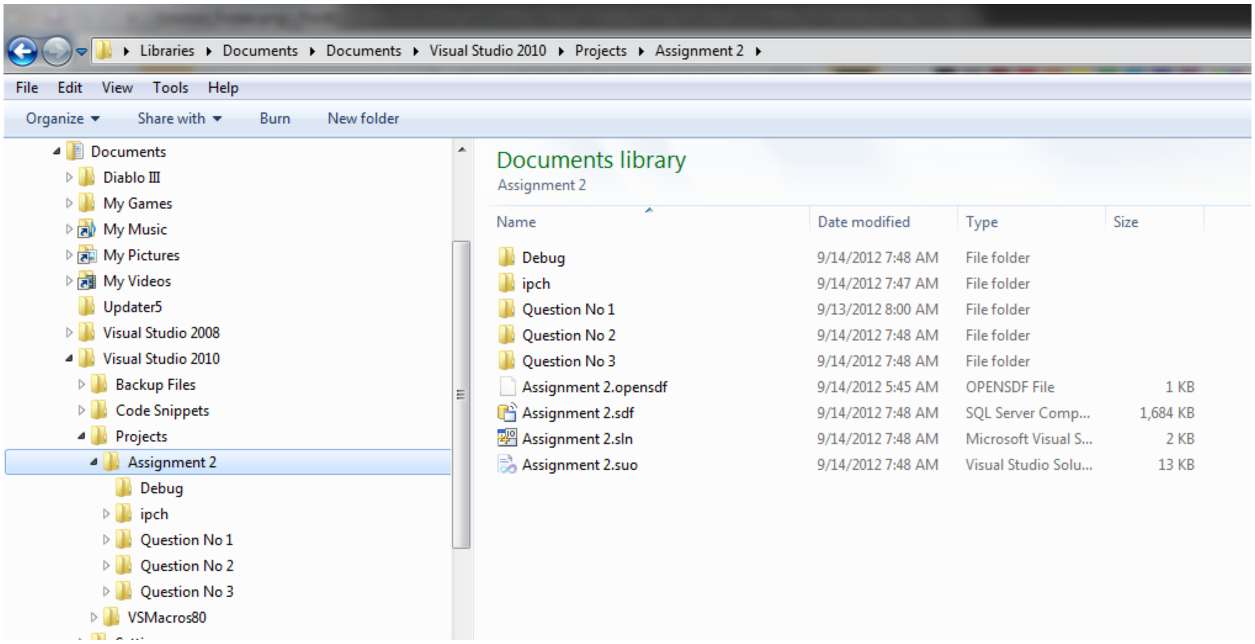
The solution folder also contains separate folders for each project in the solution. The C++ code (.cpp) files are located in their respective project folders. In order to conserve space you can delete any folders named `Debug` in the solution or project folders. You can also delete `ipch` folders or any `.sdf` files. The `Debug` folder in solution folder contains executables from each project.



```
#include <stdio.h>
int main()
{
    printf("This is question no. 3\n");
    return 0;
}
```

```
2>------ Build started: Project: Question No 3, Configuration: Debug Win32 ------
1>  A02_Q02.cpp
2>  A02_Q03.cpp
2>  Question No 3.vcxproj -> C:\Users\Attique\documents\visual studio 2010\Projects\Assignment 2\Debug\Question No 3.exe
1>  Question No 2.vcxproj -> C:\Users\Attique\documents\visual studio 2010\Projects\Assignment 2\Debug\Question No 2.exe
========== Build: 2 succeeded, 0 failed, 1 up-to-date, 0 skipped ==========
```

Figure 14: Final solution space



Name	Date modified	Type	Size
Debug	9/14/2012 7:48 AM	File folder	
ipch	9/14/2012 7:47 AM	File folder	
Question No 1	9/13/2012 8:00 AM	File folder	
Question No 2	9/14/2012 7:48 AM	File folder	
Question No 3	9/14/2012 7:48 AM	File folder	
Assignment 2.opensdf	9/14/2012 5:45 AM	OPENSDF File	1 KB
Assignment 2.sdf	9/14/2012 7:48 AM	SQL Server Comp...	1,684 KB
Assignment 2.sln	9/14/2012 7:48 AM	Microsoft Visual S...	2 KB
Assignment 2.suo	9/14/2012 7:48 AM	Visual Studio Solu...	13 KB

Figure 15: Solution folder