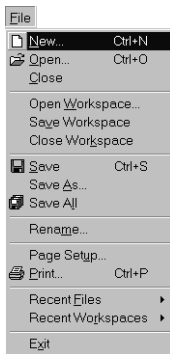


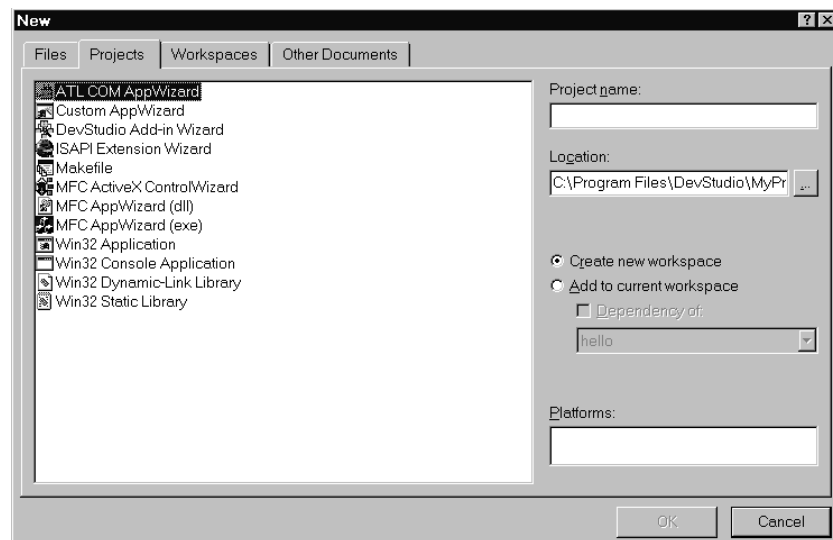
Appendix B - Microsoft Visual C++

Chapter Two introduced object-oriented programming with C++ and explained how a program is compiled before it can be run on the computer. This appendix introduces how to use the Microsoft Visual C++, version 5.0 and version 6.0 for Windows compiler.


B.1 Entering a Program in Visual C++

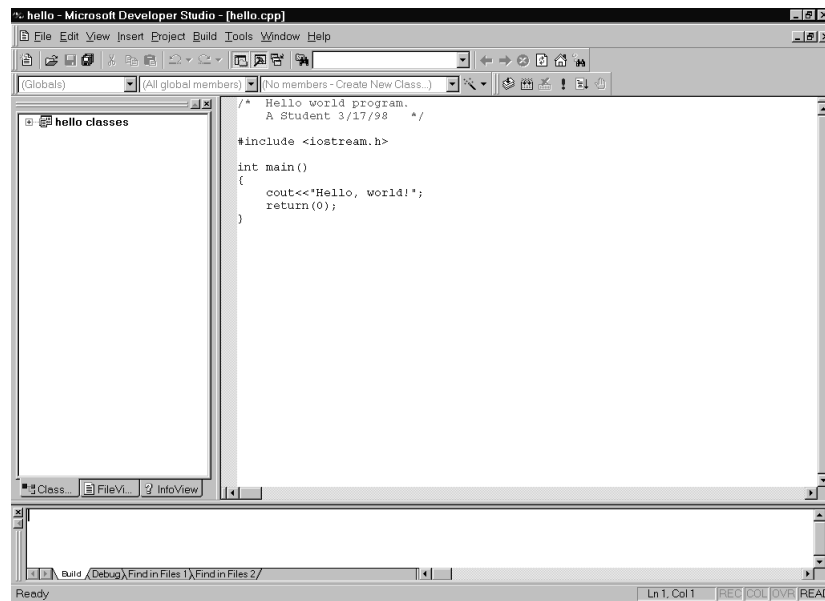


When Visual C++ is started, the *Integrated Development Environment (IDE)* window is displayed. Before entering a program, a project workspace needs to be created. The *project workspace* stores the files associated with a program's executable file. To create a new project workspace, select the New command (Ctrl+N) from the File menu and then select the Projects tab in the New dialog box:




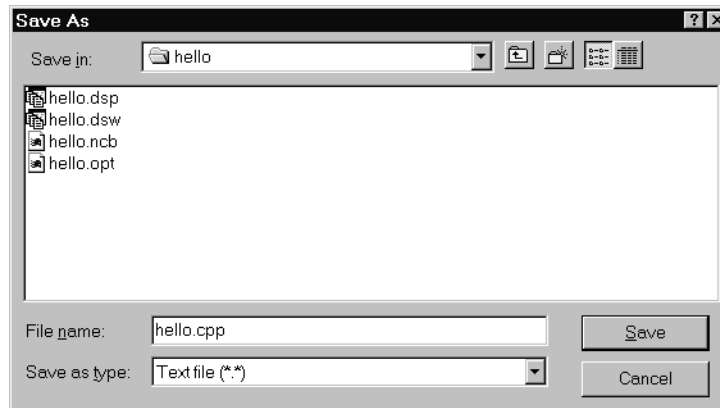
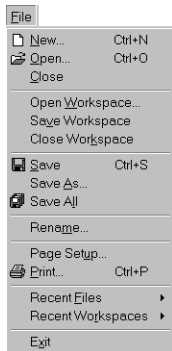
Select Win32 Console Application from the list. Typing a descriptive name in the Project name entry box and then selecting the OK button will create a project workspace. In Visual C++, version 6.0 a dialog box is displayed asking what kind of console application to created. Select the An empty project option, then the Finish button and then OK.

After the project workspace has been created, a program can be typed in an edit window. To display the edit window, select the New command from the File menu and then select Text File from the Files options in the New dialog box or click on the New Text File button () on the Tool bar. In the example on the next page, a project workspace was created and then the Hello world program typed into the edit window:



The Visual C++ IDE window and edit window

After entering a program, it is saved by selecting the Save command (Ctrl+S) from the File menu or by clicking on the Save button () on the Tool bar. The first time a program is saved, Visual C++ displays a dialog box where a descriptive program name is typed with the extension .cpp. For the program above, the name hello.cpp was used:



When finished working in Visual C++, the Exit command from the File menu is selected to close any edit windows and remove the Visual C++ IDE window from the Desktop.

Review 1

In this review, you will enter the Hello world program.

1) CREATE A PROJECT WORKSPACE

- a. Start Visual C++. The IDE window is displayed.
- b. From the File menu, select the New command. The New dialog box is displayed.
- c. Select the Projects tab and then Win32 Console Application.
- d. Type hello in the Project name entry box.
- e. Select the OK button to create a project workspace named hello. Visual C++, version 6.0 users select An empty project, then the Finish button and then OK.

2) ENTER A PROGRAM

- a. On the Tool bar, click on the New Text File button (📄). A blank edit window is displayed.
- d. In the edit window, type the following program:

```

/*Hello world program.
   Your Name Date    */

#include <iostream.h>

int main()
{
    cout << "Hello, world!";
    return(0);
}

```

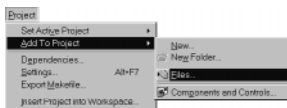
3) SAVE THE PROGRAM

- a. From the File menu, select the Save command. The Save As dialog box is displayed.
- b. Type hello.cpp to replace the default file name.
- c. Select the Save button. The file name hello.cpp is now displayed at the top of the edit window.

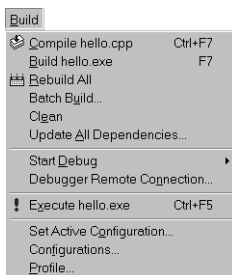
4) EXIT VISUAL C++

From the File menu, select the Exit command. The program's edit window is closed and the Visual C++ IDE window is removed from the screen.

B.2 Compiling



After the C++ source code has been saved, the file needs to be added to the project workspace before it can be compiled. To do this, select the Add To Project command from the Project menu and then select the Files command from the submenu. Next, select the file name with the .cpp extension and select the OK button.



Visual C++ automatically compiles the C++ source code into the object code and links the object code to create the executable file when the Build <project name>.exe command (F7) from the Build menu is selected or the Build button on the Tool bar (🔧) is clicked. The program, in linked object form, is then executed and the output displayed in a window by selecting the Execute <project name>.exe command (Ctrl+F5) from the Build menu or by clicking on the Execute Program button (▶) on the Tool bar. For example, when the Hello world program is run its output looks similar to:

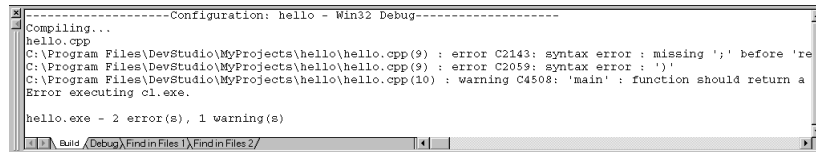


A program's output is displayed in a window

At the end of the program output, the text `Press any key to continue` is automatically displayed. Pressing a key closes the output window.

B.3 Errors

The Visual C++ compiler will notify you of any syntax errors when the program is compiled. A message is displayed at the bottom of the Visual C++ IDE window listing possible causes for errors:



```


-----Configuration: hello - Win32 Debug-----
Compiling...
hello.cpp
C:\Program Files\DevStudio\MyProjects\hello\hello.cpp(9) : error C2143: syntax error : missing ';' before 're
C:\Program Files\DevStudio\MyProjects\hello\hello.cpp(9) : error C2059: syntax error : ')'
C:\Program Files\DevStudio\MyProjects\hello\hello.cpp(10) : warning C4508: 'main' : function should return a
Error executing cl.exe.

hello.exe - 2 error(s), 1 warning(s)
  
```

The Message window lists probable causes for compilation errors

B.4 More on Using Visual C++

opening a program

To open a program previously saved on disk, its project workspace needs to be opened by selecting the **Open Workspace** command from the file menu. A project workspace file has the extension `.dsw`. The program stored in the workspace is automatically displayed in an edit window. If the program is not displayed, it can be opened by using the **Open** command from the File menu or the **Open** button on the Tool bar ().

printing a program

When the edit window is active, the **Print** command from the File menu is used to print a program. Before printing, it is important to save the program.

Review 2

In this review you will run the Hello world program.

1) OPEN THE HELLO.DSW PROJECT WORKSPACE

- a. Start Visual C++.
- b. From the File menu, select the **Open Workspace** command. The **Open Workspace** dialog box is displayed.
- c. Double-click on the `hello` folder.
- d. Select `hello.dsw`.
- e. Select **Open**. The project workspace is opened and the `hello.cpp` program is displayed in an edit window.

2) PRINT THE PROGRAM

- a. From the File menu, select the **Print** command. The **Print** dialog box is displayed.
- b. Select **OK** to accept the default options and print a copy of the program's source code.

3) ADD THE PROGRAM TO THE WORKSPACE

- a. From the Project menu, select the **Add to Project** command and from the submenu select the **Files** command. A dialog box is displayed.
- b. Select `hello.cpp` and then the **OK** button.

4) RUN THE PROGRAM

- a. From the Build menu, select the Build hello.exe command. The program is compiled. If there are no errors the program is also linked.

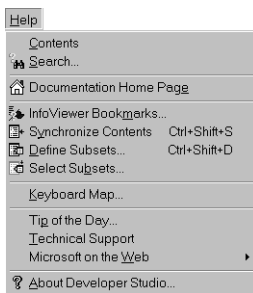
If the program has errors, they must be corrected and then the Build hello.cpp command selected again to compile and link the program.

- b. From the Build menu, select the Execute hello.exe command. The output from the program is displayed in a window.

5) CLOSE THE FILE AND EXIT VISUAL C++

- a. Press any key on the keyboard to close the output window.
- b. Click on the Close button in the upper-right corner of the edit window to close it.
- c. From the File menu, select Exit.

B.5 Using Help



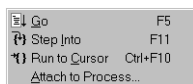
The Help menu provides commands that can be selected to display online information. Selecting the Contents command displays a list of various help topics.

The Search command allows you to search on a specific topic that you enter.

Pressing the F1 key brings up context sensitive online help. For example, when entering a program in an edit window, pressing the F1 key when the cursor is on a keyword displays a window with information about that keyword.

B.6 Debugging with Visual C++

Visual C++ has tools that are useful for debugging and testing loops. The Step Into command (F11) in the Start Debug submenu from the Build menu is for watching and controlling program execution one statement at a time. The Watch window that is displayed while debugging is for watching the values of variables as they change during program execution.



The Step Into command can help detect errors in logic. To “step through” a program in the edit window, the F11 key is pressed to place an arrow next to the first executable statement. Pressing F11 again executes the statement and moves the arrow to the next executable statement. This process may be continued for the entire program, or the Stop Debugging command (Shift+F5) from the Debug menu is selected to stop program execution.

Errors in a program can become more obvious if the values of variables are known throughout program execution. Highlighting a variable name in the edit window and dragging it to the Watch window at the bottom of

the Visual C++ IDE window adds the variable name. The values of variables in the Watch window are updated as the statements in the program are executed. The Watch window is most useful when stepping through a program.

B.7 Libraries

All C++ compilers include standard libraries that can be used in programs, such as the `iostream` library. However, each compiler may have additions to a library that are specific to that compiler. Below are notes about the libraries used in this text:

iostream.h

To format output in a field, as done in Chapter Three, alignment can be changed from left to right by first unsetting the left alignment before setting the alignment to right. For example, to change a field's alignment from left to right, the following statements are required:

```
cout.unsetf(ios::left);  
cout.setf(ios::right);
```

Please refer to the `readme.txt` file supplied on disk for more information about the libraries used in the text.