

# برنامه نویسی سیستمی



## Windows Internals

کاوه حقیقی

# برنامه نویسی سیستمی با C / C++

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# Create a new project

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C++ All platforms All project types

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- Visual Studio Package C++
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**Empty Project** New  
Start from scratch with C++ for Windows. Provides no starting files.  
C++ Windows Console

**Console App** New  
Run code in a Windows terminal. Prints "Hello World" by default.  
C++ Windows Console

**CMake Project** New  
Build modern, cross-platform C++ apps that don't depend on .sln or .vcxproj files.  
C++ Windows Linux Console

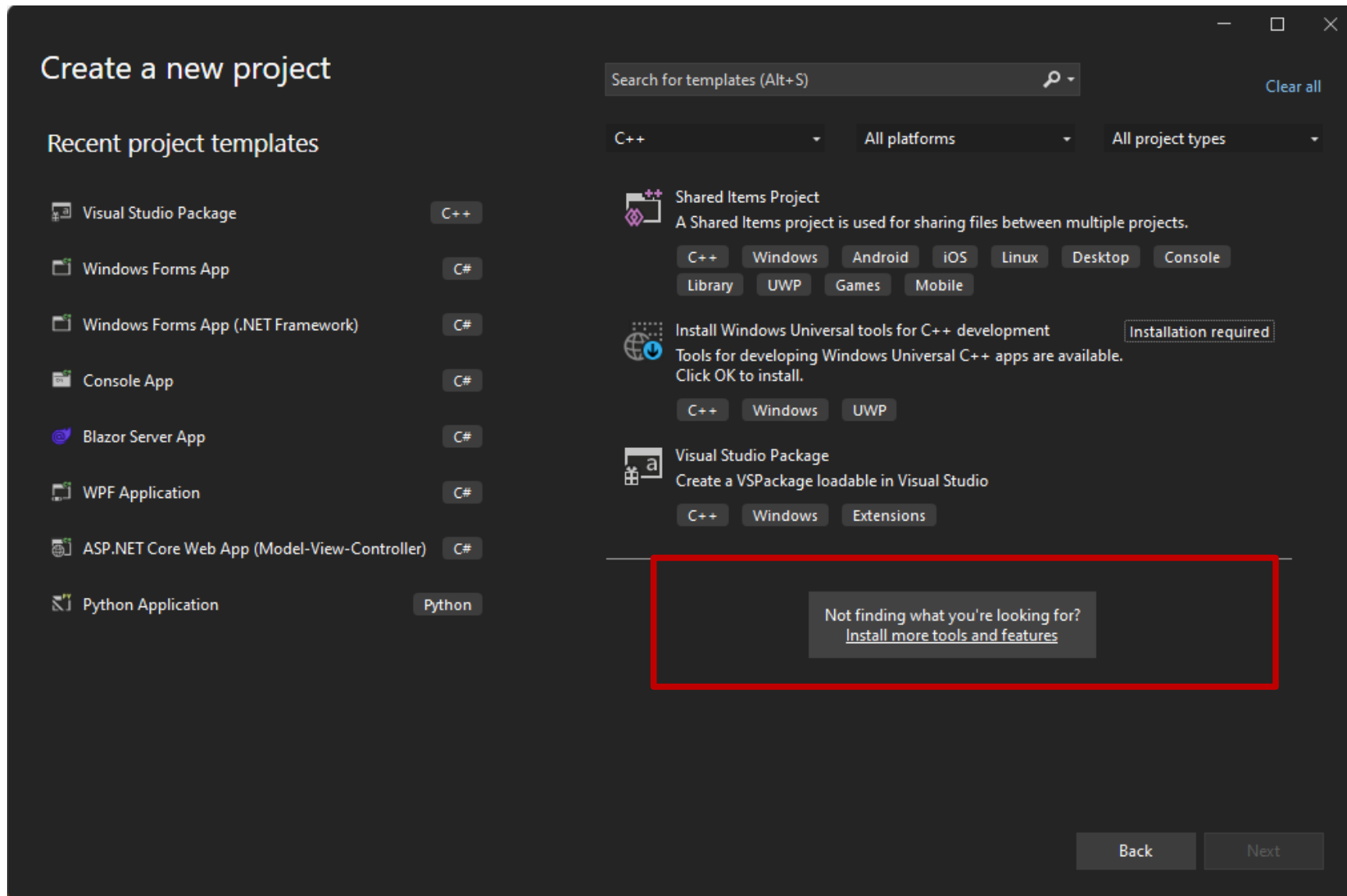
**Windows Desktop Wizard** New  
Create your own Windows app using a wizard.  
C++ Windows Desktop Console Library

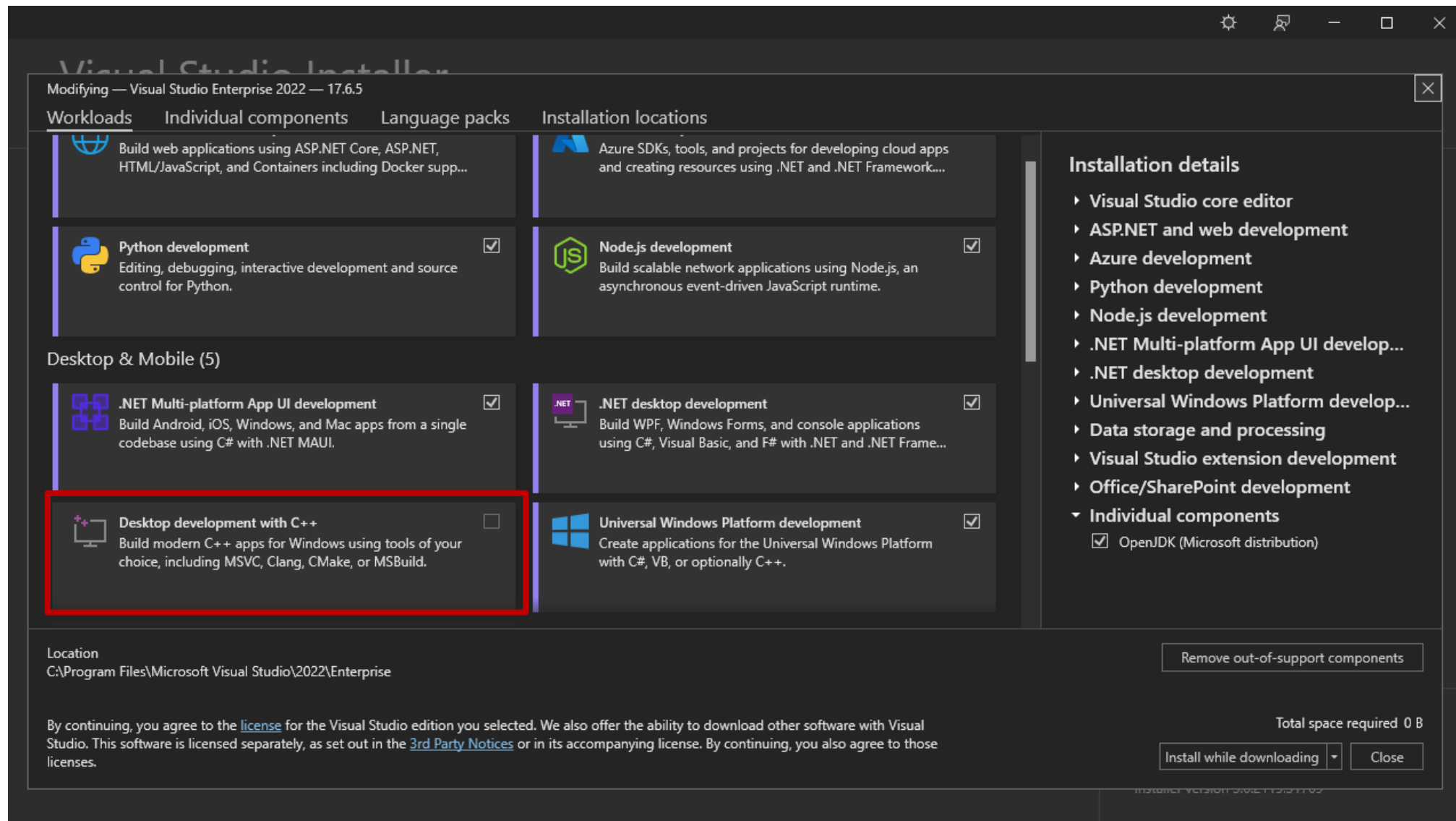
**Windows Desktop Application** New  
A project for an application with a graphical user interface that runs on Windows.  
C++ Windows Desktop

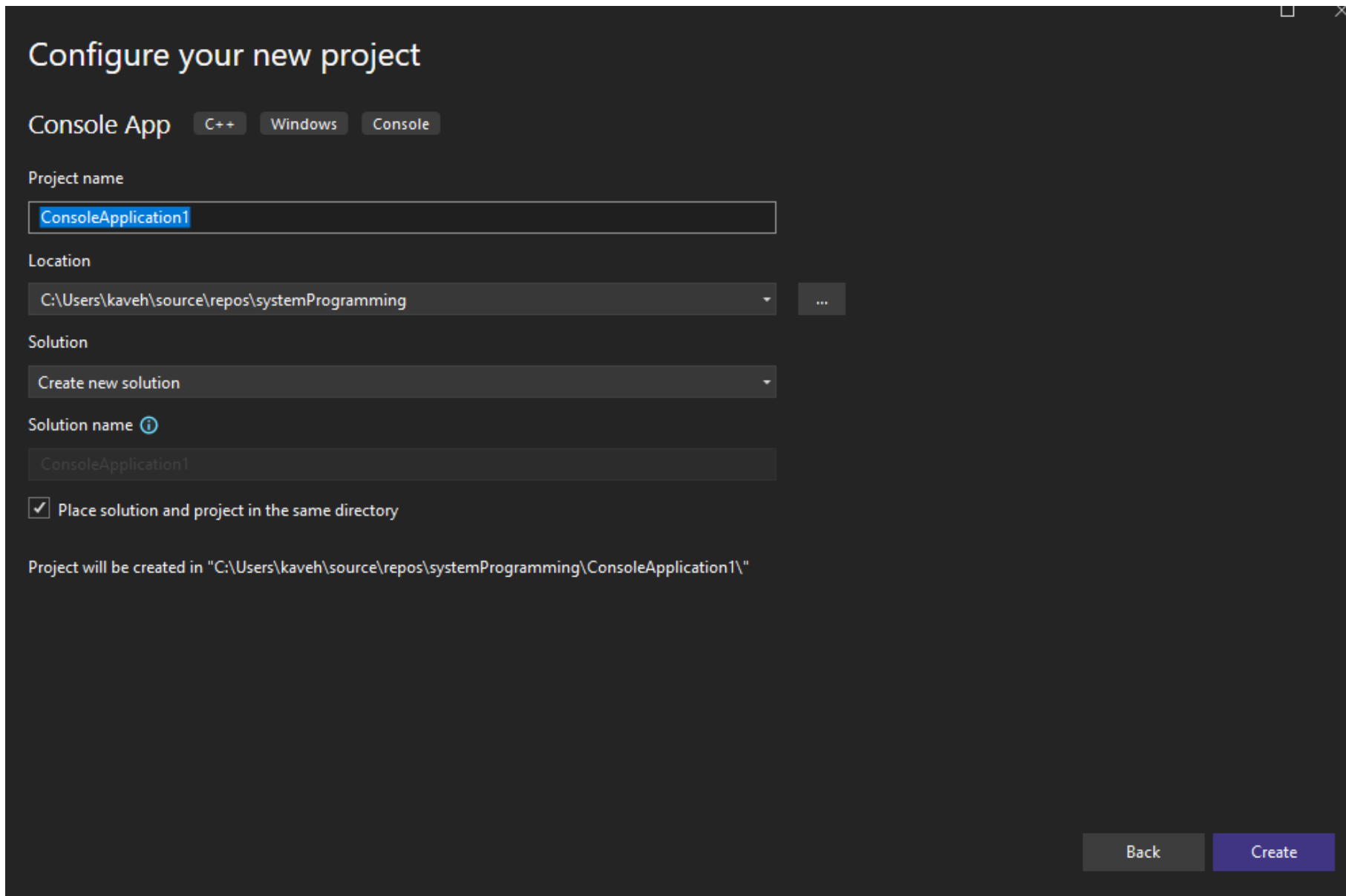
**Dynamic-Link Library (DLL)** New  
Build a .dll that can be shared between multiple running Windows apps.

Back Next

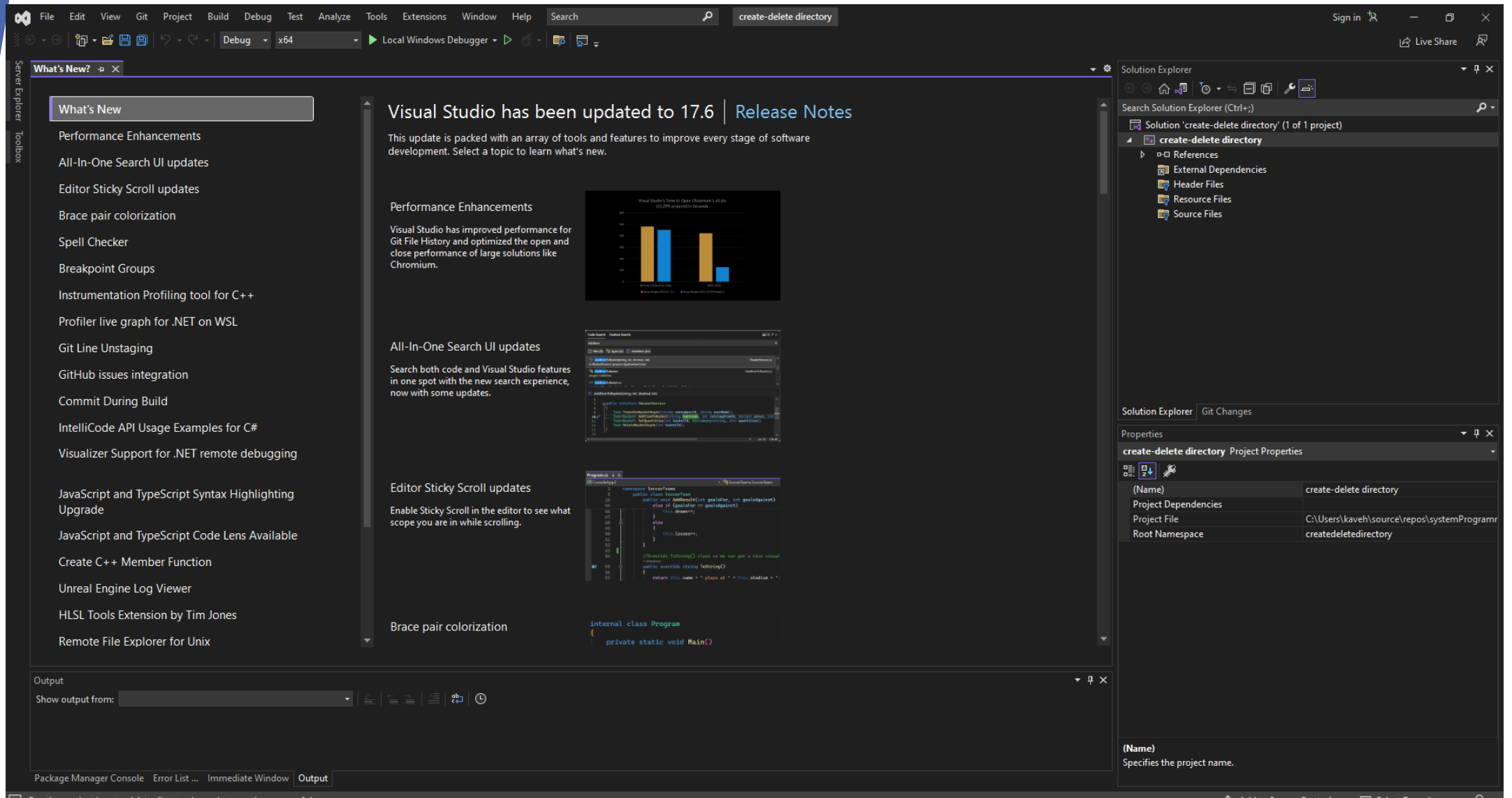
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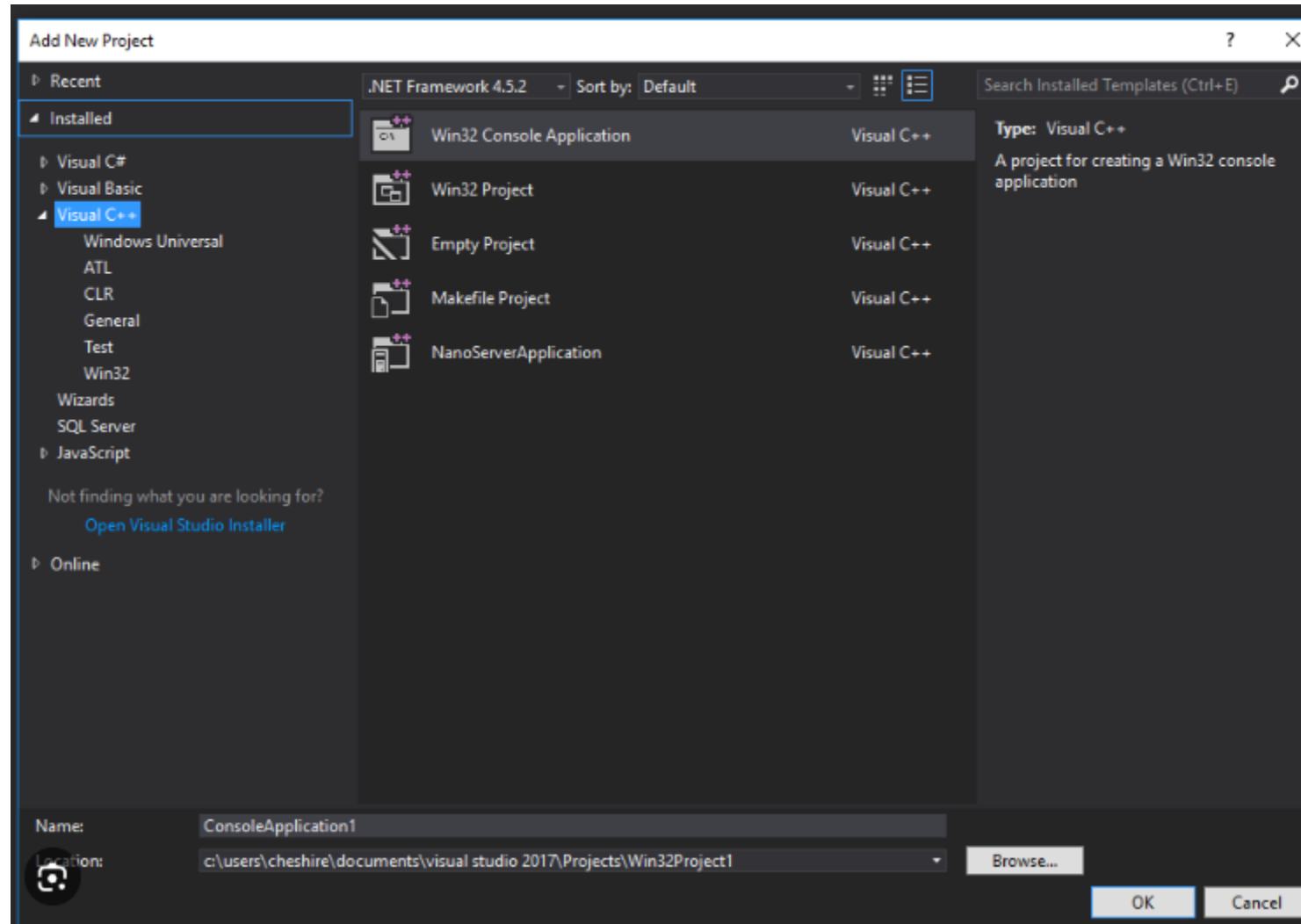




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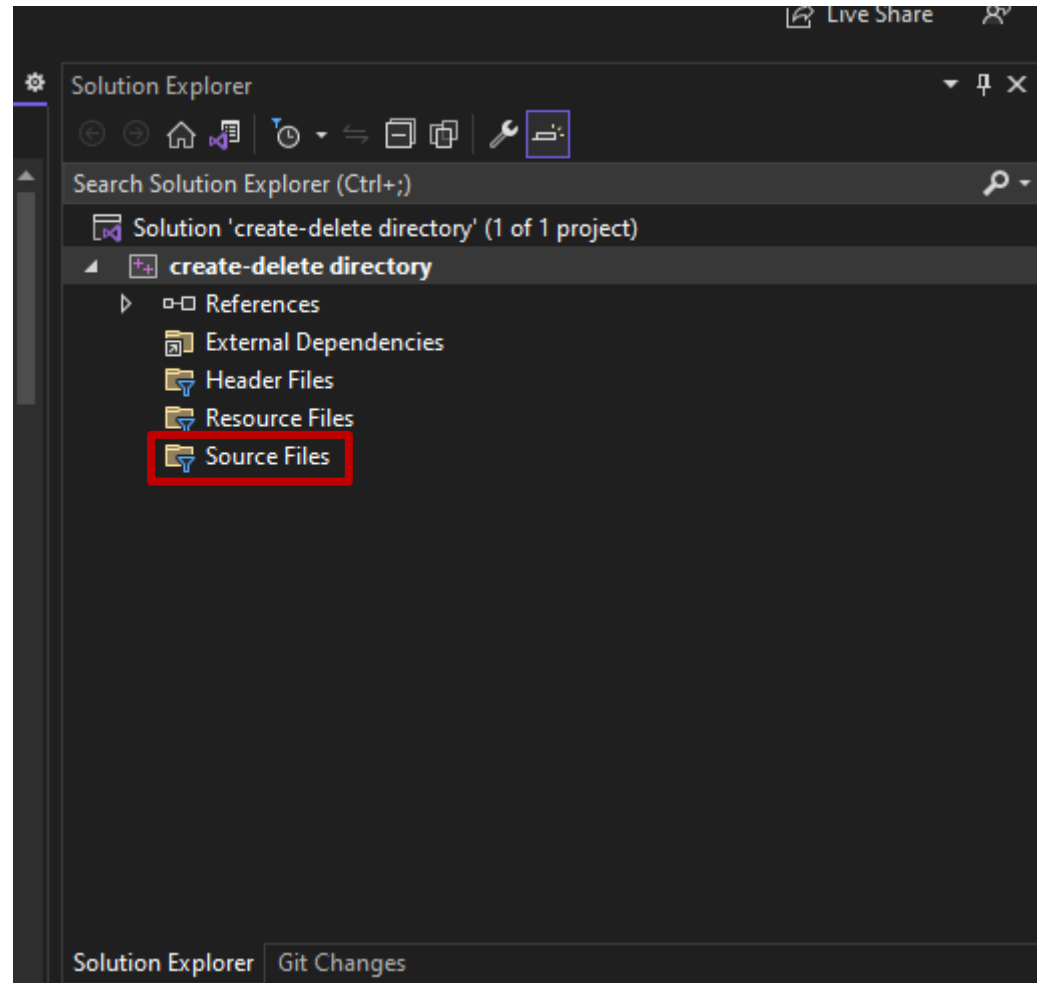


# VS 2017

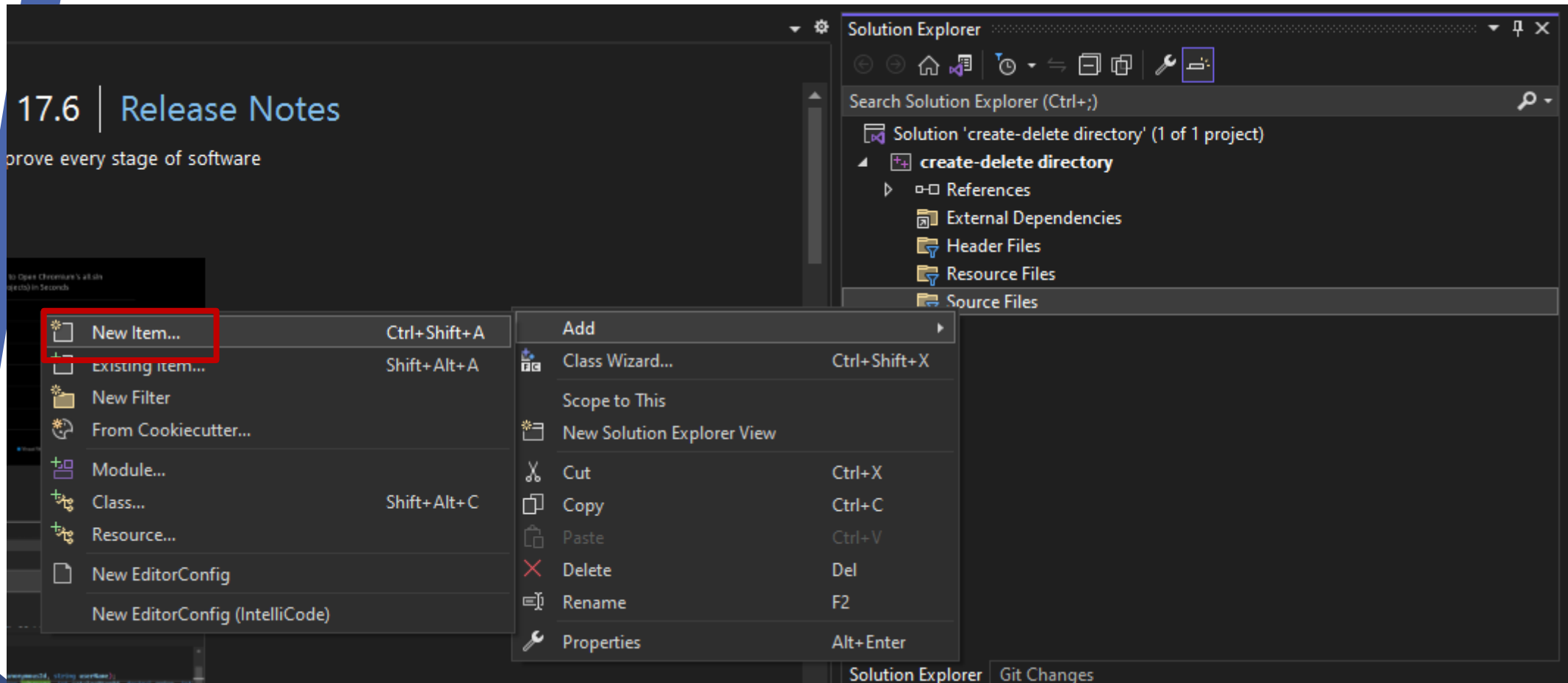


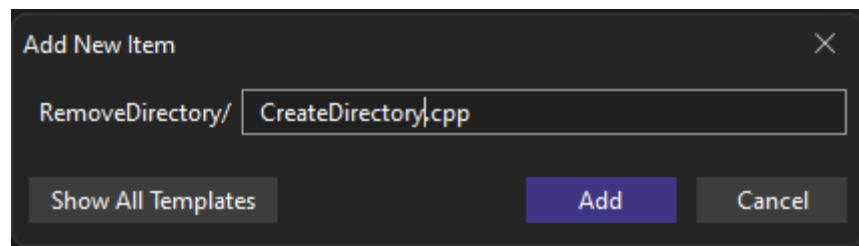
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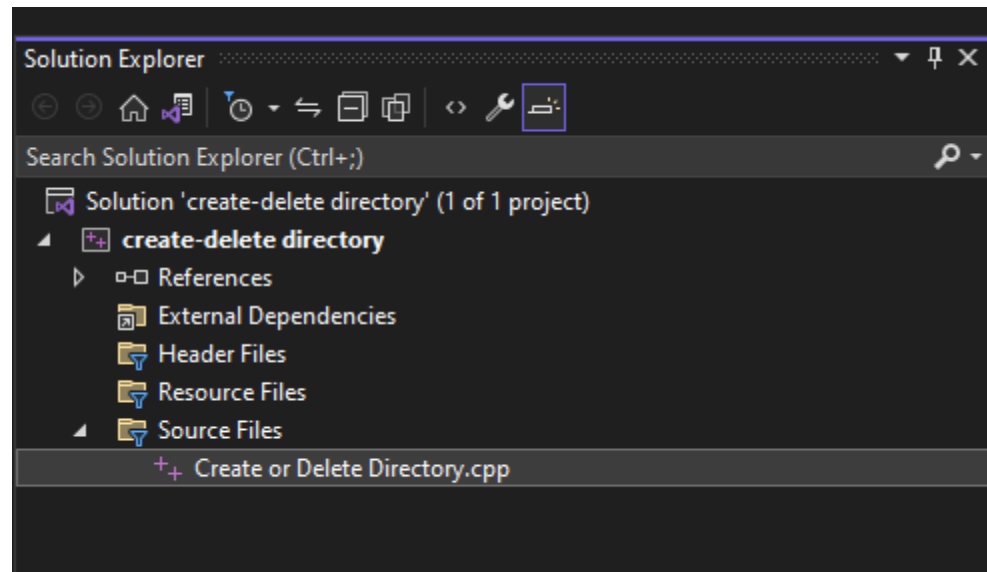


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کاوه حقیقی - برنامه نویسی سیستمی




```
Create or De...irectory.cpp*  ×
create-delete directory (Global Scope)
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CreateDirectory()
8     }
    BOOL CreateDirectoryW(LPCWSTR lpPathName, LPSECURITY_ATTRIBUTES lpSecurityAttributes)
```

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# Syntax

C++

 Copy

```
BOOL CreateDirectoryW(  
    [in] LPCWSTR lpPathName,  
    [in, optional] LPSECURITY_ATTRIBUTES lpSecurityAttributes  
);
```

## Parameters

[in] lpPathName

The path of the directory to be created.

By default, the name is limited to MAX\_PATH characters. To extend this limit to 32,767 wide characters, prepend "\\?" to the path. For more information, see [Naming Files, Paths, and Namespaces](#).

### Tip

Starting with Windows 10, Version 1607, you can opt-in to remove the MAX\_PATH limitation without prepending "\\?\". See the "Maximum Path Length Limitation" section of [Naming Files, Paths, and Namespaces](#) for details.

[in, optional] lpSecurityAttributes

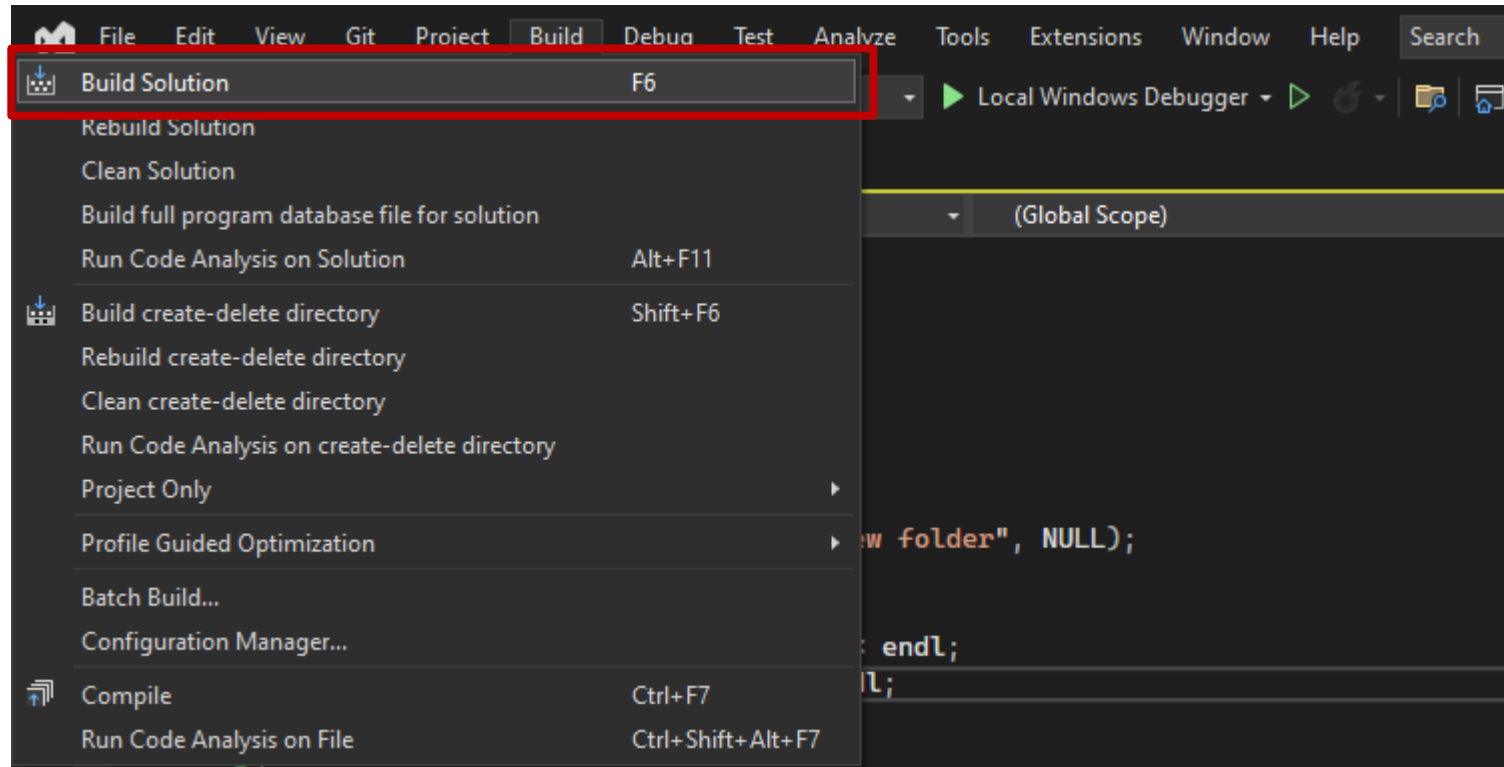
A pointer to a SECURITY\_ATTRIBUTES structure. The lpSecurityDescriptor member of the structure specifies a security descriptor for the new directory. If lpSecurityAttributes is NULL, the directory gets a default security descriptor. The ACLs in the default security descriptor for a directory are inherited from its parent directory.

The target file system must support security on files and directories for this parameter to have an effect. (This is indicated when [GetVolumeInformation](#) returns FS\_PERSISTENT\_ACLS.)

## Return value

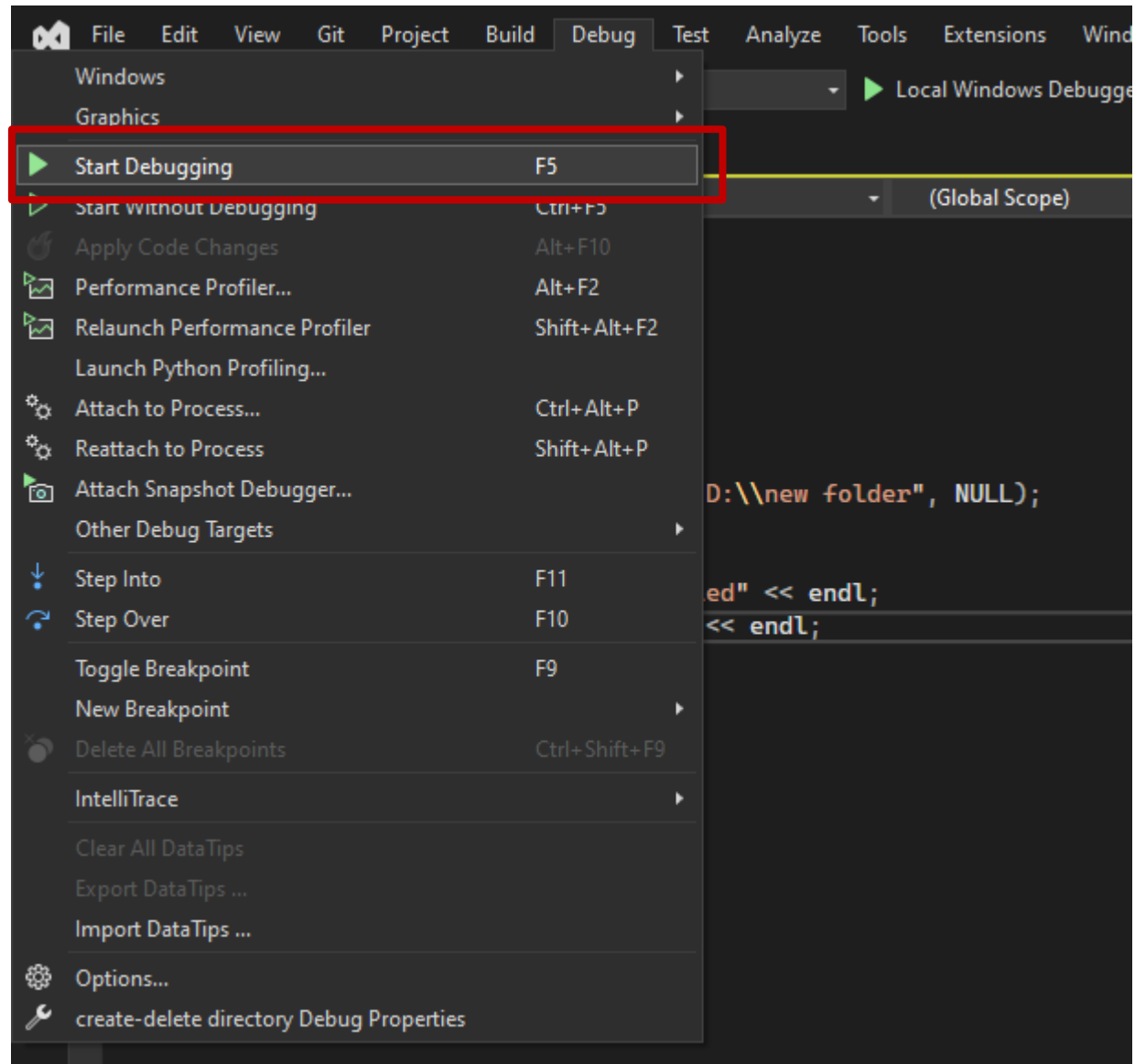
If the function succeeds, the return value is nonzero.

```
Create or De...irectory.cpp*  X
create-delete directory (Glob
1  #include<windows.h>
2  #include<iostream>
3  using namespace std;
4
5  int main()
6  {
7      CreateDirectory(L"D:\\new folder", NULL);
8  }
```



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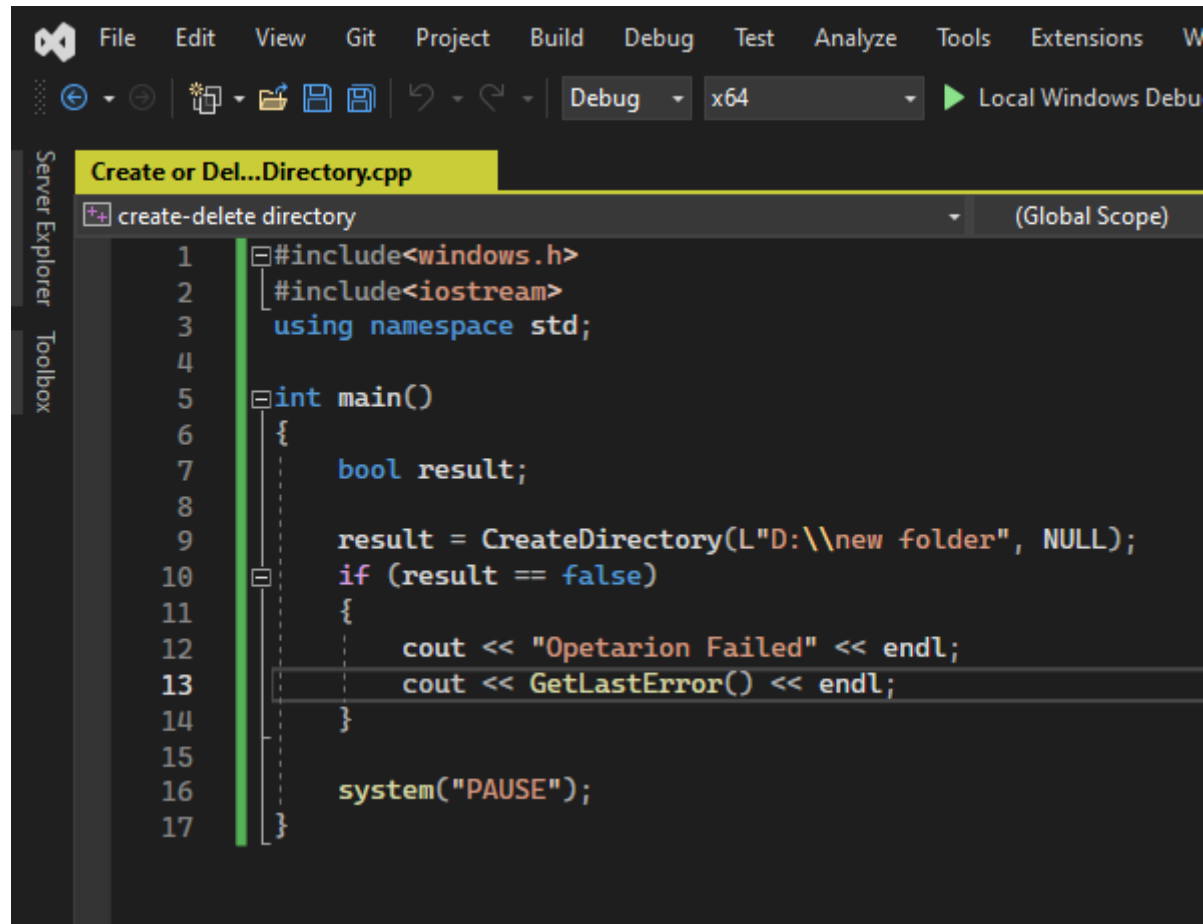




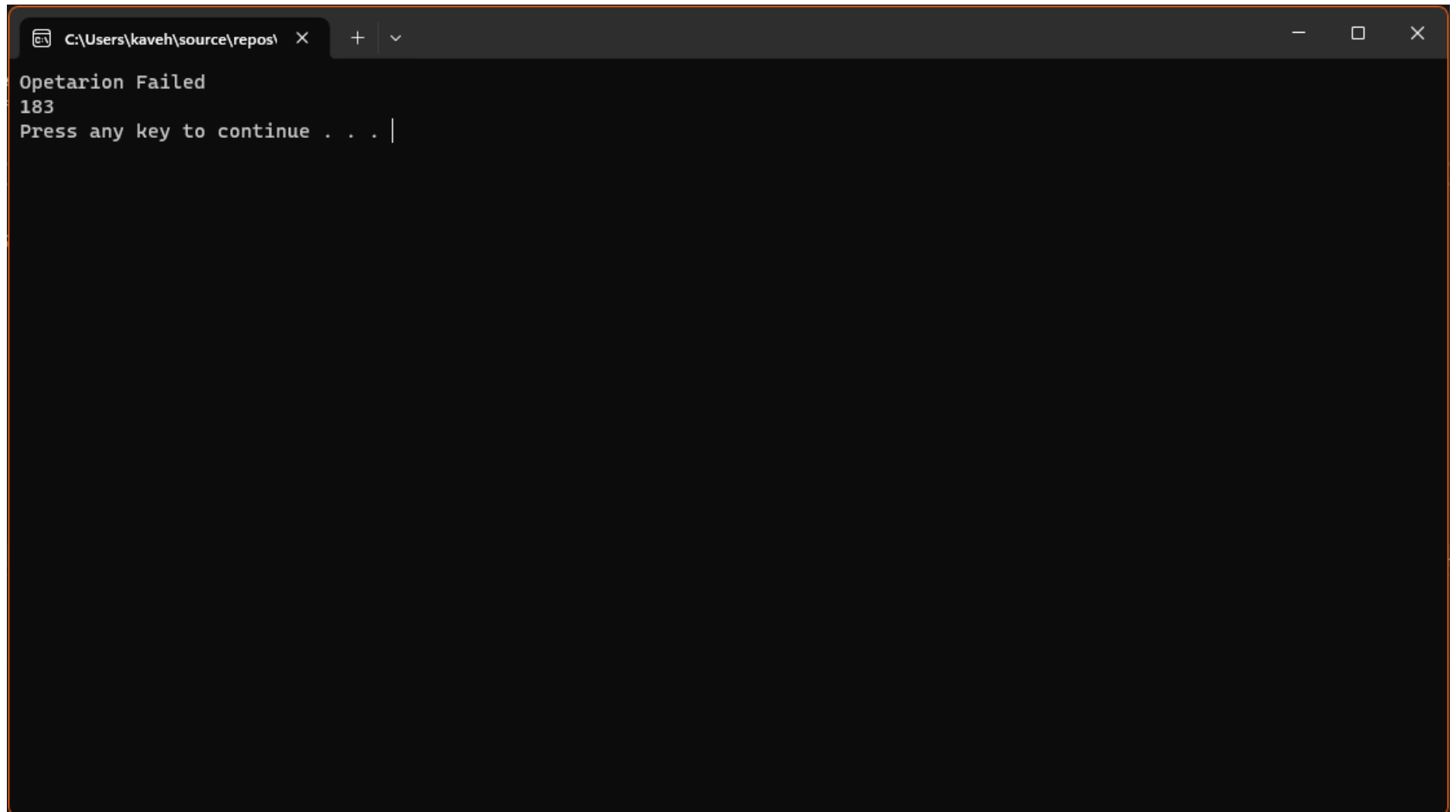
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پس از اجرا پنجره کنسول باز و بسته می شود.

```
Create or De...irectory.cpp*  ×
create-delete directory (Global Scope)
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CreateDirectory()
8
9     BOOL CreateDirectoryW(LPCWSTR lpPathName, LPSECURITY_ATTRIBUTES lpSecurityAttributes)
```

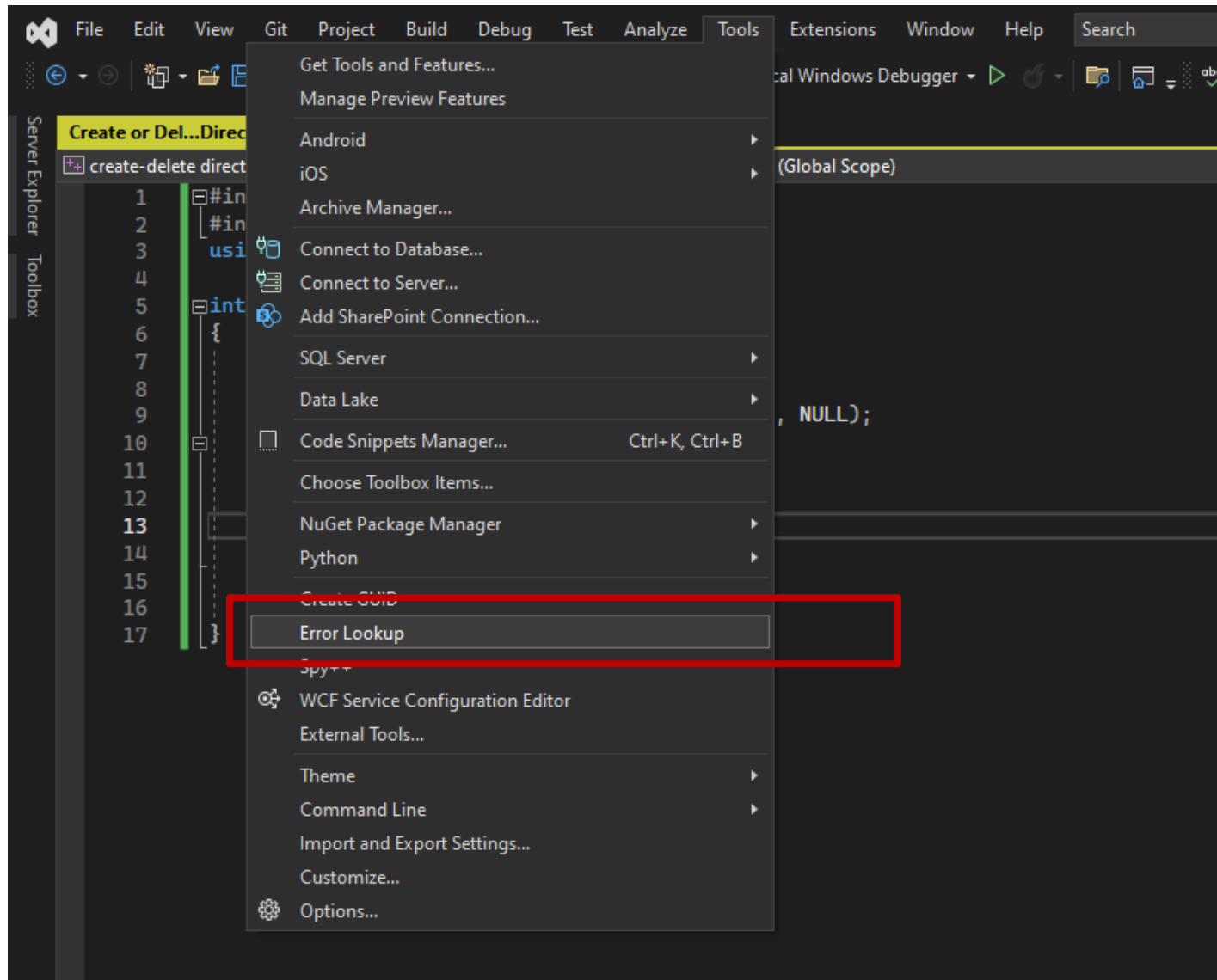


```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     bool result;
8
9     result = CreateDirectory(L"D:\\new folder", NULL);
10    if (result == false)
11    {
12        cout << "Operation Failed" << endl;
13        cout << GetLastError() << endl;
14    }
15
16    system("PAUSE");
17 }
```

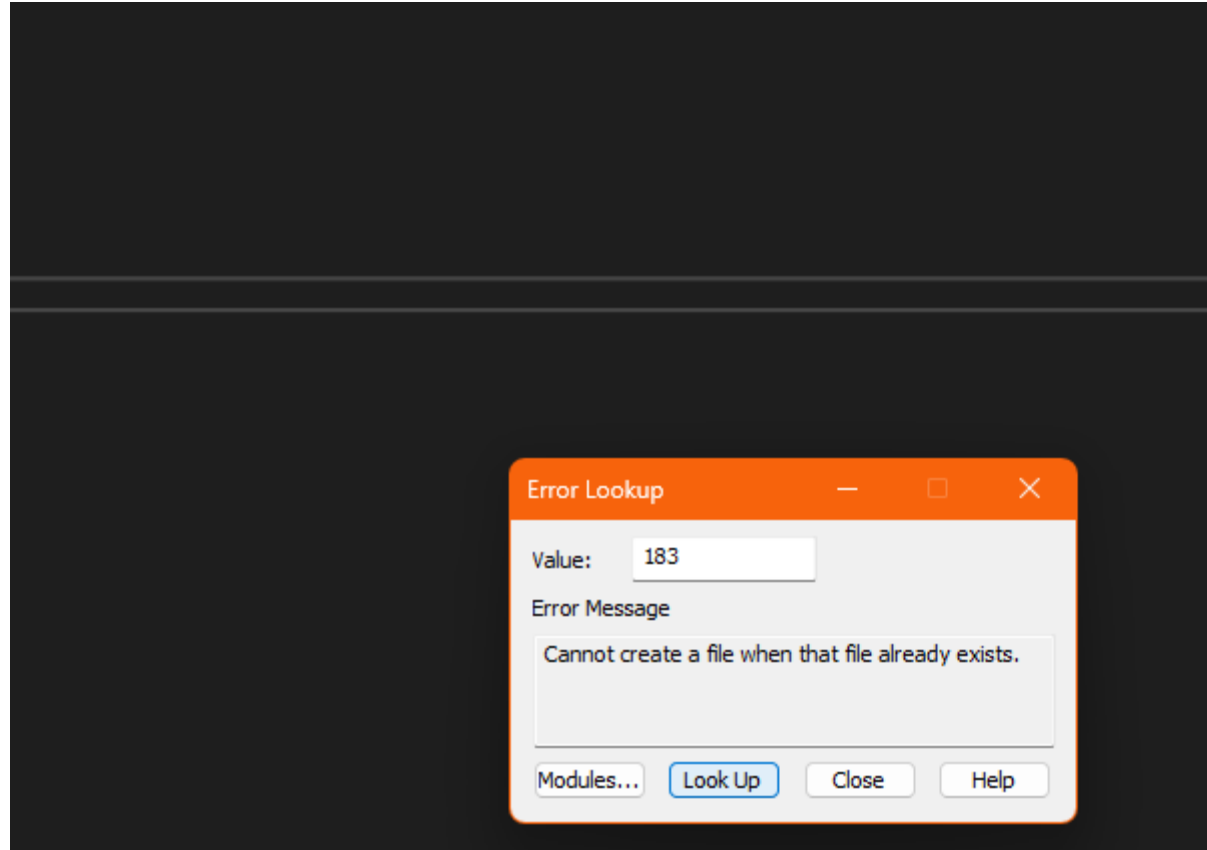


A screenshot of a Windows command prompt window. The title bar shows the path 'C:\Users\kaveh\source\repos' and standard window controls. The terminal content is as follows:

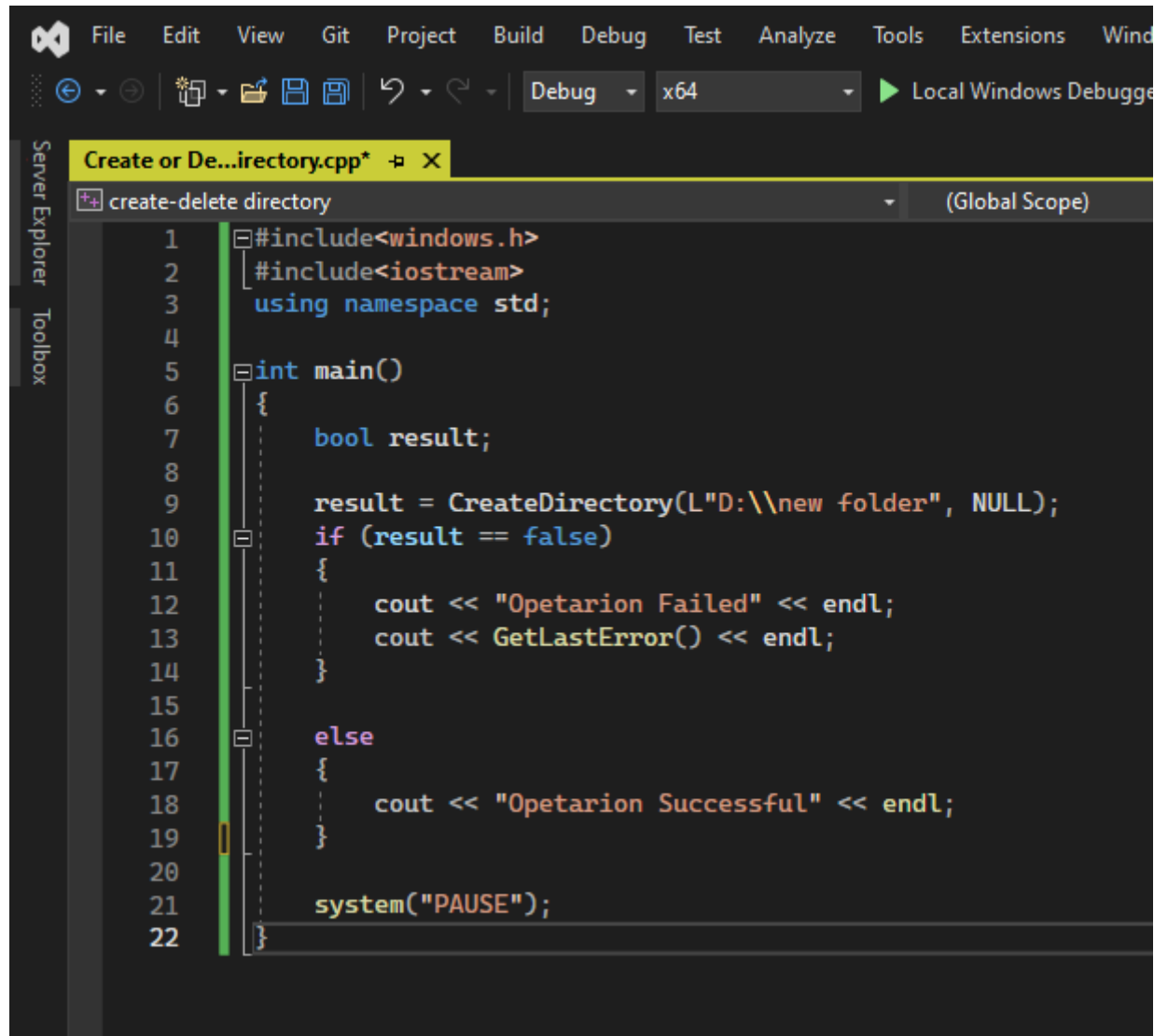
```
Opetarion Failed  
183  
Press any key to continue . . . |
```



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کاوه حقیقی - برنامه نویسی سیستمی



The image shows a screenshot of the Visual Studio Code editor. The main window displays a C++ source file named "create-delete directory.cpp". The code is as follows:

```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     bool result;
8
9     result = CreateDirectory(L"D:\\new folder", NULL);
10    if (result == false)
11    {
12        cout << "Opetarion Failed" << endl;
13        cout << GetLastError() << endl;
14    }
15
16    else
17    {
18        cout << "Opetarion Successful" << endl;
19    }
20
21    system("PAUSE");
22 }
```

The editor interface includes a menu bar (File, Edit, View, Git, Project, Build, Debug, Test, Analyze, Tools, Extensions, Window), a toolbar with navigation and development icons, and a sidebar on the left with "Server Explorer" and "Toolbox" panels. The status bar at the bottom indicates the current configuration is "Debug" for "x64" architecture, running on a "Local Windows Debugger".

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```
File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help Search
Debug x64 Local Windows Debugger
Server Explorer Toolbox
Create or De...irectory.cpp* X
create-delete directory (Global Scope)
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     bool result;
8     string s;
9     cin >> s;
10    wstring temp = wstring(s.begin(),s.end());
11    result = CreateDirectory(temp.c_str(), NULL);
12    if (result == false)
13    {
14        cout << "Opetarion Failed" << endl;
15        cout << GetLastError() << endl;
16    }
17
18    else
19    {
20        cout << "Opetarion Successful" << endl;
21    }
22
23    system("PAUSE");
24 }
```

تمرین ۱ : برنامه‌ای بنویسید که نام دایرکتوری را از کاربر گرفته و آن را ایجاد کند.

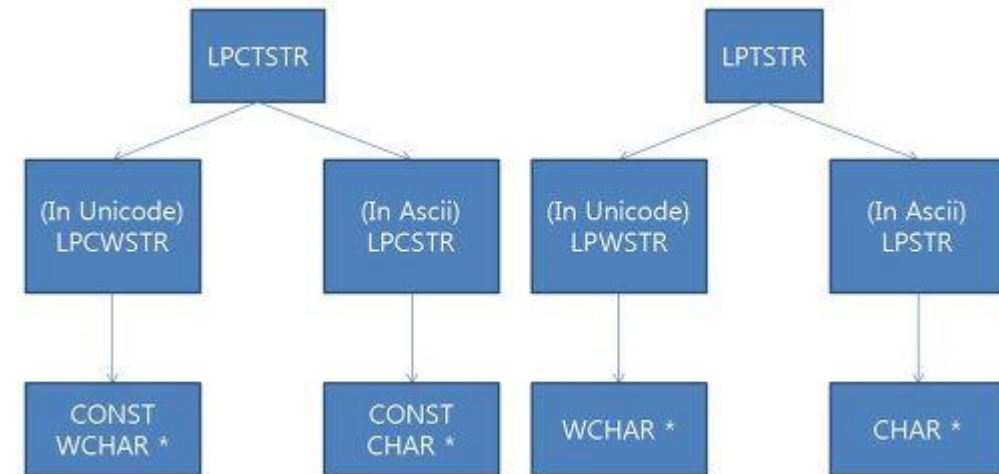
```

1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     bool result;
8     string s;
9     cin >> s;
10    result = CreateDirectoryA(s.c_str(), NULL);
11    if (result == false)
12    {
13        cout << "Opetarion Failed" << endl;
14        cout << GetLastError() << endl;
15    }
16
17    else
18    {
19        cout << "Opetarion Successful" << endl;
20    }
21
22    system("PAUSE");
23 }

```

تمرین ۱ : برنامه‌ای بنویسید که نام دایرکتوری را از کاربر گرفته و آن را ایجاد کند.

Type	Description	Example
String	Fixed Length Latin-1 String. The length should be at least as large as the longest string you want contained in the field, or values are truncated. Limited to 8192 Latin-1 characters.	Any string whose length does not vary much from value to value, and only contains simple Latin-1 characters.
WString	Wide String accepts any character (Unicode). Limited to 8192 characters.	Any string whose length does not vary much from value to value and contains any character.
V_String	Variable Length. The length of the field adjusts to accommodate the entire string within the field.	Any string whose length varies from value to value, and only contains simple Latin-1 characters.
V_WString	Variable Length Wide String. The length of the field adjusts to accommodate the entire string within the field and will accept any character.	Any string whose length varies from value to value and contains any character.



The screenshot shows the Visual Studio code editor with a dark theme. The menu bar includes File, Edit, View, Git, Project, Build, Debug, Test, Analyze, Tools, Extensions, and Window. The toolbar shows navigation and debugging icons, with 'Debug' and 'x64' selected. The active window is 'Create or De...irectory.cpp\*'. The code in the editor is as follows:

```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CreateDirectory(L"D:\\new folder", NULL);
8 }
```

The screenshot shows the Visual Studio code editor with a dark theme. The menu bar includes File, Edit, View, Git, Project, Build, Debug, Test, Analyze, Tools, and Extensions. The toolbar shows navigation and debugging icons, with 'Debug' and 'x64' selected. The active window is 'Create or De...irectory.cpp\*'. The code in the editor is as follows:

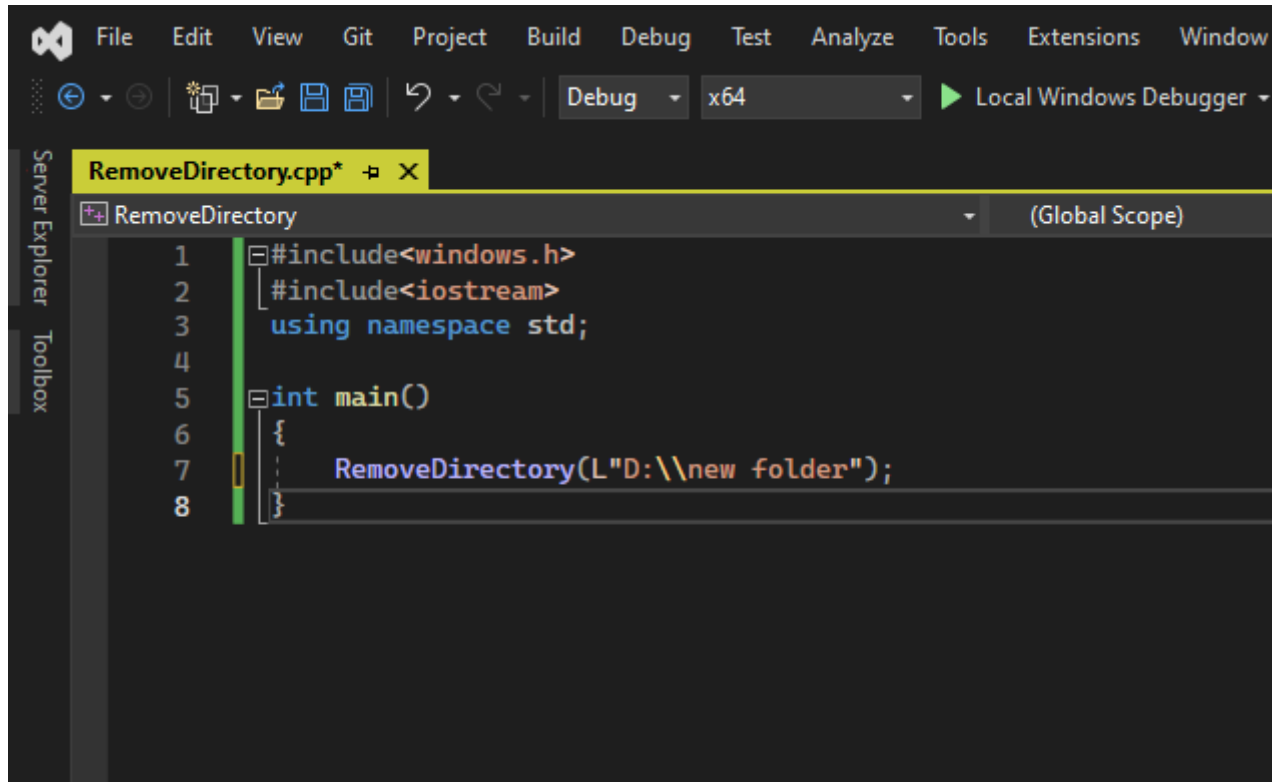
```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CreateDirectoryA("D:\\new folder", NULL);
8 }
```

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```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     RemoveDirectory();
8 }
```

BOOL RemoveDirectoryW(LPCWSTR lpPathName)

کاوه حقیقی - برنامه نویسی سیستمی



```
File Edit View Git Project Build Debug Test Analyze Tools Extensions Window
Debug x64 Local Windows Debugger
RemoveDirectory.cpp*
RemoveDirectory (Global Scope)
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     RemoveDirectory(L"D:\\new folder");
8 }
```

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تمرین ۲ : برنامه اسلاید قبلی را کامل کنید.

تمرین ۳ : دو برنامه AddDirectory و RemoveDirectory را با هم ادغام کنید به طوری که کاربر انتخاب کند کدام عمل و در چه مسیری انجام شود.



```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CopyFile()
8 }
```

BOOL CopyFileW(LPCWSTR lpExistingFileName, LPCWSTR lpNewFileName, BOOL bFailIfExists)

کاوه حقیقی - برنامه نویسی سیستمی

C++

Copy

```
BOOL CopyFile(  
    [in] LPCTSTR lpExistingFileName,  
    [in] LPCTSTR lpNewFileName,  
    [in] BOOL    bFailIfExists  
);
```

## Parameters

`[in] lpExistingFileName`

The name of an existing file.

By default, the name is limited to `MAX_PATH` characters. To extend this limit to 32,767 wide characters, prepend "\\?\\" to the path. For more information, see [Naming Files, Paths, and Namespaces](#).

If *lpExistingFileName* does not exist, `CopyFile` fails, and `GetLastError` returns `ERROR_FILE_NOT_FOUND`.

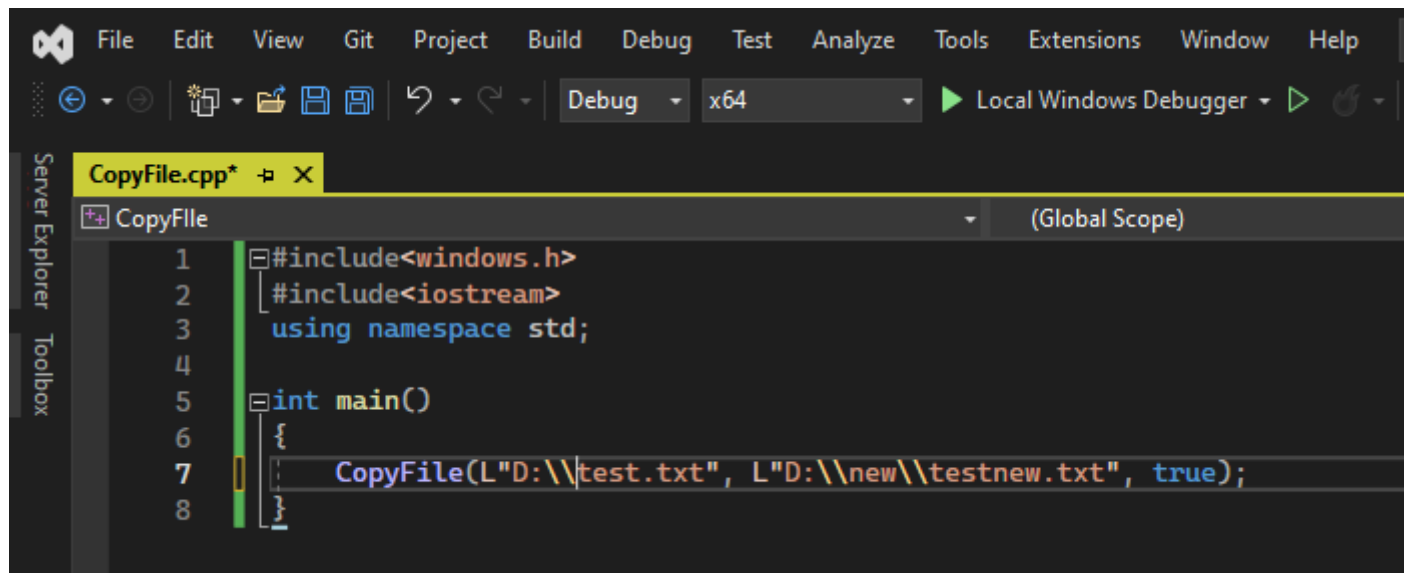
`[in] lpNewFileName`

The name of the new file.

By default, the name is limited to `MAX_PATH` characters. To extend this limit to 32,767 wide characters, prepend "\\?\\" to the path. For more information, see [Naming Files, Paths, and Namespaces](#).

`[in] bFailIfExists`

If this parameter is `TRUE` and the new file specified by *lpNewFileName* already exists, the function fails. If this parameter is `FALSE` and the new file already exists, the function overwrites the existing file and succeeds.



```
1 #include<windows.h>
2 #include<iostream>
3 using namespace std;
4
5 int main()
6 {
7     CopyFile(L"D:\\test.txt", L"D:\\new\\testnew.txt", true);
8 }
```

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تمرین ۴ : برنامه کپی را کامل کنید، سپس آن را با سایر برنامه ها ادغام کرده و یک منوی کامل بسازید.

## Syntax

C++

Copy

```
BOOL MoveFile(  
    [in] LPCTSTR lpExistingFileName,  
    [in] LPCTSTR lpNewFileName  
);
```

```
MoveFile (Global Scope)
1 #include<windows.h>
2 #include<iostream>
3
4 using namespace std;
5
6 int main()
7 {
8     MoveFile(L"D:\\before.txt", L"D:\\after.txt");
9 }
```

## Syntax

C++

Copy

```
HANDLE CreateFileA(  
    [in] LPCSTR lpFileName,  
    [in] DWORD dwDesiredAccess,  
    [in] DWORD dwShareMode,  
    [in, optional] LPSECURITY_ATTRIBUTES lpSecurityAttributes,  
    [in] DWORD dwCreationDisposition,  
    [in] DWORD dwFlagsAndAttributes,  
    [in, optional] HANDLE hTemplateFile  
);
```

```
#include<windows.h>
#include<iostream>

using namespace std;

int main()
{
    CreateFile(
        L"D:\\kv.txt",
        GENERIC_READ | GENERIC_WRITE,
        FILE_SHARE_READ,
        NULL,
        CREATE_NEW,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );
}
```



```
#include<windows.h>
#include<iostream>

using namespace std;

int main()
{
    HANDLE h;
    h=CreateFile(
        L"D:\\kv.txt",
        GENERIC_READ | GENERIC_WRITE,
        FILE_SHARE_READ,
        NULL,
        CREATE_NEW,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );
    if (h == INVALID_HANDLE_VALUE)
    {
        cout << "create failed" << GetLastError() << endl;
    }
    else
    {
        cout << "create sucecess" << endl;
    }
    CloseHandle(h);
}
```

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## Syntax

C++

Copy

```
BOOL WriteFile(  
    [in]          HANDLE      hFile,  
    [in]          LPCVOID     lpBuffer,  
    [in]          DWORD       nNumberOfBytesToWrite,  
    [out, optional] LPDWORD    lpNumberOfBytesWritten,  
    [in, out, optional] LPOVERLAPPED lpOverlapped  
);
```

کاوه حقیقی - برنامه نویسی سیستمی

```
(Global Scope)
#include<windows.h>
#include<iostream>

using namespace std;

int main()
{
    HANDLE h;
    bool b;
    h = CreateFile(
        L"D:\\kv.txt",
        GENERIC_WRITE,
        FILE_SHARE_READ,
        NULL,
        CREATE_NEW,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );
    if (h == INVALID_HANDLE_VALUE)
    {
        cout << "Create failed" << GetLastError() << endl;
    }
    else
    {
        cout << "Create success" << endl;

        WriteFile(
            h,
            "Welcome To FANNI University",
            strlen("Welcome To FANNI University"),
            0,
            NULL
        );

        CloseHandle(h);
    }
}
```

کاوه حقیقی - برنامه نویسی سیستمی

```
(Global Scope)
#include<windows.h>
#include<iostream>

using namespace std;

int main()
{
    HANDLE h;
    bool b;
    char ch[] = "Welcome To FANNI University";
    h = CreateFile(
        L"D:\\kv.txt",
        GENERIC_WRITE,
        FILE_SHARE_READ,
        NULL,
        CREATE_NEW,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );
    if (h == INVALID_HANDLE_VALUE)
    {
        cout << "Create failed" << GetLastError() << endl;
    }
    else
    {
        cout << "Create success" << endl;
    }

    WriteFile(
        h,
        ch,
        strlen(ch),
        0,
        NULL
    );

    CloseHandle(h);
}
```

## Syntax

C++

Copy

```
BOOL ReadFile(  
    [in]          HANDLE      hFile,  
    [out]         LPVOID     lpBuffer,  
    [in]          DWORD       nNumberOfBytesToRead,  
    [out, optional] LPDWORD   lpNumberOfBytesRead,  
    [in, out, optional] LPOVERLAPPED lpOverlapped  
);
```

کاوه حقیقی - برنامه نویسی سیستمی

```
#include<windows.h>
#include<iostream>

using namespace std;

int main()
{
    HANDLE h;
    bool b;
    char ch[20];
    h = CreateFile(
        L"D:\\kv.txt",
        GENERIC_READ,
        FILE_SHARE_READ,
        NULL,
        OPEN_EXISTING,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );
    if (h == INVALID_HANDLE_VALUE)
    {
        cout << "create failed" << GetLastError() << endl;
    }
    else
    {
        cout << "create sucecess" << endl;

        ReadFile(
            h,
            ch,
            20,
            0,
            NULL
        );

        cout << ch << endl;

        CloseHandle(h);
    }
}
```