Zaawansowane środowiska programistyczne

2009/2010

Sprawy organizacyjne

- Forma zajęć
- Zaliczenie
- Literatura

MFC

Co to jest MFC?

- MFC – Microsoft Foundation Classes
- “Opakowanie” dla WinAPI, zestaw klas C++ umożliwiających wygodniejsze pisanie programów
- MFC od pewnego czasu jest wypierane przez .NET, ale jest rozwiązaniem przydatnym jeśli z jakichś względów nie chcemy używać .NET
- Microsoft zapowiada stopniową integrację MFC z .NET
- MFC nie jest dostępne w wersjach Express produktów

Zalety

- Znaczne uproszczenie tworzenia typowych aplikacji w stosunku do WinAPI
- Wygodniejsze zastosowanie w technologiach obiektowych (m. in. dziedziczenie z jednej klasy)
- Organizacja współpracy między warstwą dokumentu a warstwą prezentacji
- Organizacja wymiany danych z okienkami
- Dodatkowe klasy związane m. in. z kolekcjami i serializacją
- Wizardy wspierające tworzenie aplikacji

Wady

- Rzeczy które nie zostały przewidziane przez twórców biblioteki często bardzo trudno zaimplementować. Konieczne jest modyfikowanie fragmentów generowanych przez wizardy, co często powoduje niekompatybilności i trudności w dalszej pracy z wizardami
- Zmiana rodzaju projektu po wygenerowaniu przez wizard jest praktycznie niemożliwa
- Architektura dokument-widok jest niezbyt przejrzysta, niektóre rozwiązania są “wydumane”
- Konieczność dołączania bibliotek

Zasadnicze koncepcje

- Nazwy klas zaczynają się od C
- Prawie wszystko dziedziczy po CObject
- Prawie wszystkie elementy interfejsu dziedziczą po CWnd
- Dziedzicznie jest intensywnie wykorzystywane, podstawowe klasy aplikacji użytkownika dziedziczą po klasach MFC
- Duża część implementacji polega na pisaniu własnych implementacji funkcji zdefiniowanych w klasach bazowych

Zasadnicze koncepcje

- Możliwe są trzy zasadnicze rodzaje aplikacji: Dialog, SDI, MDI
- Interakcja między elementami jest oparta na standardowych komunikatach Windows, obsługa dodawana przez wizardy
- Elementy dodawane przez wizardy mają często postać makr
- Nieuważna próba edytowania fragmentów dodanych przez wizardy może popsuć współpracę z nimi

Microsoft Foundation Class Library Version 7.0

CObject

- Klasa bazowa dla większości klas MFC, zalecane dziedziczenie po niej również własnych klas
- Wsparcie dla:
  - Serializacji
  - RTTI
  - Debugowania
  - Klas kolekcji

CObject

- CObject()
- CObject(const CObject& objectSrc) - prywatny
- operator delete
- operator new
- AssertValid
- Dump
- IsSerializable
- Serialize
- GetRuntimeClass
- IsKindOf

CWnd

- Stanowi “opakowanie” dla okienka Windows
- Ukrywa mechanizm obsługi wiadomości (zdarzeń) implementowany przez Windows. Wiadomości automatycznie wywołują funkcje OnNazwaWiadomosci. Aby zaimplementować obsługę wiadomości, wystarczy napisać ciało funkcji
- Wiele funkcji API działających na uchwycie okna (HWND) ma swoje odpowiedniki w CWnd

CWnd

- Tworzenie okna w MFC jest dwuetapowe:
  - Utworzenie obiektu klasy CWnd (lub pochodnej)
  - Wywołanie funkcji Create
- W wielu wypadkach proces ten jest realizowany automatycznie

CWnd

- HWND m_hWnd
- CWnd( );
- virtual BOOL DestroyWindow( );

CWnd::Create

- virtual BOOL Create(
  LPCTSTR lpszClassName,
  LPCTSTR lpszWindowName,
  DWORD dwStyle,
  const RECT& rect,
  CWnd* pParentWnd,
  UINT nID,
  CCreateContext* pContext = NULL);

CWnd::GetWindowRect etc.

- void GetWindowRect(LPRECT lpRect) const;
- void GetClientRect(LPRECT lpRect) const;
- void MoveWindow(int x, int y, int nWidth, int nHeight, BOOL bRepaint = TRUE);
- void MoveWindow(LPCRECT lpRect, BOOL bRepaint = TRUE);
- BOOL SetWindowPos(const CWnd* pWndInsertAfter, int x, int y, int cx, int cy, UINT nFlags);

CWnd::GetParent etc.

- CWnd* GetParent( ) const;
- CWnd* GetDlgItem(int nID) const;
- CFrameWnd* GetParentFrame( ) const;

CWnd::ShowWindow

- BOOL ShowWindow(int nCmdShow);
- void Invalidate(BOOL bErase = TRUE);
- void UpdateWindow( );

CWnd::GetWindowText

- int GetWindowText(LPTSTR lpszStringBuf, int nMaxCount) const;
- void GetWindowText(CString& rString) const;
- void SetWindowText(LPCTSTR lpszString);

CWnd...

- W sumie około 360 funkcji
- Znaczna część to funkcje obsługujące zdarzenia, np:
- afx_msg void OnMove(int x, int y);

Klasy dziedziczące po CWnd

- Ramki
- Okienka dialogowe
- Widoki
- Kontrolki

Ramki - CFrameWnd

- Najbardziej zewnętrzne okno aplikacji
- Zarządza widokami, toolbarami, menu, paskiem statusu etc.
- Współpracuje z aktywnym widokiem

Widoki - CView

- Widok jest elementem pośredniczącym między dokumentem a użytkownikiem – wyświetla stan dokumentu i przyjmuje działania użytkownika na dokumencie
- Jest dzieckiem (w sensie zależności między oknami, nie dziedziczenia) okienka ramki
- Jest dołączony do jednego dokumentu (ale dokument może mieć wiele widoków)
- Jest odpowiedzialny za obsługę komend użytkownika. Komendy są przekazywane przez okienko ramki, jeśli nie są obsłużone, idą dalej – do dokumentu

CView

- Rysowanie widoku odbywa się w funkcji OnDraw
- Jest 10 klas dziedziczących po CView, m. in.:
  - CEditView
  - CFormView
  - CRichEditView
  - CTreeView

CFrameWnd i CView – podstawa aplikacji SDI i MDI

- SDI – single document interface
- MDI – multiple document interface
- Architektury różnią się liczbą dokumentów z którymi można jednocześnie pracować. Przekłada się to na liczbę “równoległych” widoków (nie mylić z widokami w okienku split oraz innymi oknami, np. toolbarami)
- Są to typowe architektury aplikacji o “swobodnej” interakcji, np. edytory tekstu, programy graficzne, arkusze kalkulacyjne itp.

Okienka dialogowe - CDialog

- Jest też podstawą dla okienek dialogowych w aplikacjach
- Istotnym elementem tworzenia okienka dialogowego jest opracowanie układu kontrolek – dokonuje się tego przy pomocy wbudowanego w środowiska edytora
- Okienka dialogowe mogą być modalne (tworzone funkcją DoModal) lub nie (tworzone funkcją Create)
- Istotne funkcje to OnOK i OnCancel

CDialog – aplikacje “dialogowe”

- CDialog jest podstawą dla aplikacji “dialogowych”
- Są to aplikacje gdzie główne okno to okno dialogowe – składa się z zestawu kontrolek
- Nie ma widoku i dokumentu, zwykle nie ma zmiennego rozmiaru
- Dobrze nadaje się do prostych aplikacji, gdzie interakcja z użytkownikiem jest ograniczona

CCommonDialog i pochodne

- MFC dostarcza gotowe okna dialogowe dla typowych zastosowań:
  - CFileDialog
  - CFontDialog
  - CColorDialog
  - CPageSetupDialog
  - CPrintDialog
  - CPrintDialogEx
  - CFindReplaceDialog
  - COleDialog

Kontrolki

- Dziedziczą po CWnd (około 30). Np.:
  - CButton
  - CComboBox
  - CEdit
  - CListBox
  - CSliderCtrl
  - CStatic
  - CTabCtrl

Serializacja

- Kroki aby klasa była serializowalna:
  - Odziedziczyć po CObject (bezpośrednio lub pośrednio)
  - Napisać własną implementację funkcji Serialize
  - Zastosować makro DECLARE_SERIAL w definicji klasy
  - Zdefiniować konstruktor domyślny (może być protected, private)
  - Zastosować makro IMPLEMENT_SERIAL w pliku .cpp implementującym funkcje klasy

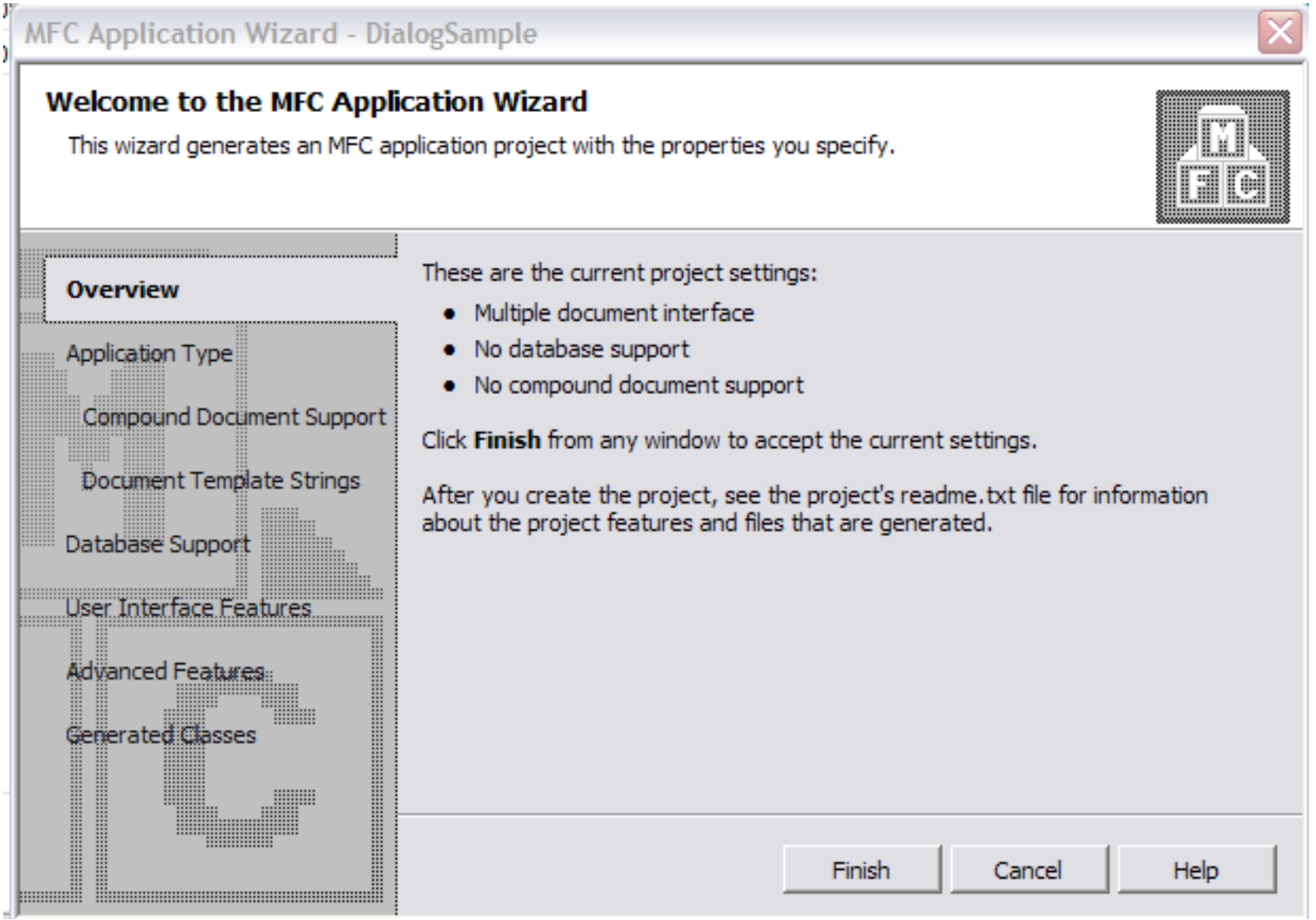
Funkcja Serialize

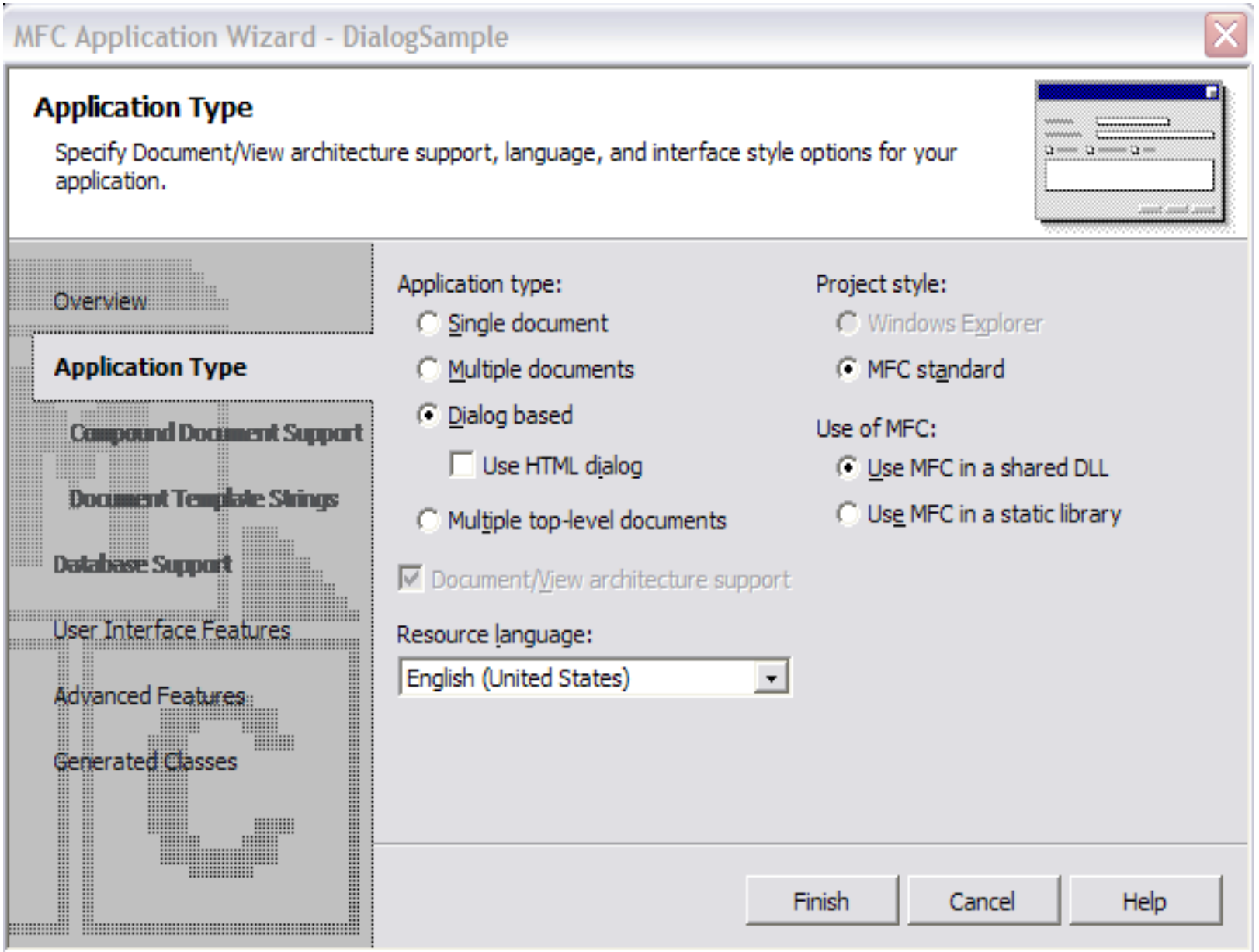
```
void CMyClass::Serialize( CArchive& archive )
{
    CObject::Serialize( archive );

    // do the stuff for our specific class
    if( archive.IsStoring() )
        //store data
    else
        //read data
}
```

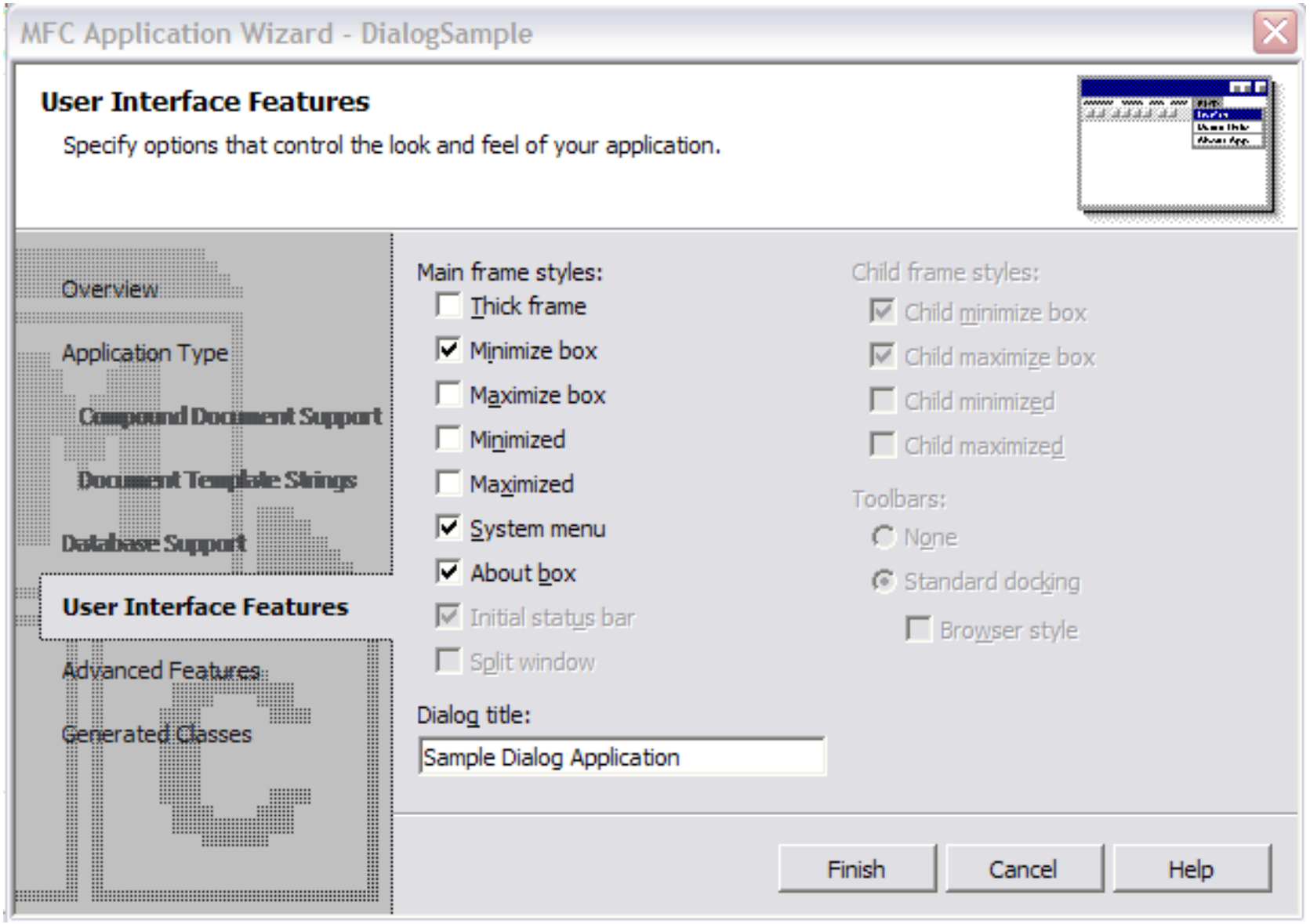
Klasa CArchive

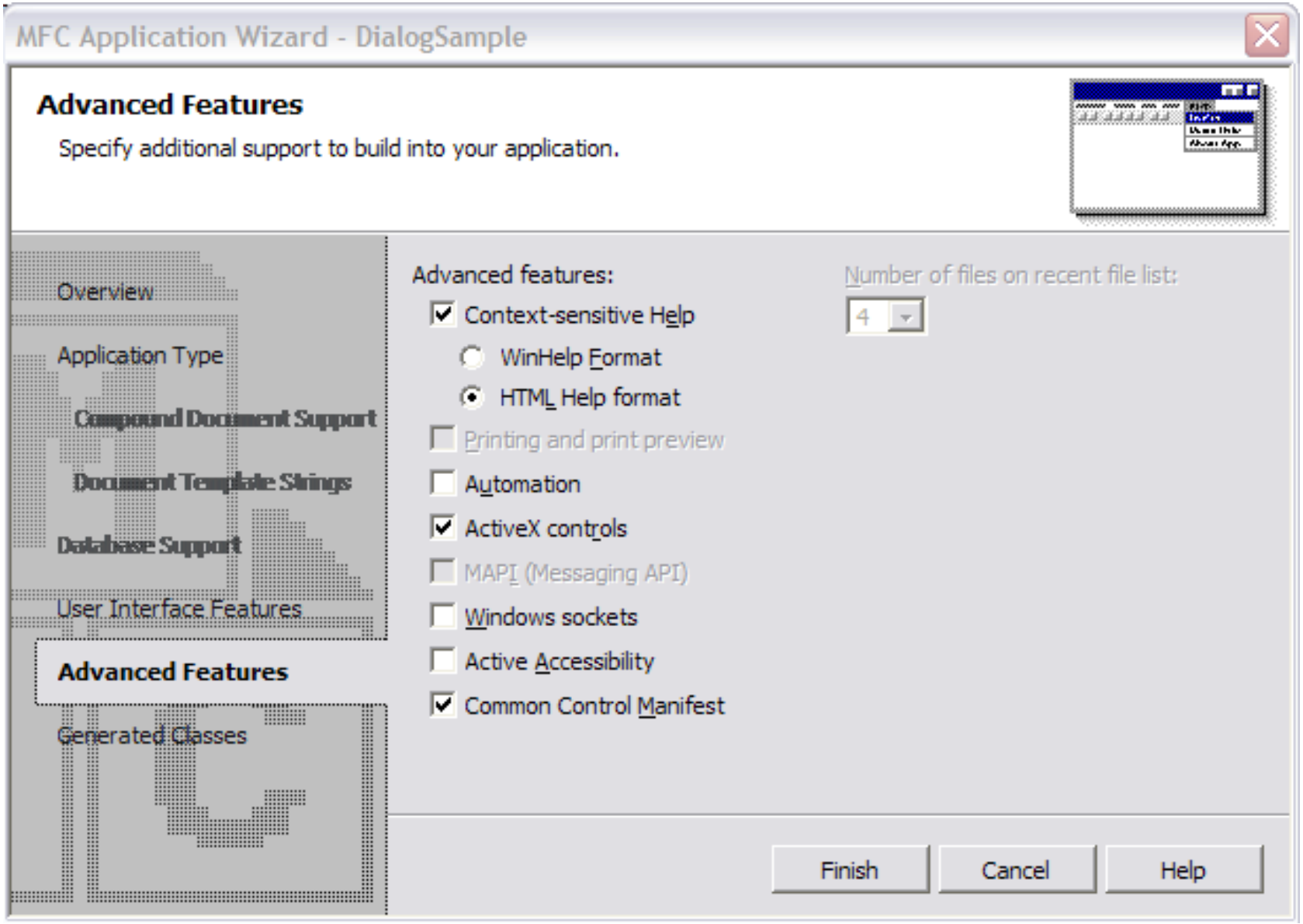
- Flush
- operator <<
- operator >>
- Read
- ReadString
- Write
- WriteString
- CArchive(CFile* pFile, UINT nMode, int nBufSize = 4096, void* lpBuf = NULL);

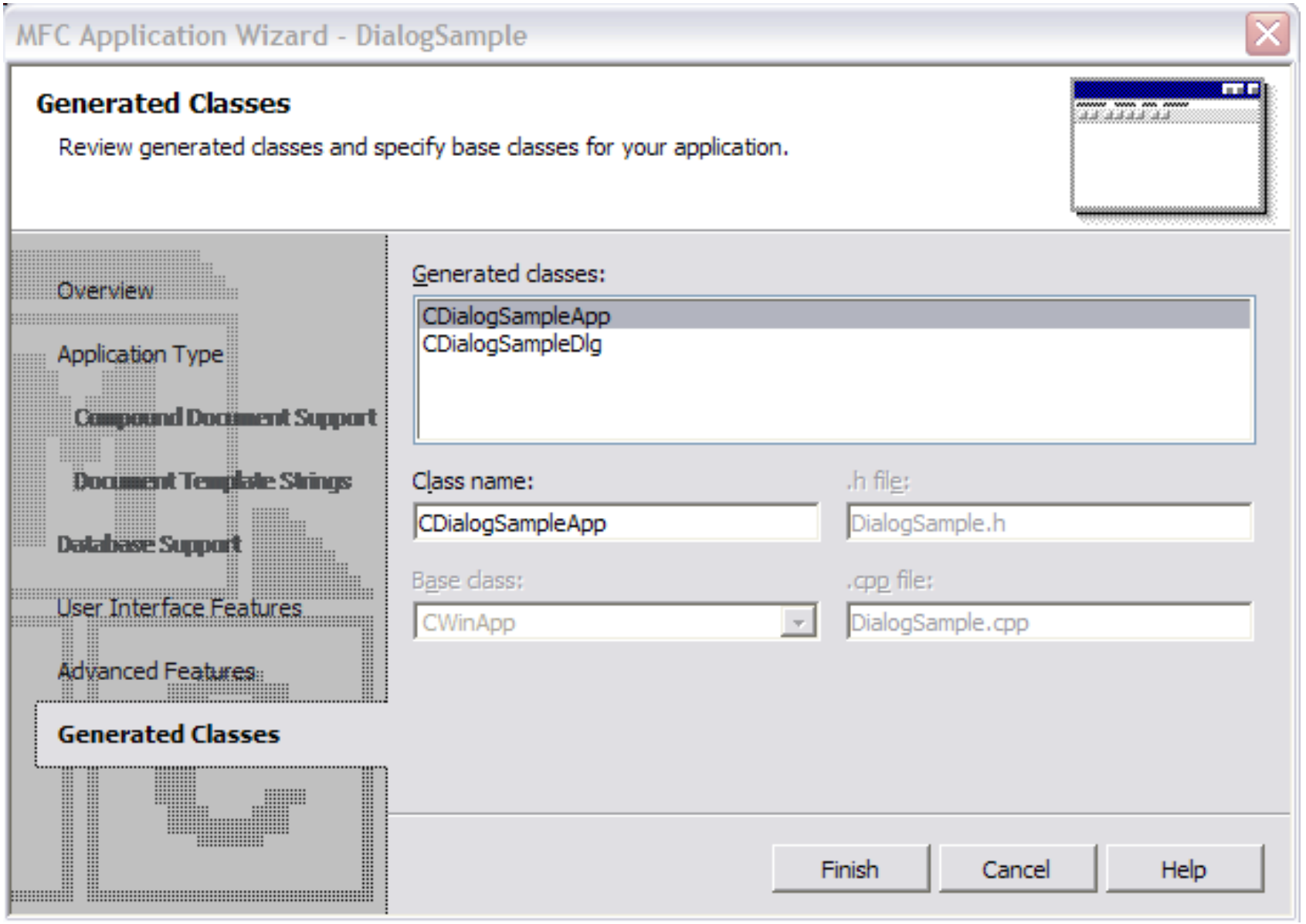
Przykładowa aplikacja dialogowa

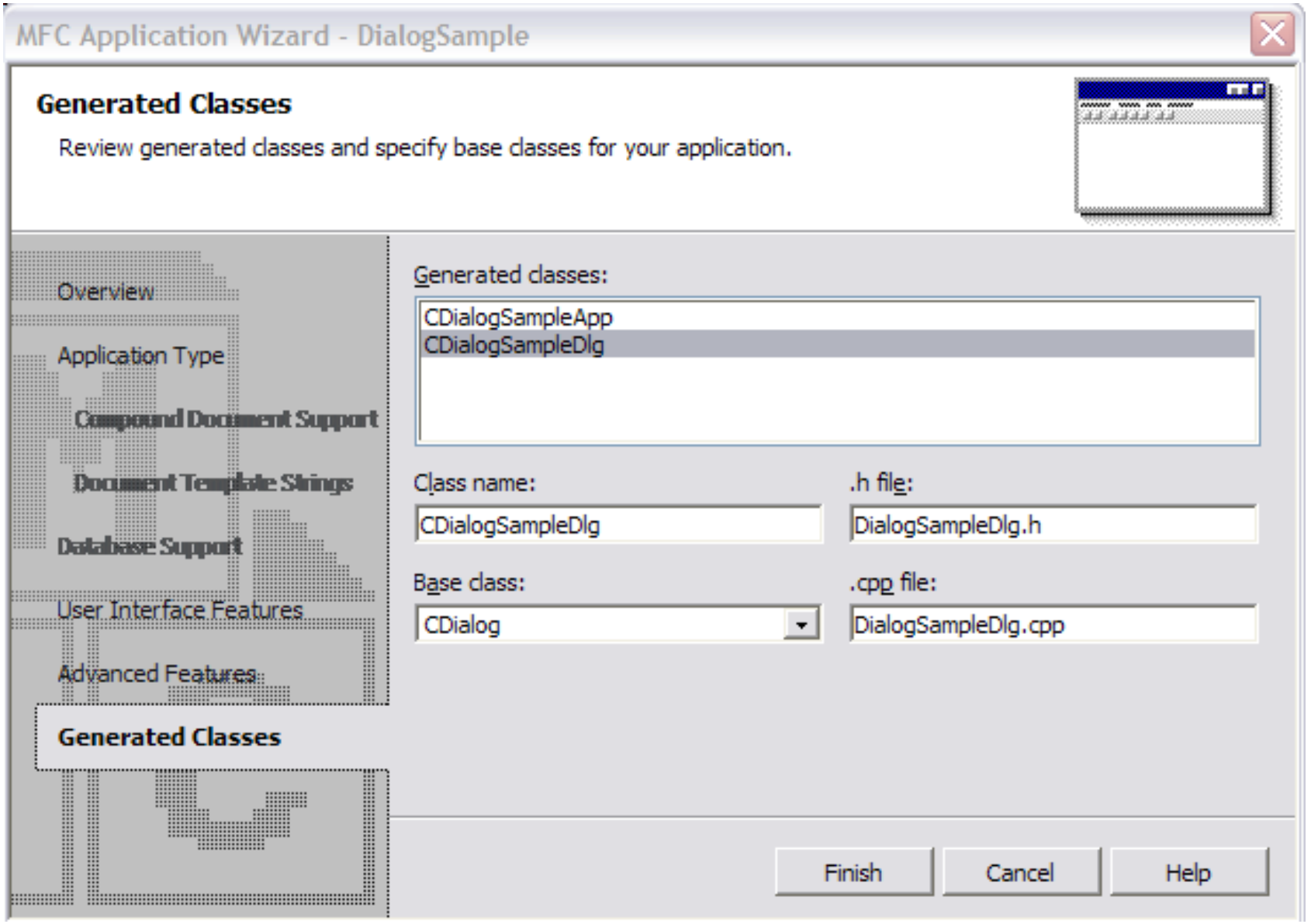



MFC Application Wizard - DialogSample
Application Type
Specify Document/View architecture support, language, and interface style options for your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Application type:
Single document
Multiple documents
Dialog based
Use HTML dialog
Multiple top-level documents
Document/View architecture support
Resource language:
English (United States)
Project style:
Windows Explorer
MFC standard
Use of MFC:
Use MFC in a shared DLL
Use MFC in a static library
Finish
Cancel
Help


MFC Application Wizard - DialogSample
User Interface Features
Specify options that control the look and feel of your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Main frame styles:
Thick frame
Minimize box
Maximize box
Minimized
Maximized
System menu
About box
Initial status bar
Split window
Child frame styles:
Child minimize box
Child maximize box
Child minimized
Child maximized
Toolbars:
None
Standard docking
Browser style
Dialog title:
Sample Dialog Application
Finish
Cancel
Help


MFC Application Wizard - DialogSample
Advanced Features
Specify additional support to build into your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Advanced features:
Context-sensitive Help
WinHelp Format
HTML Help format
Printing and print preview
Automation
ActiveX controls
MAPI (Messaging API)
Windows sockets
Active Accessibility
Common Control Manifest
Number of files on recent file list:
4
Finish
Cancel
Help


MFC Application Wizard - DialogSample
Generated Classes
Review generated classes and specify base classes for your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Generated classes:
CDialogSampleApp
CDialogSampleDlg
Class name:
CDialogSampleApp
.h file:
DialogSample.h
Base class:
CWinApp
.cpp file:
DialogSample.cpp
Finish
Cancel
Help


MFC Application Wizard - DialogSample
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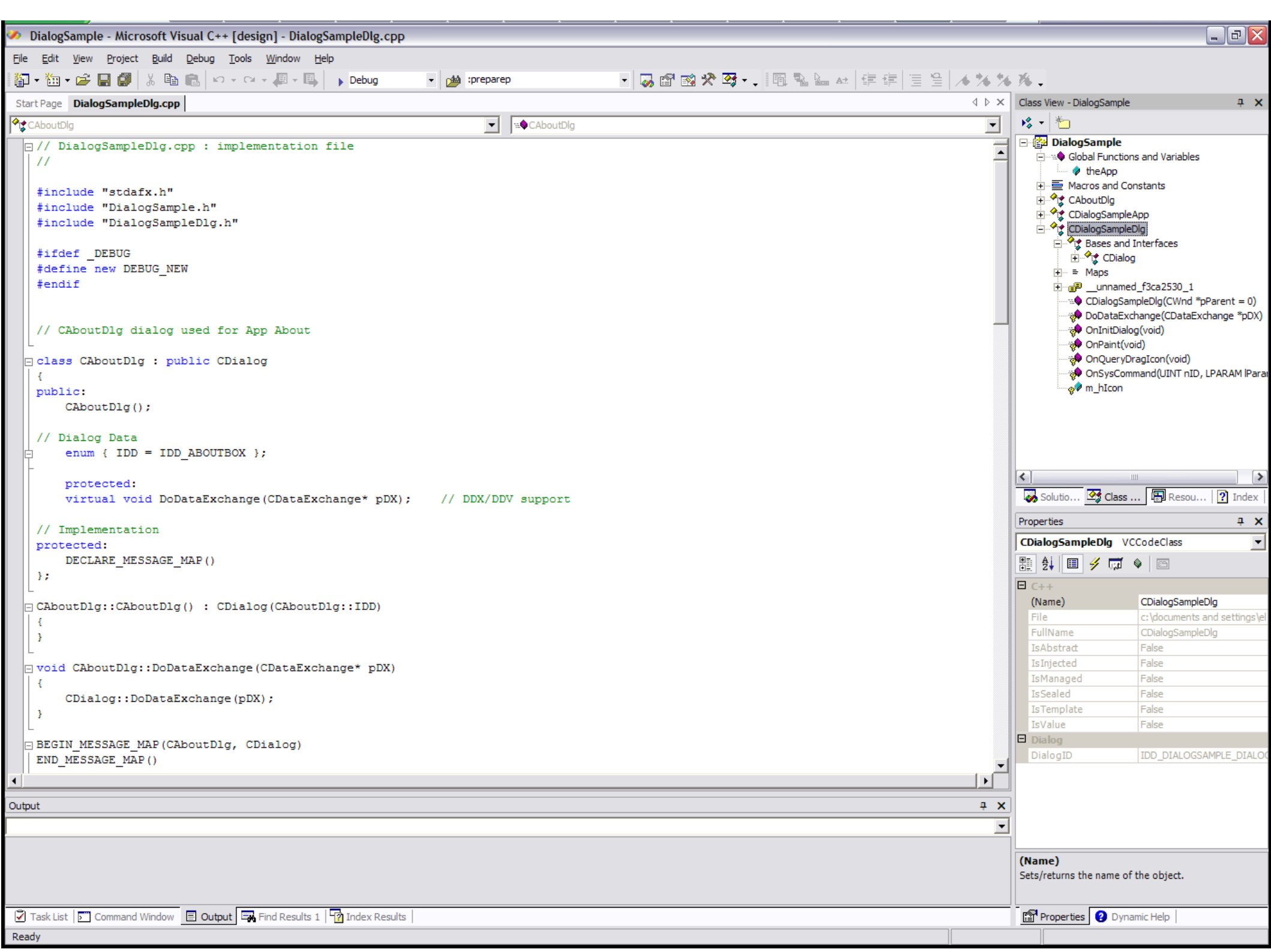
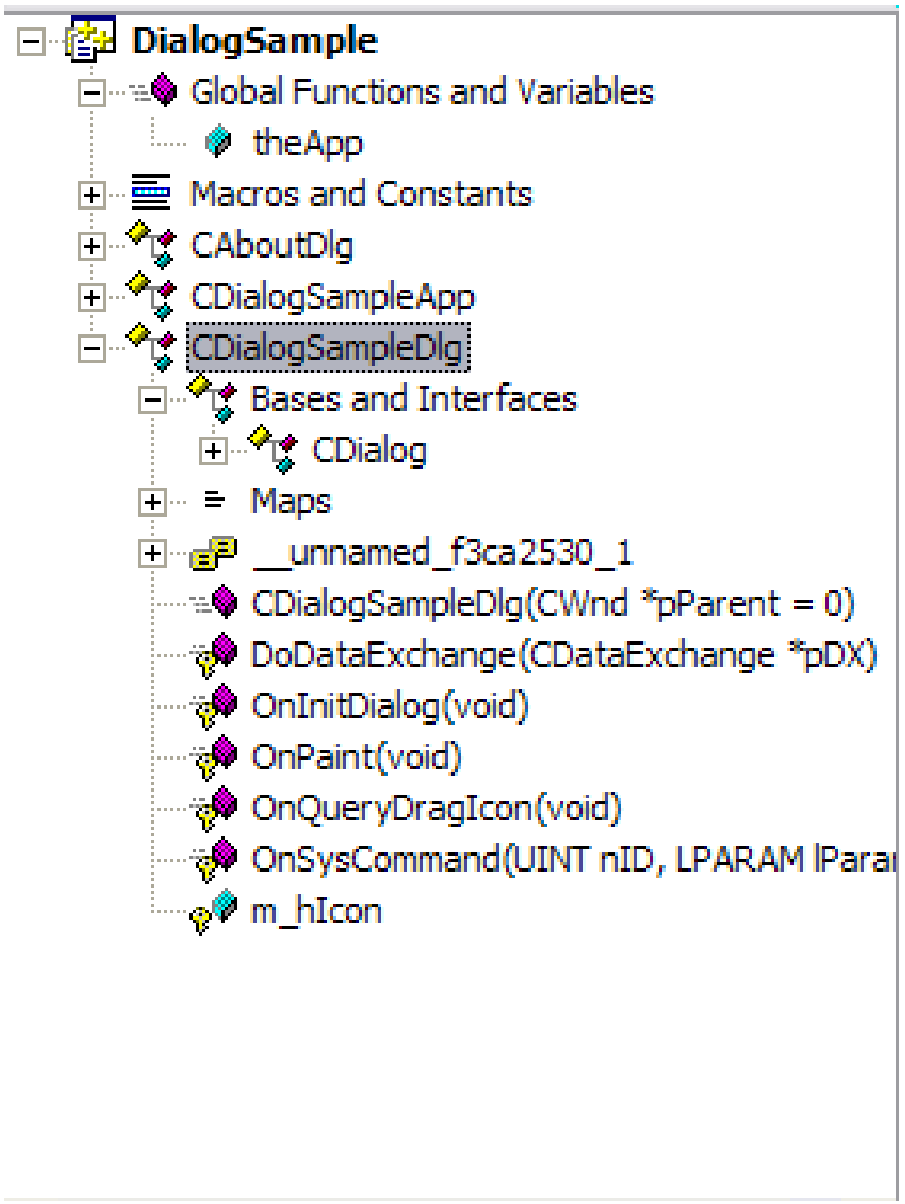
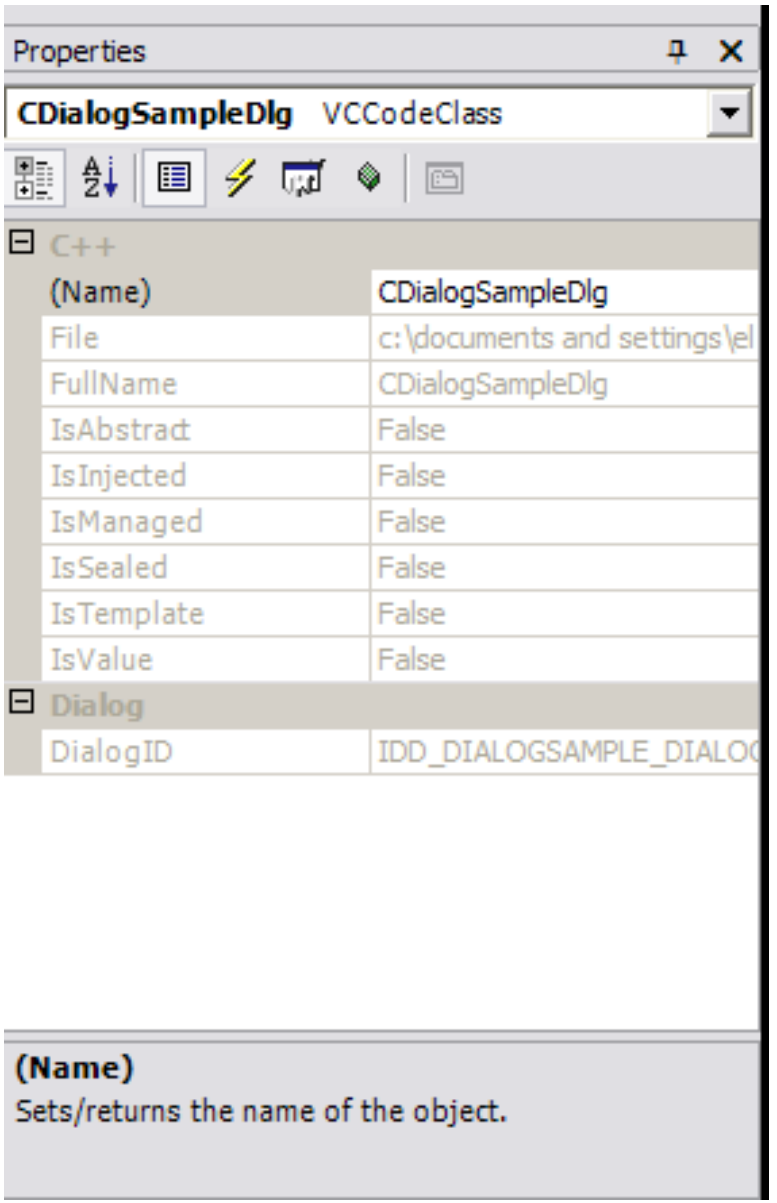
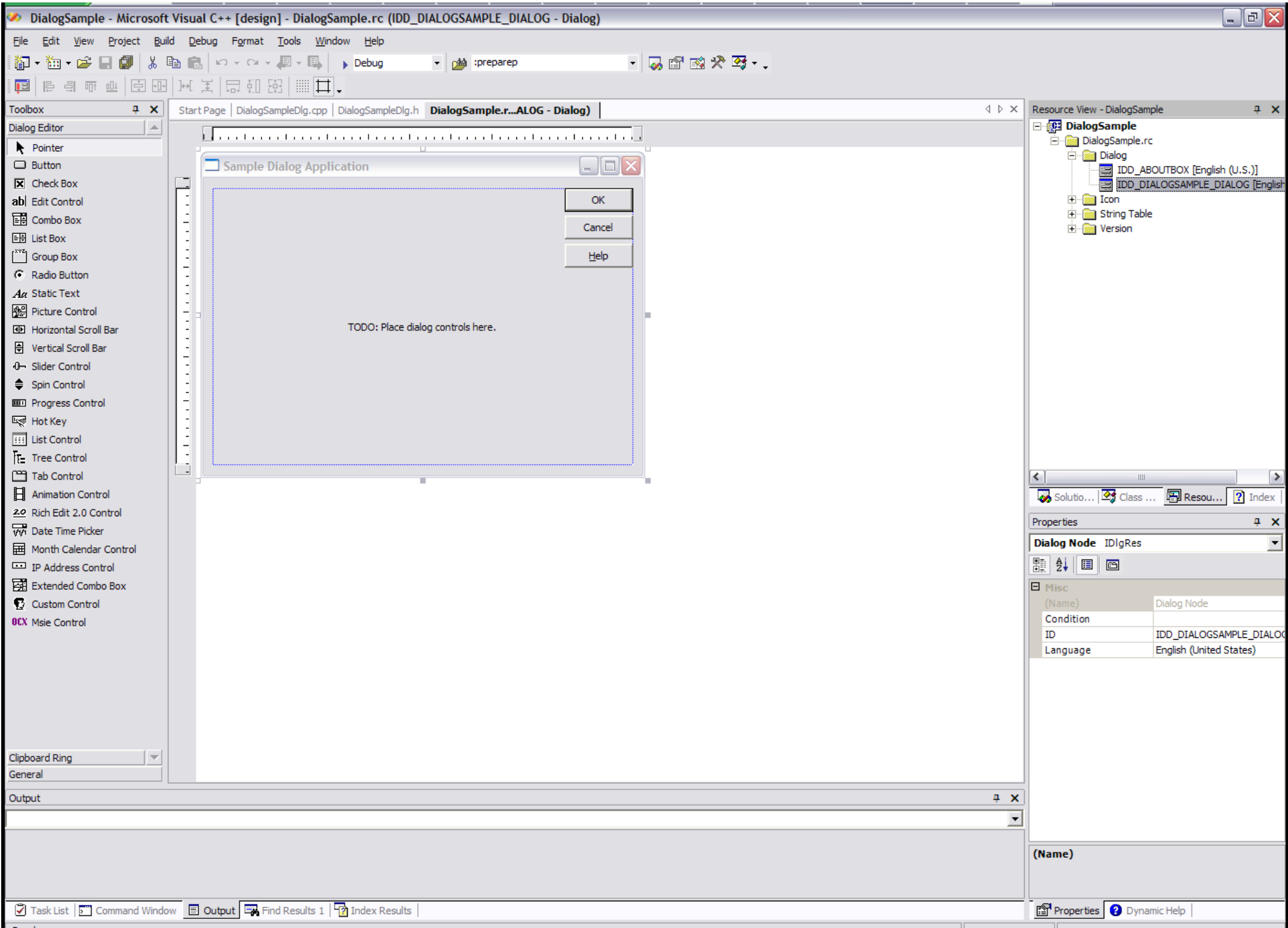
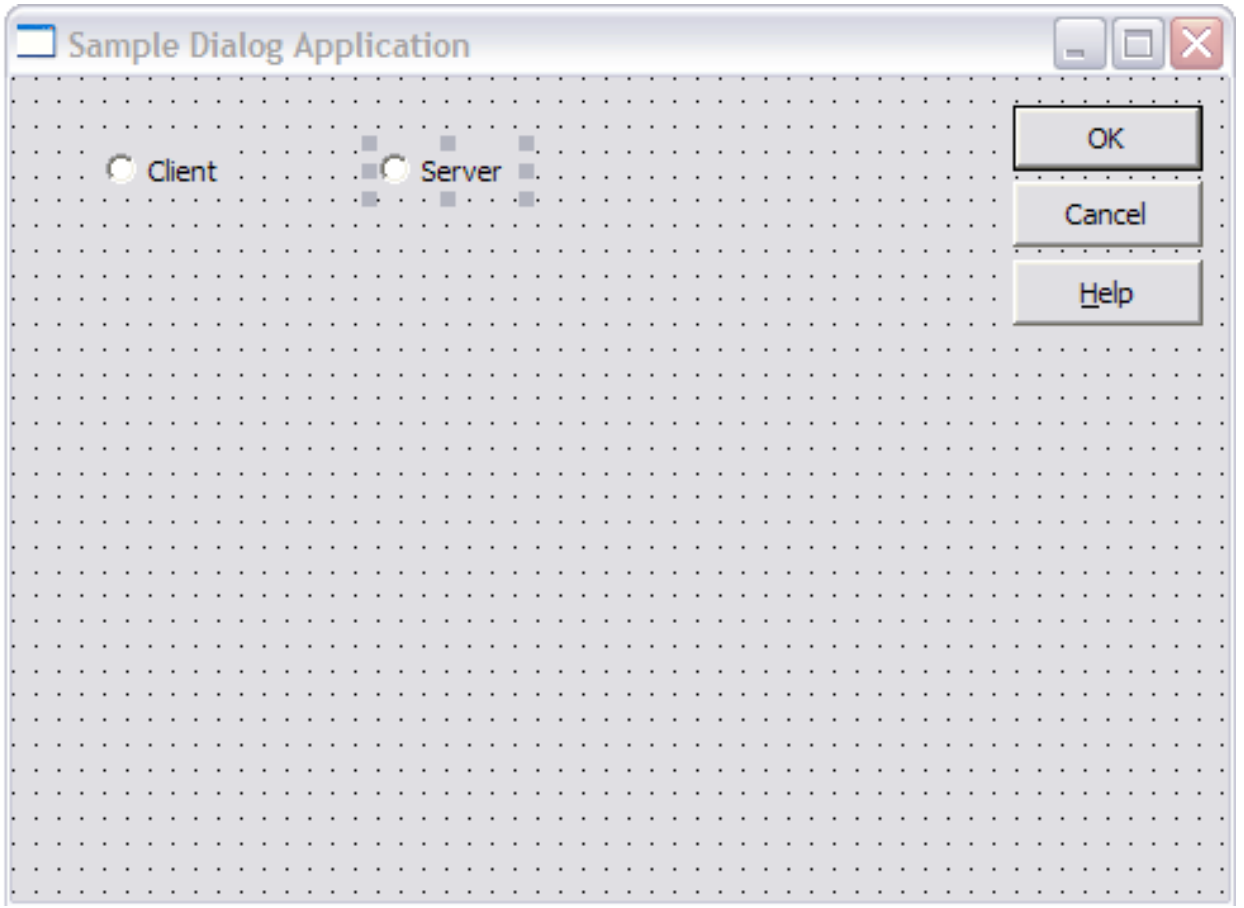
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Generated classes:
CDialogSampleApp
CDialogSampleDlg
Class name:
CDialogSampleDlg
.h file:
DialogSampleDlg.h
Base class:
CDialog
.cpp file:
DialogSampleDlg.cpp
Finish
Cancel
Help

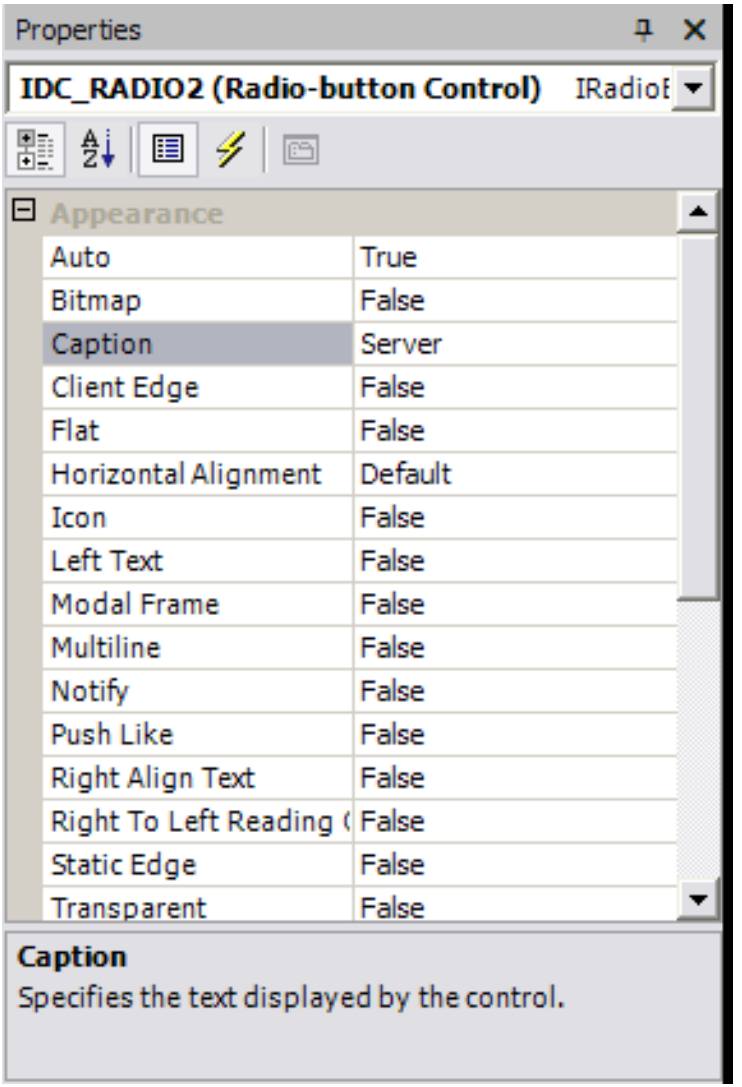

DialogSample - Microsoft Visual C++ [design] - DialogSampleDlg.cpp
File Edit View Project Build Debug Tools Window Help
Debug
:preparep
Start Page
DialogSampleDlg.cpp
CAboutDlg
CAboutDlg
// DialogSampleDlg.cpp : implementation file
//
#include "stdafx.h"
#include "DialogSample.h"
#include "DialogSampleDlg.h"
#ifdef _DEBUG
#define new DEBUG_NEW
#endif
// CAboutDlg dialog used for App About
class CAboutDlg : public CDialog
{
public:
CAboutDlg();
// Dialog Data
enum { IDD = IDD_ABOUTBOX };
protected:
virtual void DoDataExchange(CDataExchange* pDX); // DDX/DDV support
// Implementation
protected:
DECLARE_MESSAGE_MAP()
};
CAboutDlg::CAboutDlg() : CDialog(CAboutDlg::IDD)
{
}
void CAboutDlg::DoDataExchange(CDataExchange* pDX)
{
CDialog::DoDataExchange(pDX);
}
BEGIN_MESSAGE_MAP(CAboutDlg, CDialog)
END_MESSAGE_MAP()
Class View - DialogSample
DialogSample
Global Functions and Variables
theApp
Macros and Constants
CAboutDlg
CDialogSampleApp
CDialogSampleDlg
Bases and Interfaces
CDialog
Maps
__unnamed_f3ca2530_1
CDialogSampleDlg(CWnd *pParent = 0)
DoDataExchange(CDataExchange *pDX)
OnInitDialog(void)
OnPaint(void)
OnQueryDragIcon(void)
OnSysCommand(UINT nID, LPARAM lPara
m_hIcon
Solutio... Class ... Resou... Index
Properties
CDialogSampleDlg VCCodeClass
C++
(Name) CDialogSampleDlg
File c:\documents and settings\el
FullName CDialogSampleDlg
IsAbstract False
IsInjected False
IsManaged False
IsSealed False
IsTemplate False
IsValue False
Dialog
DialogID IDD_DIALOGSAMPLE_DIALO
(Name)
Sets/returns the name of the object.
Output
Task List Command Window Output Find Results 1 Index Results
Properties Dynamic Help
Ready

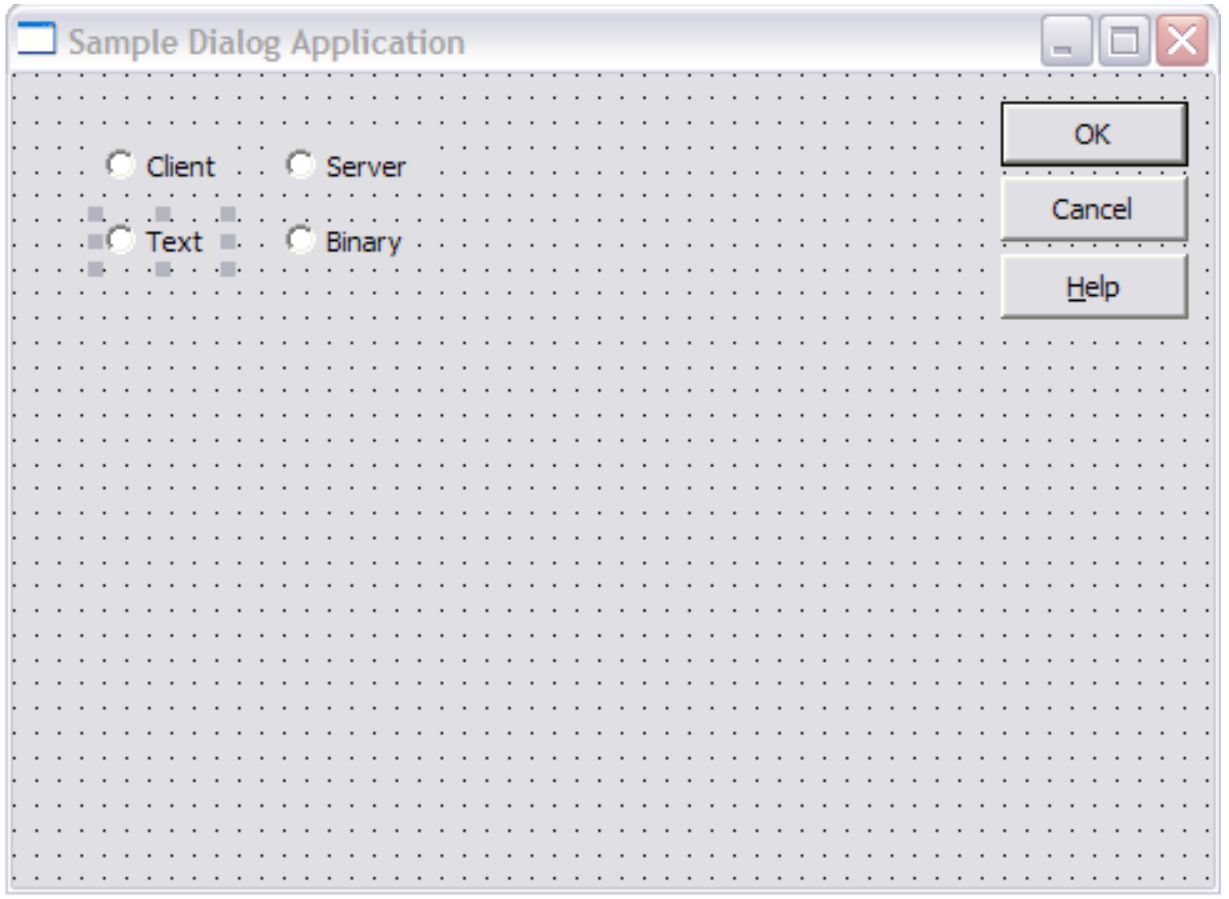

DialogSample
Global Functions and Variables
theApp
Macros and Constants
CAboutDlg
CDialogSampleApp
CDialogSampleDlg
Bases and Interfaces
CDialog
Maps
__unnamed_f3ca2530_1
CDialogSampleDlg(CWnd *pParent = 0)
DoDataExchange(CDataExchange *pDX)
OnInitDialog(void)
OnPaint(void)
OnQueryDragIcon(void)
OnSysCommand(UINT nID, LPARAM lPara
m_hIcon

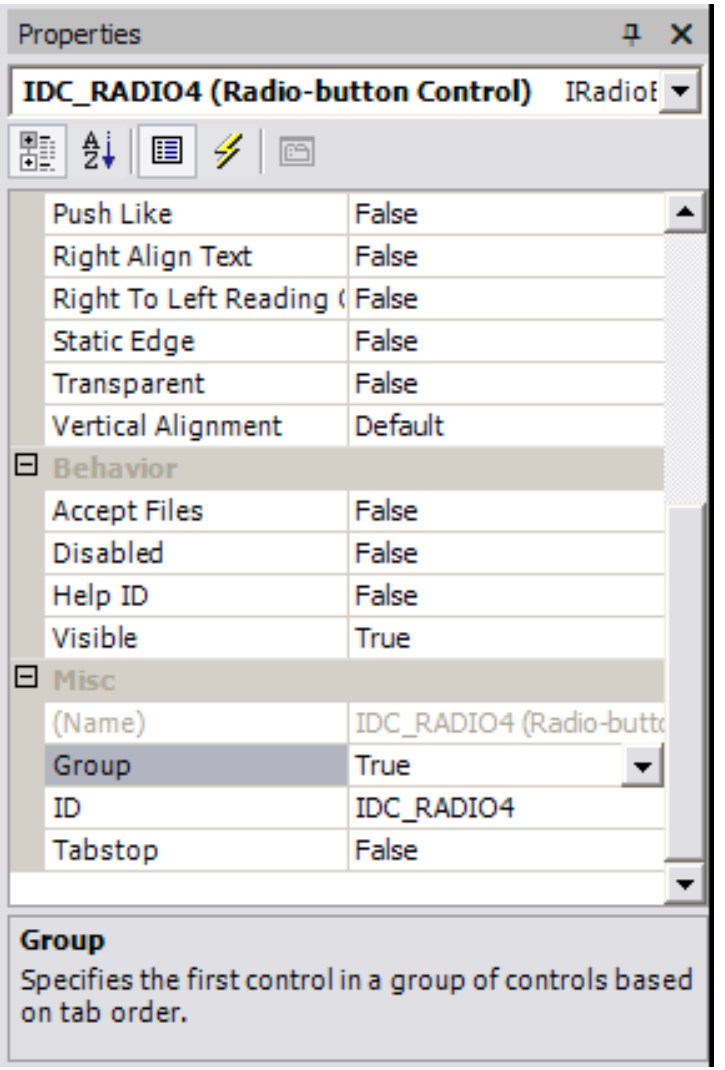

Properties
CDialogSampleDlg VCCodeClass
C++
(Name) CDialogSampleDlg
File c:\documents and settings\el
FullName CDialogSampleDlg
IsAbstract False
IsInjected False
IsManaged False
IsSealed False
IsTemplate False
IsValue False
Dialog
DialogID IDD_DIALOGSAMPLE_DIALO
(Name)
Sets/returns the name of the object.

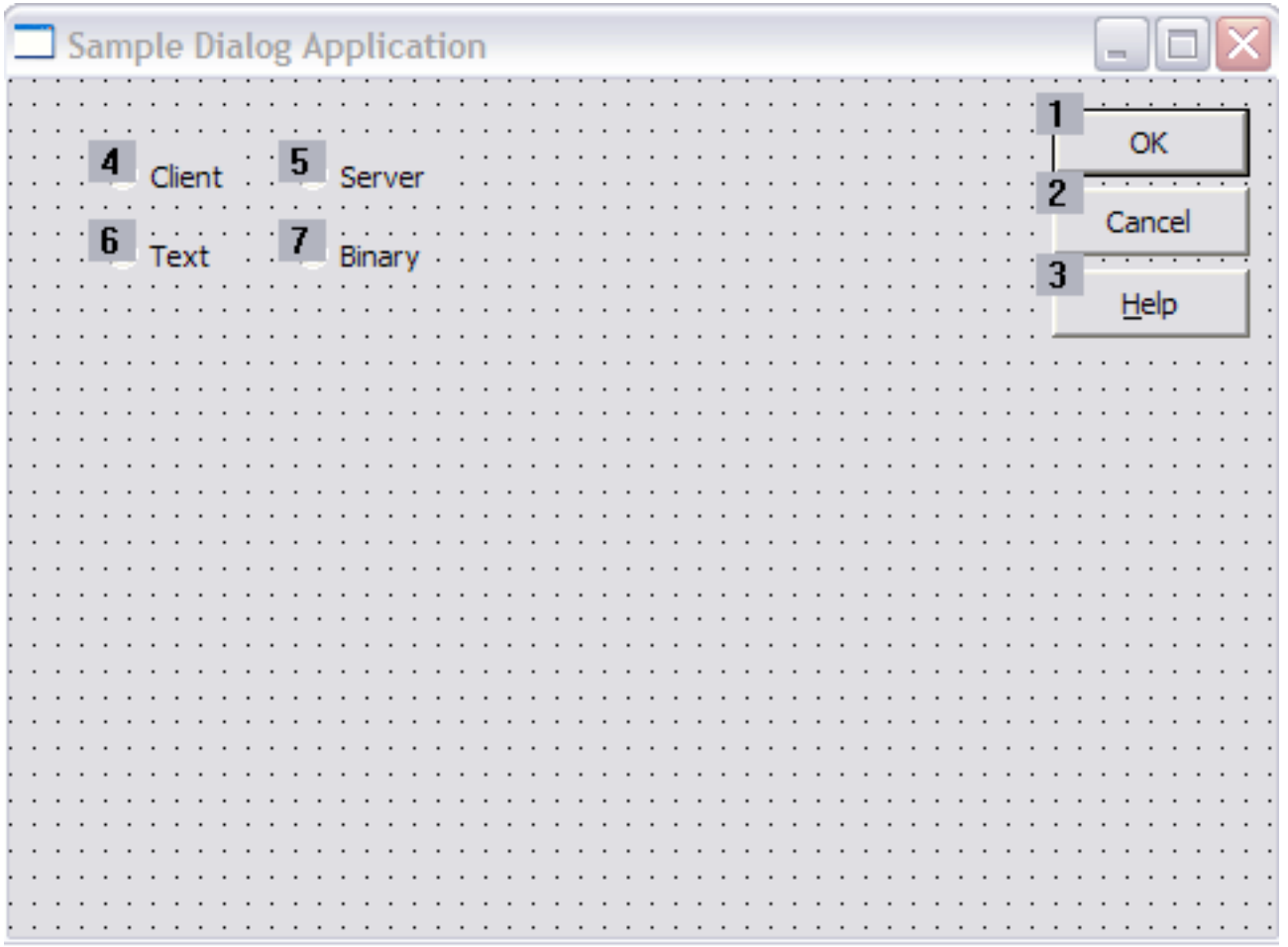

DialogSample - Microsoft Visual C++ [design] - DialogSample.rc (IDD_DIALOGSAMPLE_DIALOG - Dialog)
File Edit View Project Build Debug Format Tools Window Help
Debug
:preparep
Toolbox
Dialog Editor
Pointer
Button
Check Box
Edit Control
Combo Box
List Box
Group Box
Radio Button
Static Text
Picture Control
Horizontal Scroll Bar
Vertical Scroll Bar
Slider Control
Spin Control
Progress Control
Hot Key
List Control
Tree Control
Tab Control
Animation Control
Rich Edit 2.0 Control
Date Time Picker
Month Calendar Control
IP Address Control
Extended Combo Box
Custom Control
Msie Control
Clipboard Ring
General
Start Page
DialogSampleDlg.cpp
DialogSampleDlg.h
DialogSample.r...ALOG - Dialog)
Sample Dialog Application
OK
Cancel
Help
TODO: Place dialog controls here.
Resource View - DialogSample
DialogSample
DialogSample.rc
Dialog
IDD_ABOUTBOX [English (U.S.)]
IDD_DIALOGSAMPLE_DIALOG [English
Icon
String Table
Version
Solutio...
Class ...
Resou...
Index
Properties
Dialog Node IDlgRes
Misc
(Name) Dialog Node
Condition
ID IDD_DIALOGSAMPLE_DIALOG
Language English (United States)
(Name)
Output
Task List
Command Window
Output
Find Results 1
Index Results
Properties
Dynamic Help

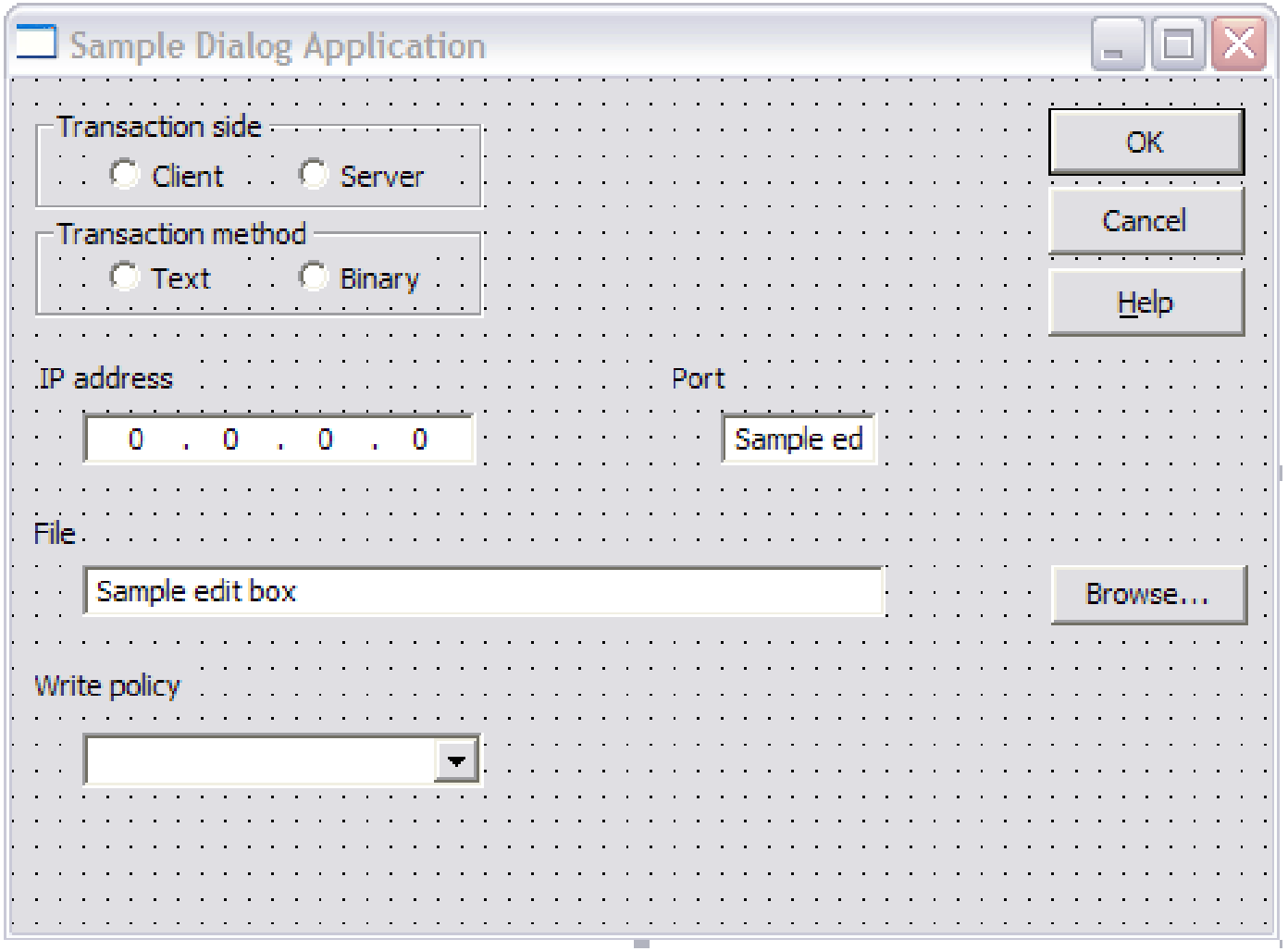

Sample Dialog Application
Client
Server
OK
Cancel
Help

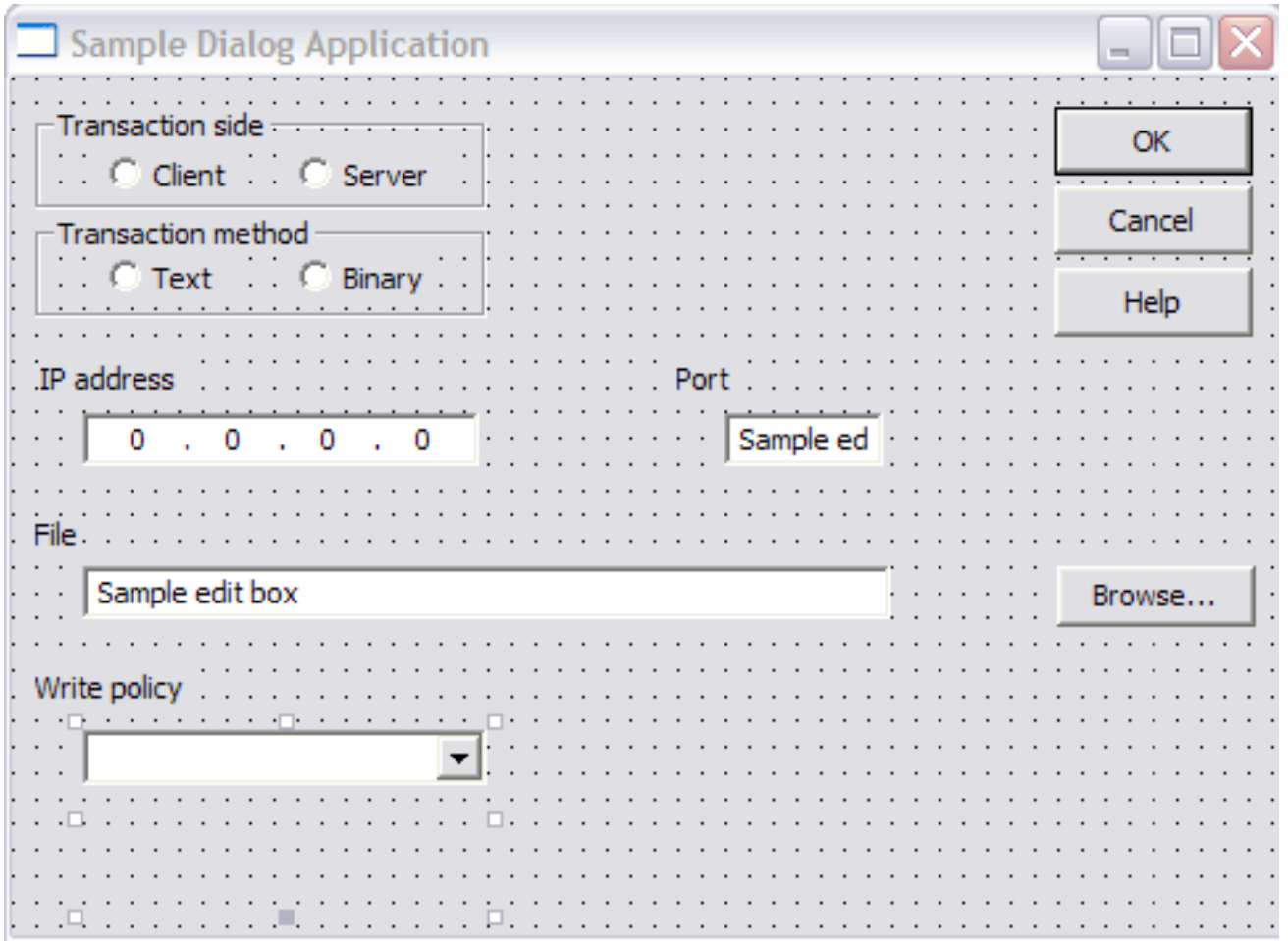

Properties
IDC_RADIO2 (Radio-button Control)
IRadioI
Appearance
Auto
True
Bitmap
False
Caption
Server
Client Edge
False
Flat
False
Horizontal Alignment
Default
Icon
False
Left Text
False
Modal Frame
False
Multiline
False
Notify
False
Push Like
False
Right Align Text
False
Right To Left Reading
False
Static Edge
False
Transparent
False
Caption
Specifies the text displayed by the control.

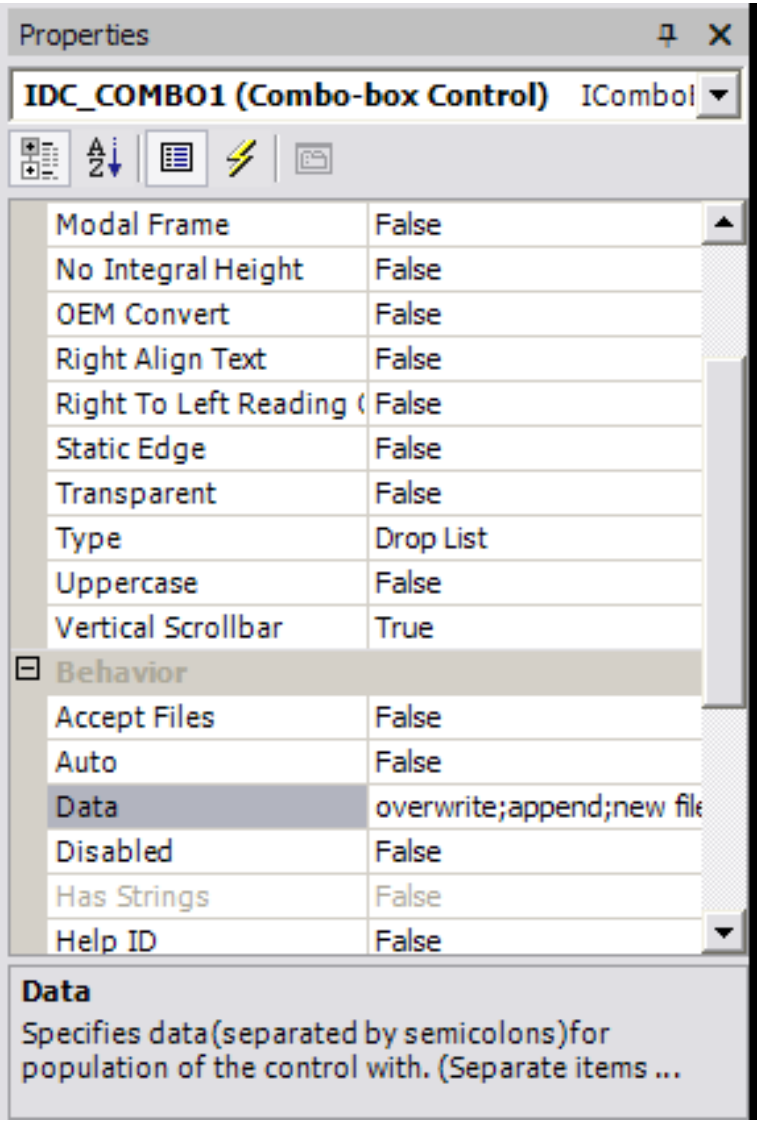

Sample Dialog Application
Client
Server
Text
Binary
OK
Cancel
Help

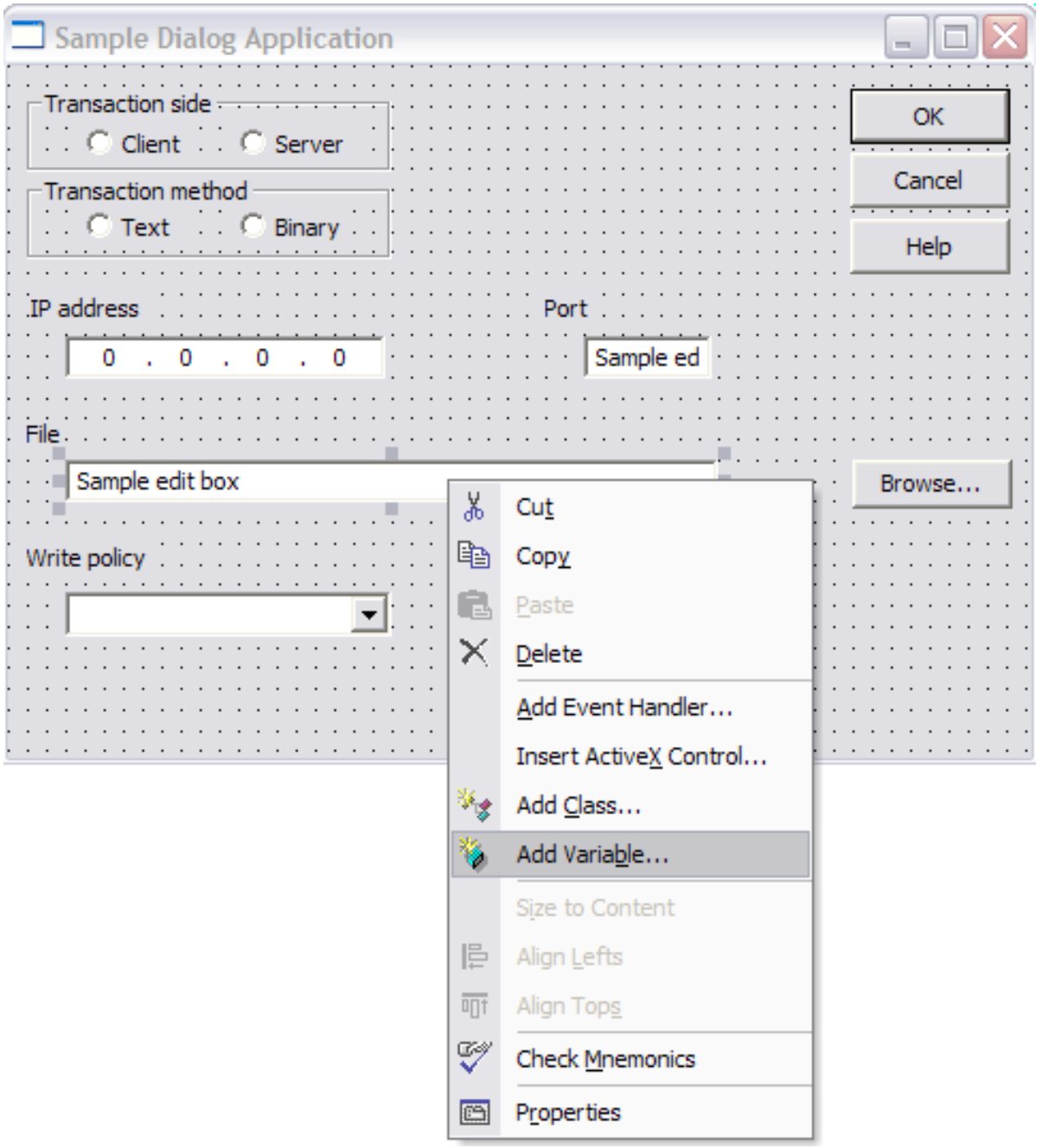

Properties
IDC_RADIO4 (Radio-button Control)
IRadioE
Push Like
False
Right Align Text
False
Right To Left Reading (
False
Static Edge
False
Transparent
False
Vertical Alignment
Default
Behavior
Accept Files
False
Disabled
False
Help ID
False
Visible
True
Misc
(Name)
IDC_RADIO4 (Radio-butt
Group
True
ID
IDC_RADIO4
Tabstop
False
Group
Specifies the first control in a group of controls based on tab order.

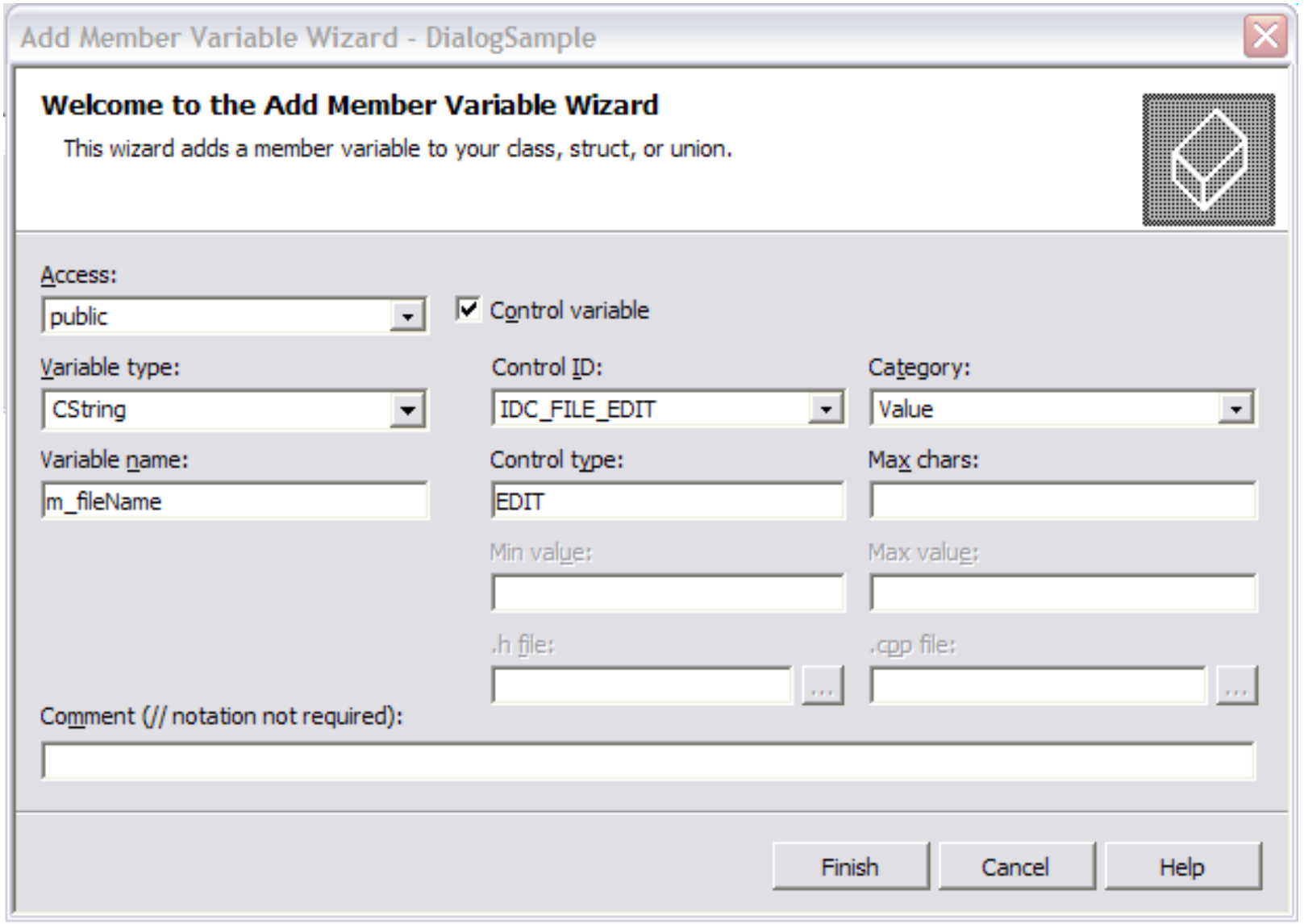

Sample Dialog Application
1
OK
2
Cancel
3
Help
4
Client
5
Server
6
Text
7
Binary


Sample Dialog Application
Transaction side
Client
Server
Transaction method
Text
Binary
OK
Cancel
Help
IP address
0 . 0 . 0 . 0
Port
Sample ed
File
Sample edit box
Browse...
Write policy

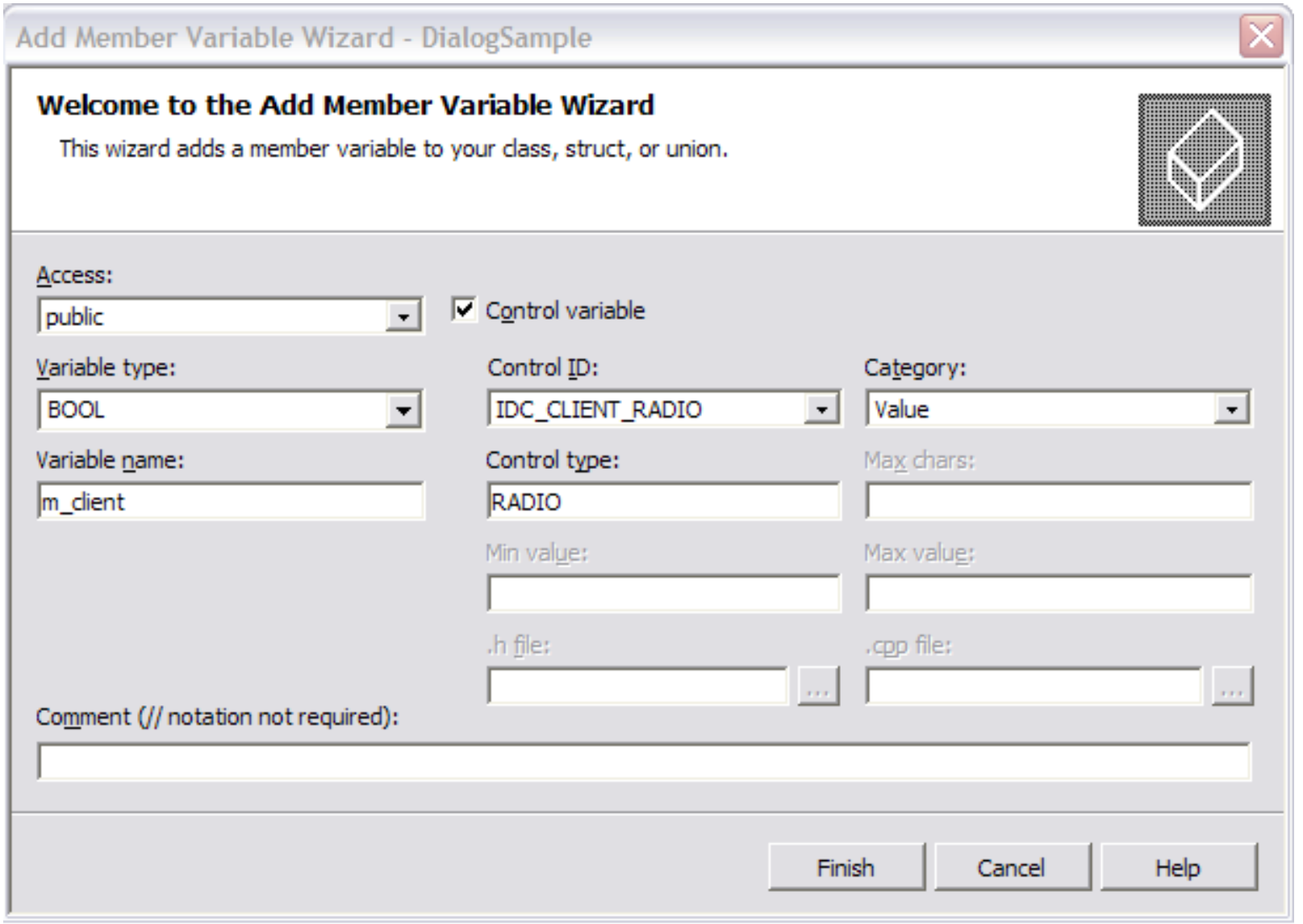

Sample Dialog Application
Transaction side
Client
Server
Transaction method
Text
Binary
OK
Cancel
Help
IP address
0 . 0 . 0 . 0
Port
Sample ed
File
Sample edit box
Browse...
Write policy


Properties
IDC_COMBO1 (Combo-box Control)
IComboI
Modal Frame
False
No Integral Height
False
OEM Convert
False
Right Align Text
False
Right To Left Reading (
False
Static Edge
False
Transparent
False
Type
Drop List
Uppercase
False
Vertical Scrollbar
True
Behavior
Accept Files
False
Auto
False
Data
overwrite;append;new file
Disabled
False
Has Strings
False
Help ID
False
Data
Specifies data(separated by semicolons)for population of the control with. (Separate items ...

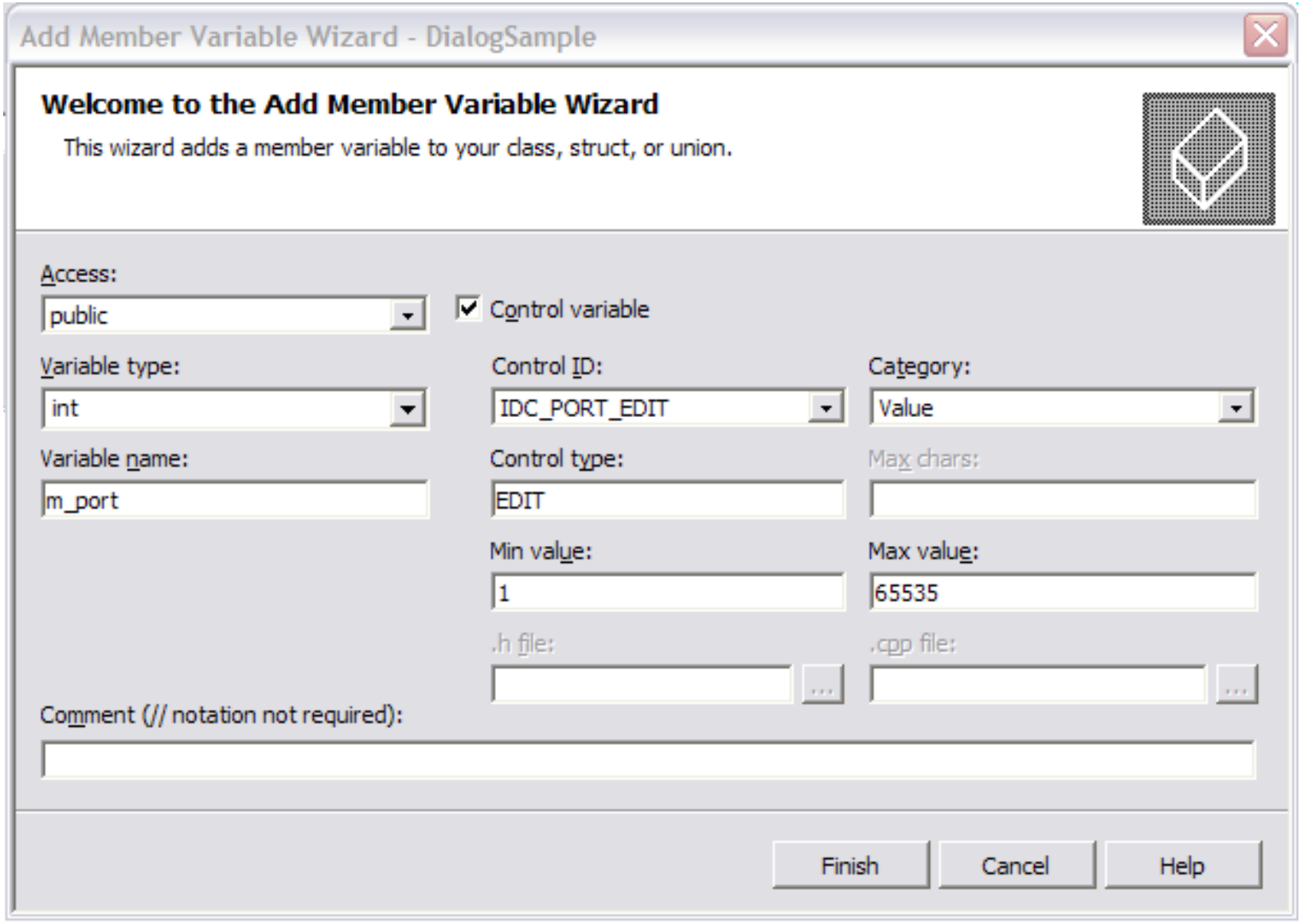

Sample Dialog Application
Transaction side
Client
Server
Transaction method
Text
Binary
OK
Cancel
Help
IP address
0 . 0 . 0 . 0
Port
Sample ed
File
Sample edit box
Browse...
Write policy
Cut
Copy
Paste
Delete
Add Event Handler...
Insert ActiveX Control...
Add Class...
Add Variable...
Size to Content
Align Lefts
Align Tops
Check Mnemonics
Properties



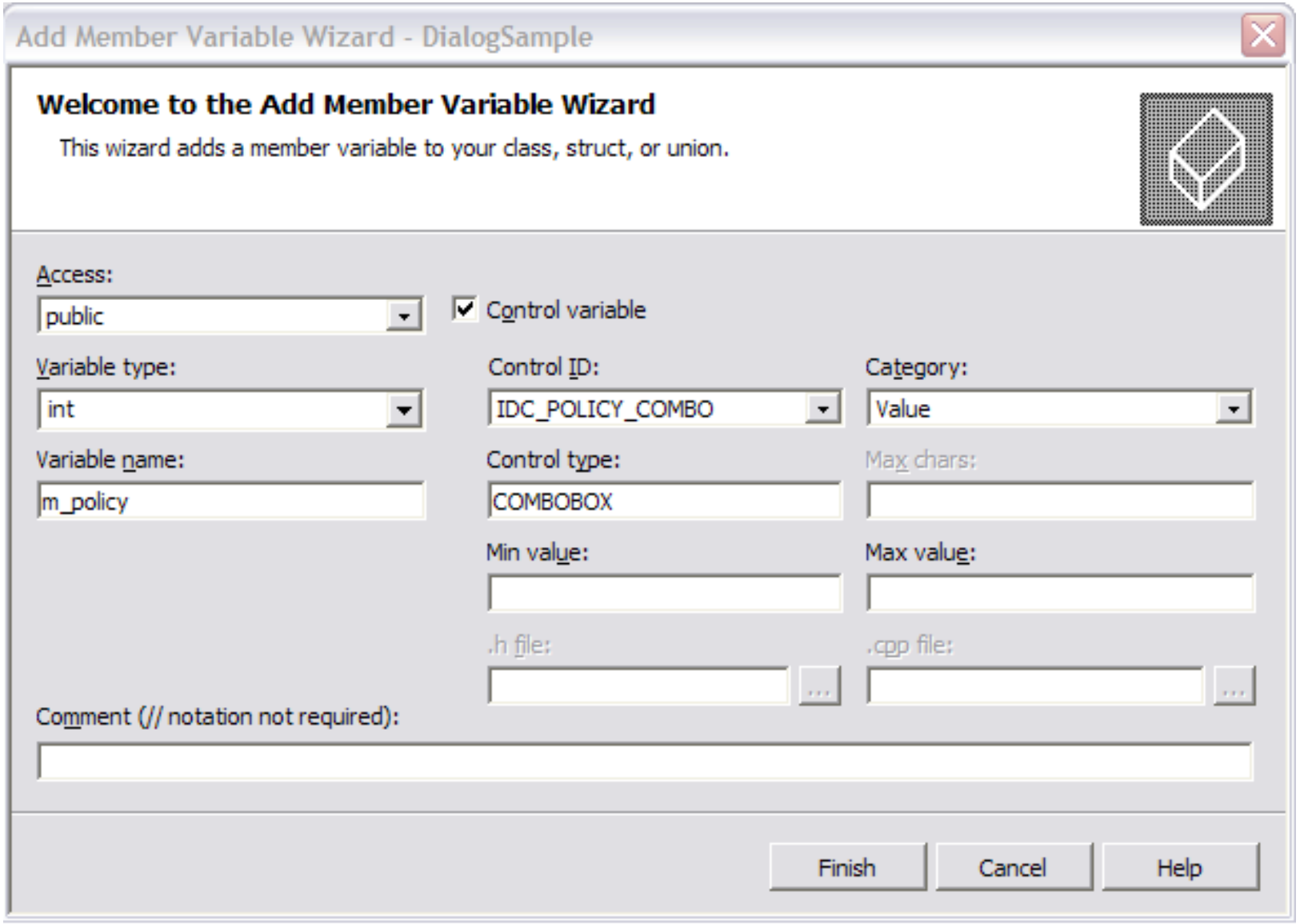

```
CDialogSampleDlg::CDialogSampleDlg(CWnd* pParent /*=NULL*/)
: CDialog(CDialogSampleDlg::IDD, pParent)
, m_fileName(_T("type filename here"))
{
    m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);
}
```

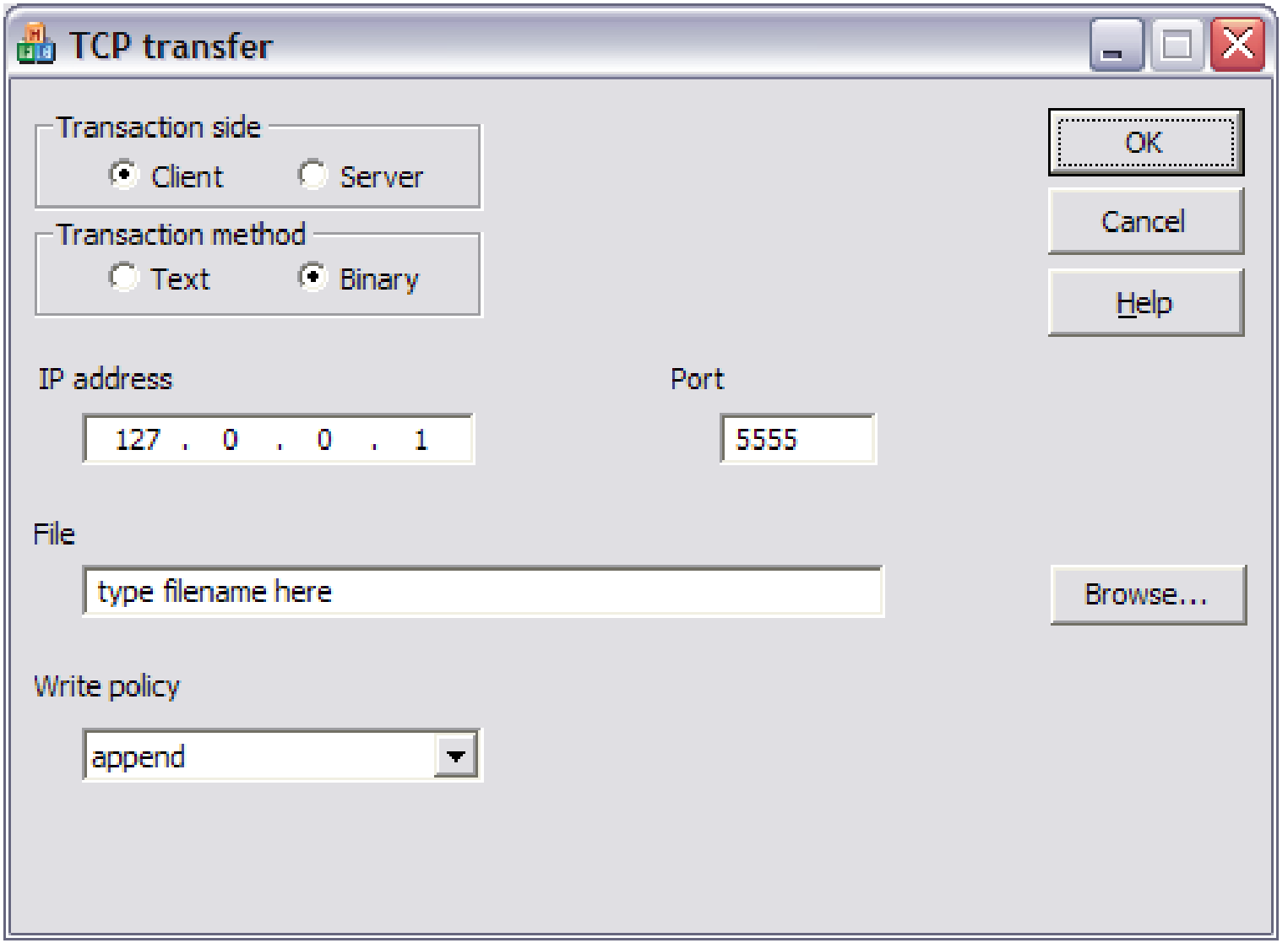


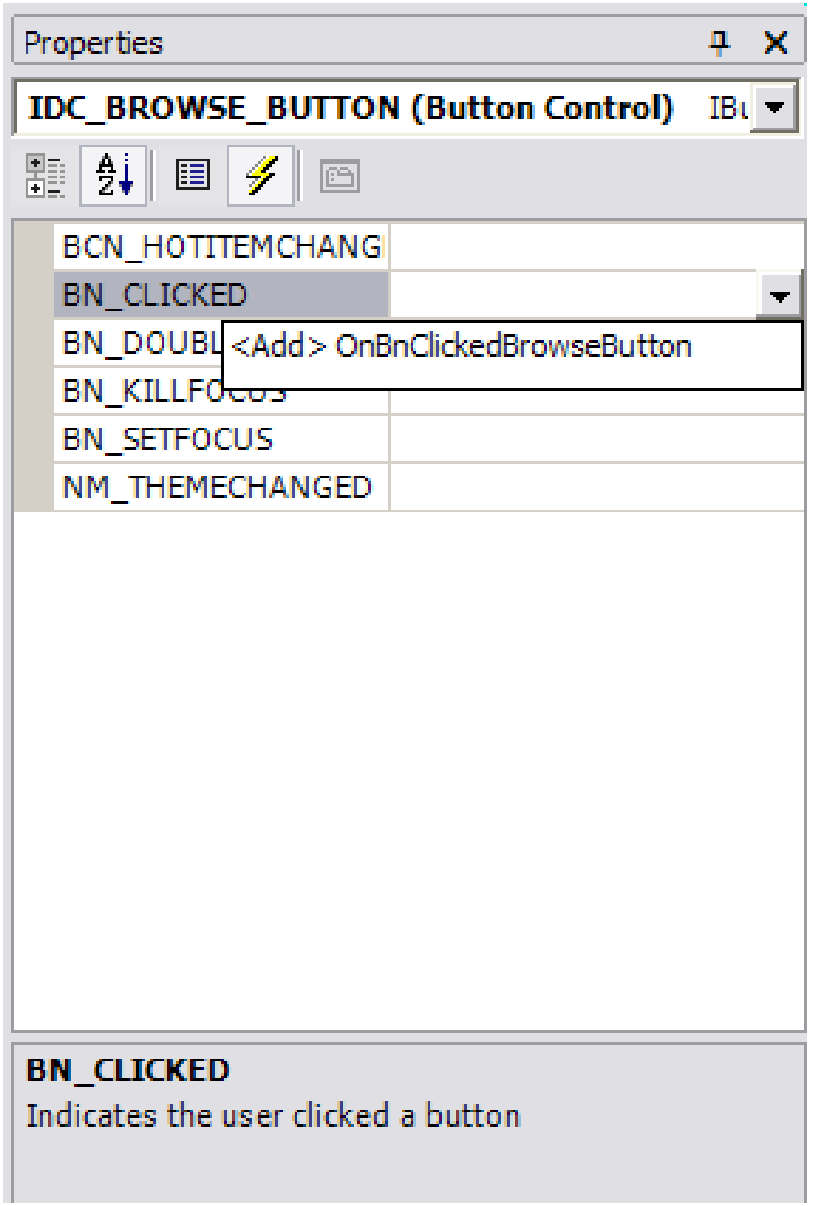

```
CDialogSampleDlg::CDialogSampleDlg(CWnd* pParent /*=NULL*/)
: CDialog(CDialogSampleDlg::IDD, pParent)
, m_fileName(_T("type filename here"))
, m_client(0)
{
    m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);
}
```


Add Member Variable Wizard - DialogSample
Welcome to the Add Member Variable Wizard
This wizard adds a member variable to your class, struct, or union.
Access:
public
Control variable
Variable type:
int
Control ID:
IDC_PORT_EDIT
Category:
Value
Variable name:
m_port
Control type:
EDIT
Max chars:
Min value:
1
Max value:
65535
.h file:
.cpp file:
Comment (// notation not required):
Finish
Cancel
Help

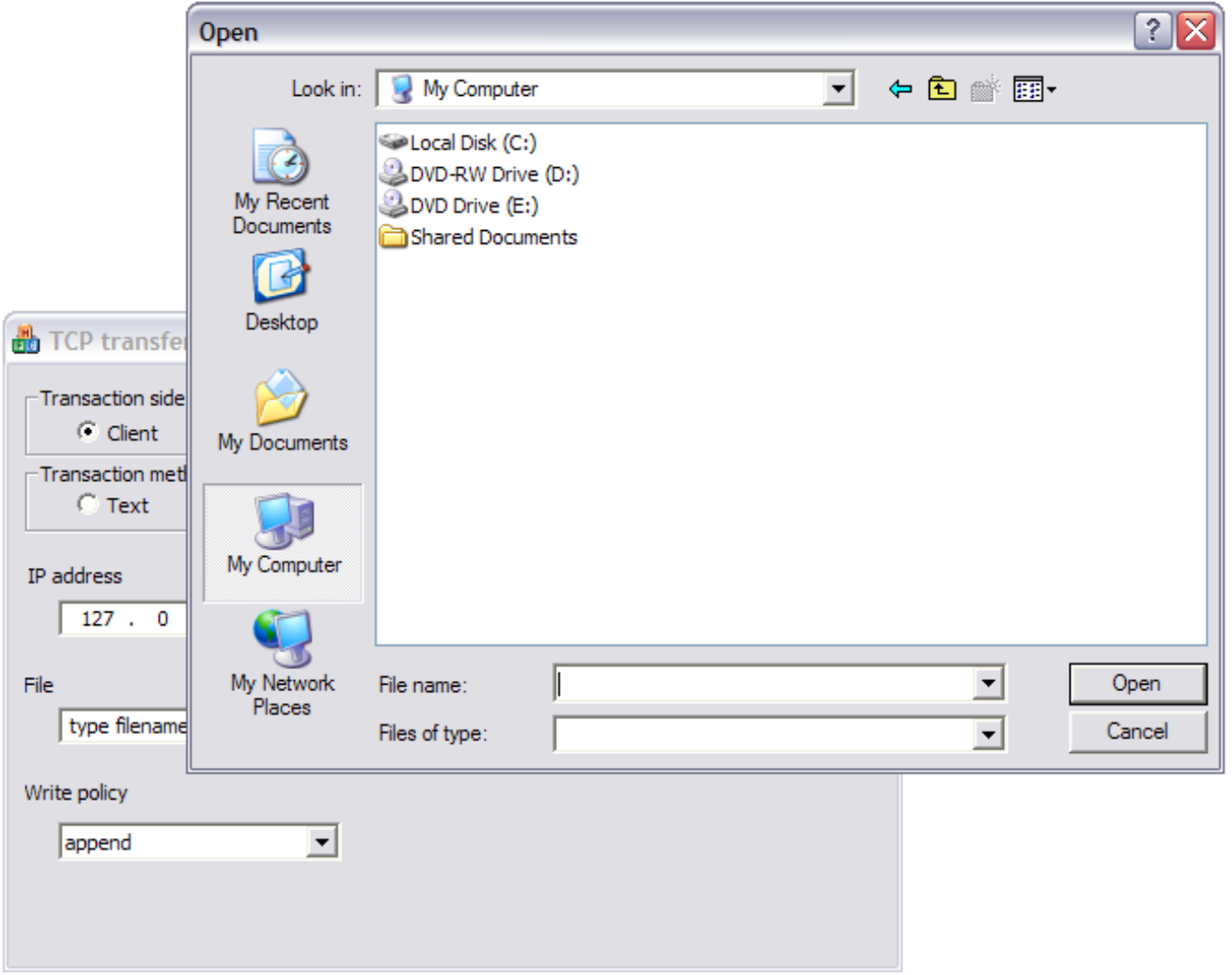
```
CDialogSampleDlg::CDialogSampleDlg(CWnd* pParent /*=NULL*/)
: CDialog(CDialogSampleDlg::IDD, pParent)
    , m_fileName(_T("type filename here"))
    , m_client(0)
    , m_transaction(1)
    , m_IP(htonl(inet_addr("127.0.0.1")))
    , m_port(5555)
{
m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);
}

void CDialogSampleDlg::DoDataExchange(CDataExchange* pDX)
{
    CDialog::DoDataExchange(pDX);
    DDX_Text(pDX, IDC_FILE_EDIT, m_fileName);
    DDX_Radio(pDX, IDC_CLIENT_RADIO, m_client);
    DDX_Radio(pDX, IDC_TEXT_RADIO, m_transaction);
    DDX_IPAddress(pDX, IDC_IPADDRESS, m_IP);
    DDX_Text(pDX, IDC_PORT_EDIT, m_port);
    DDV_MinMaxInt(pDX, m_port, 1, 65535);
}
```


Add Member Variable Wizard - DialogSample
Welcome to the Add Member Variable Wizard
This wizard adds a member variable to your class, struct, or union.
Access:
public
Control variable
Variable type:
int
Control ID:
IDC_POLICY_COMBO
Category:
Value
Variable name:
m_policy
Control type:
COMBOBOX
Max chars:
Min value:
Max value:
.h file:
.cpp file:
Comment (// notation not required):
Finish
Cancel
Help

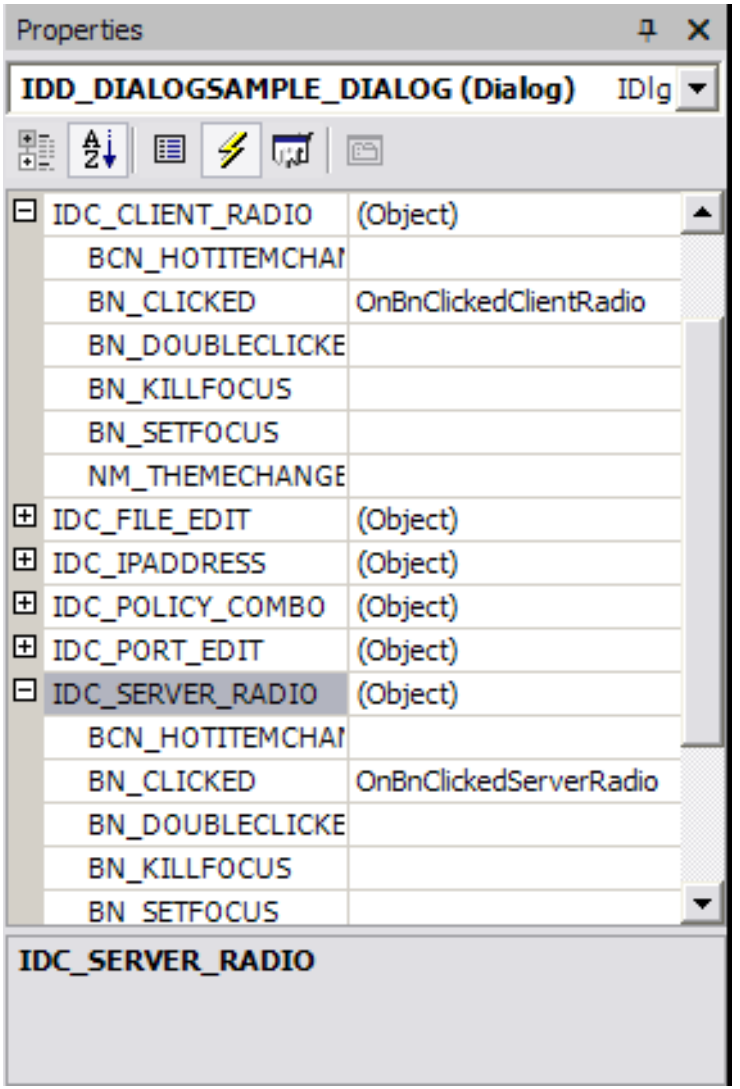

TCP transfer
Transaction side
Client
Server
Transaction method
Text
Binary
OK
Cancel
Help
IP address
127 . 0 . 0 . 1
Port
5555
File
type filename here
Browse...
Write policy
append

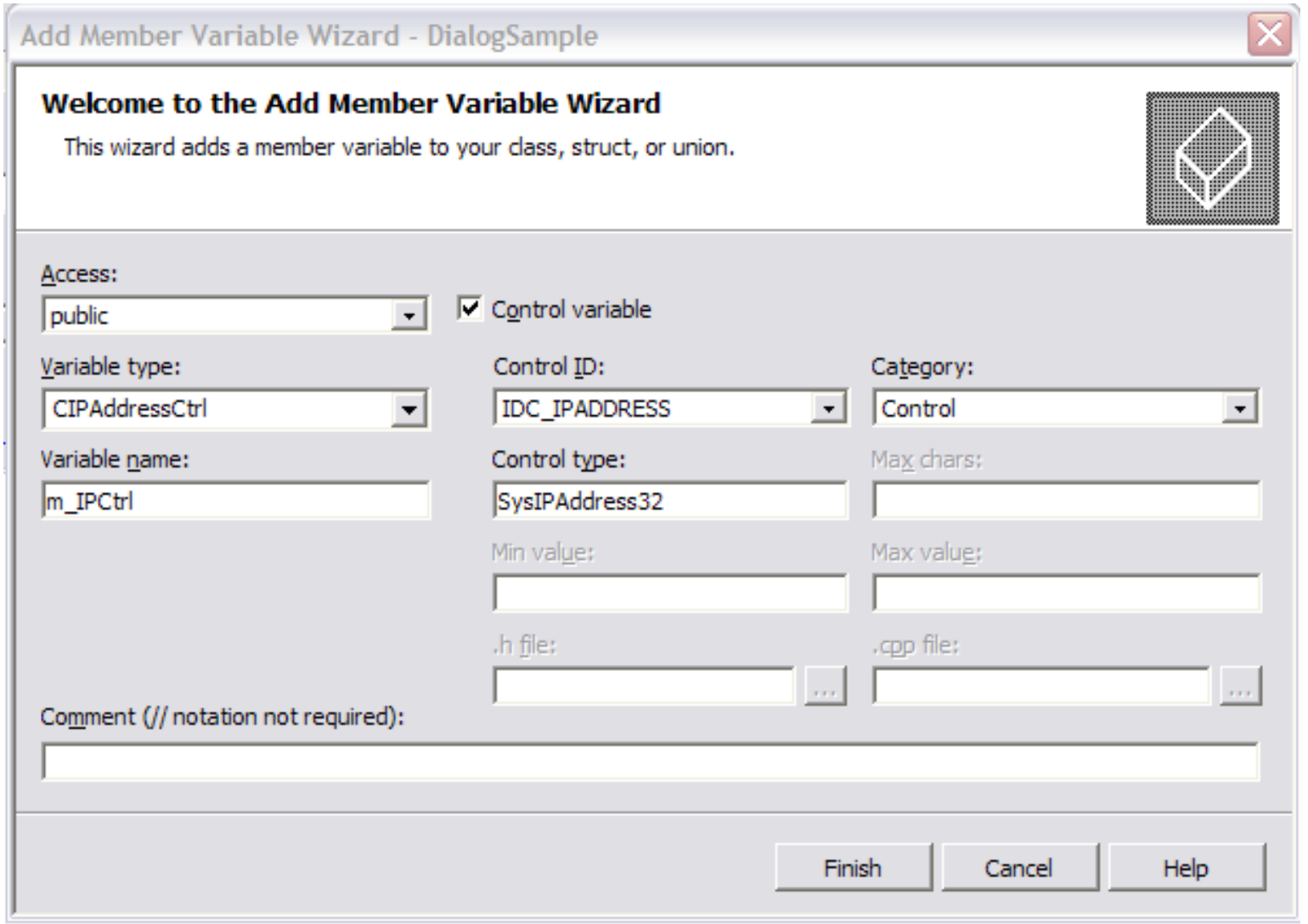


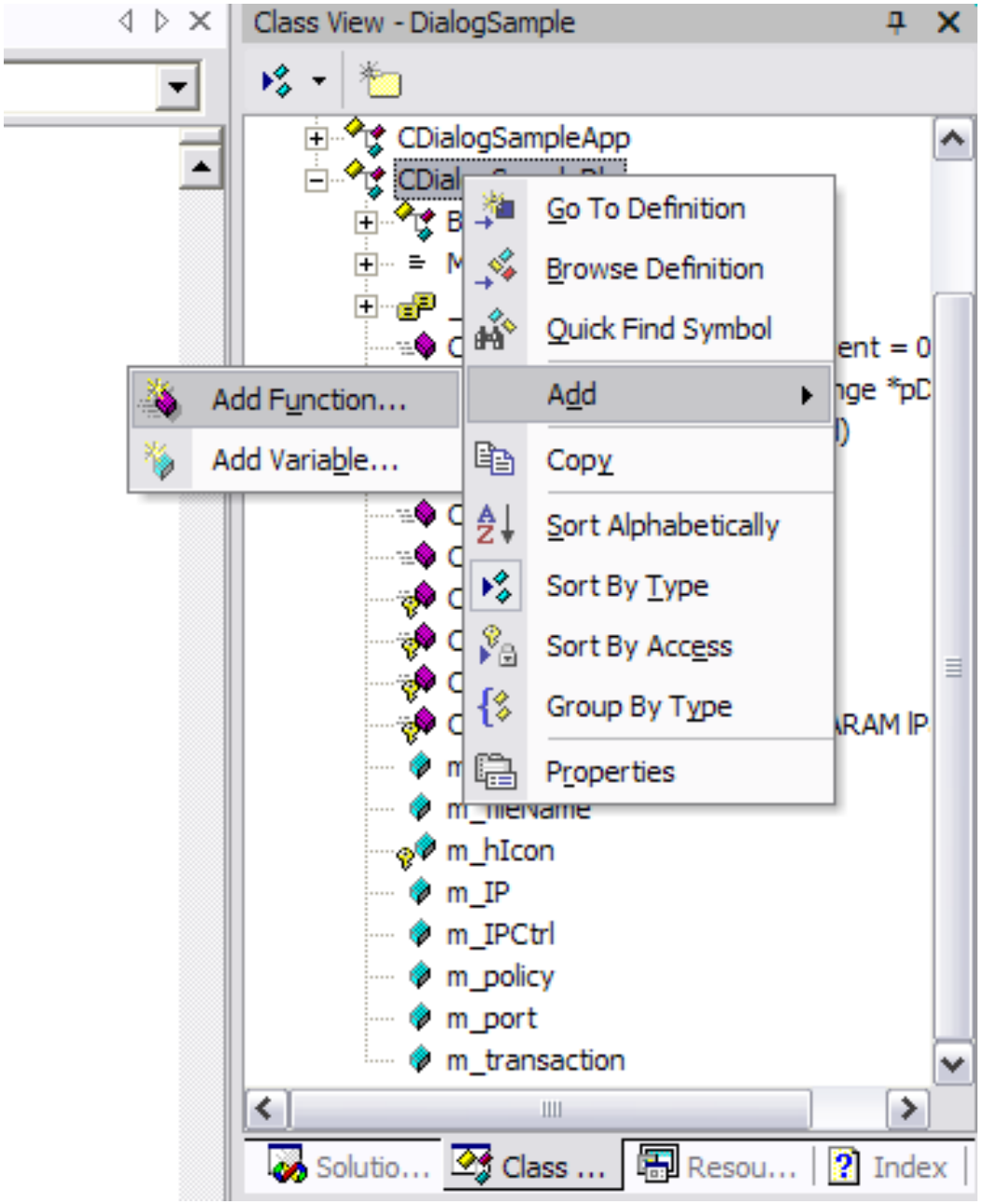

```
void CDialogSampleDlg::OnBnClickedBrowseButton()
{
    CFileDialog dialog(TRUE);
    dialog.DoModal();
}
```

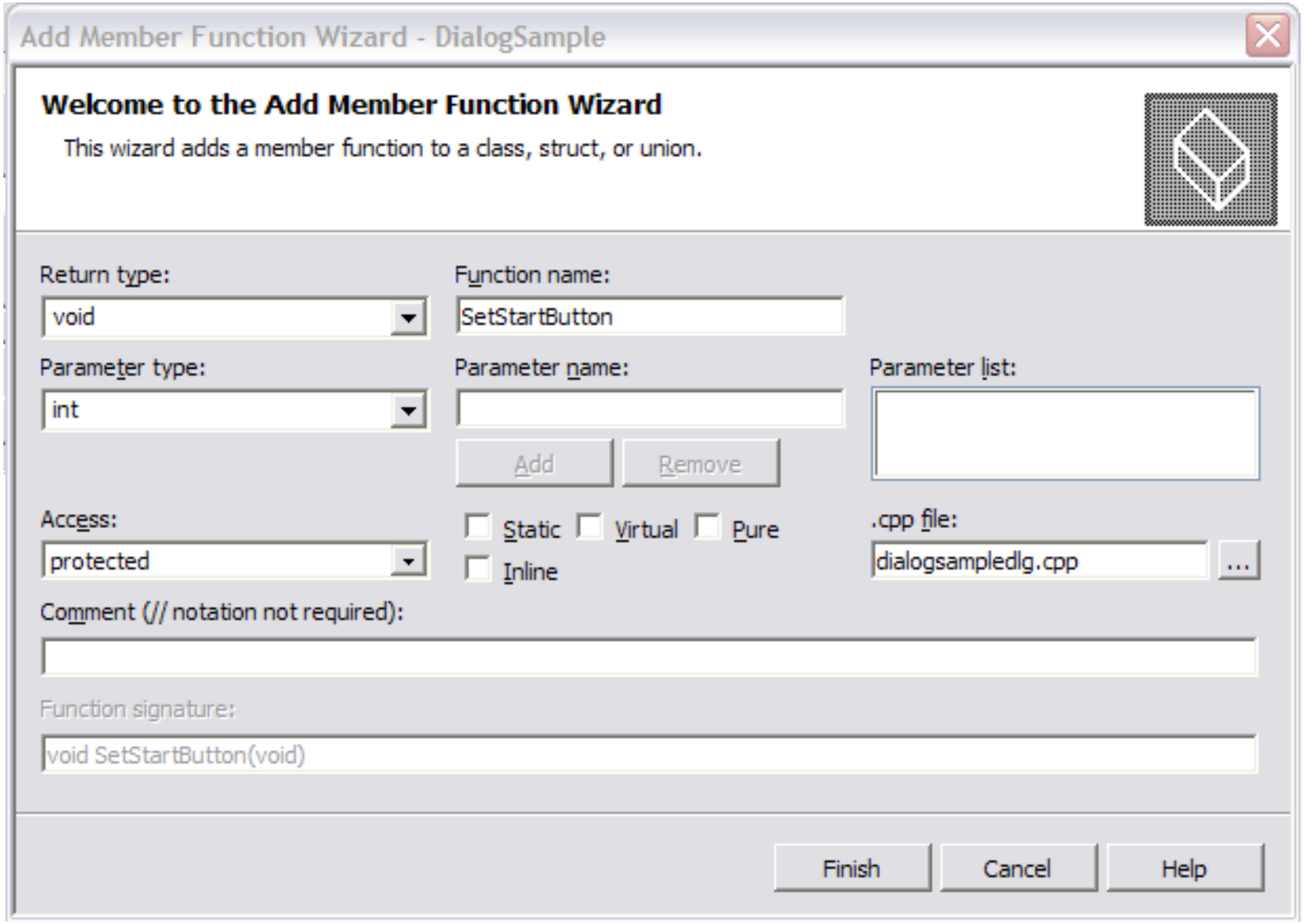



```
void CDialogSampleDlg::OnBnClickedBrowseButton()
{
    CFileDialog dialog(TRUE);
    if (dialog.DoModal() == IDOK)
    {
        m_fileName = dialog.GetPathName();
        UpdateData(FALSE);
    }
}
```


Properties
IDD_DIALOGSAMPLE_DIALOG (Dialog)
IDlg
IDC_CLIENT_RADIO
(Object)
BCN_HOTITEMCHAI
BN_CLICKED
OnBnClickedClientRadio
BN_DOUBLECLICKE
BN_KILLFOCUS
BN_SETFOCUS
NM_THEMECHANGE
IDC_FILE_EDIT
(Object)
IDC_IPADDRESS
(Object)
IDC_POLICY_COMBO
(Object)
IDC_PORT_EDIT
(Object)
IDC_SERVER_RADIO
(Object)
BCN_HOTITEMCHAI
BN_CLICKED
OnBnClickedServerRadio
BN_DOUBLECLICKE
BN_KILLFOCUS
BN_SETFOCUS
IDC_SERVER_RADIO

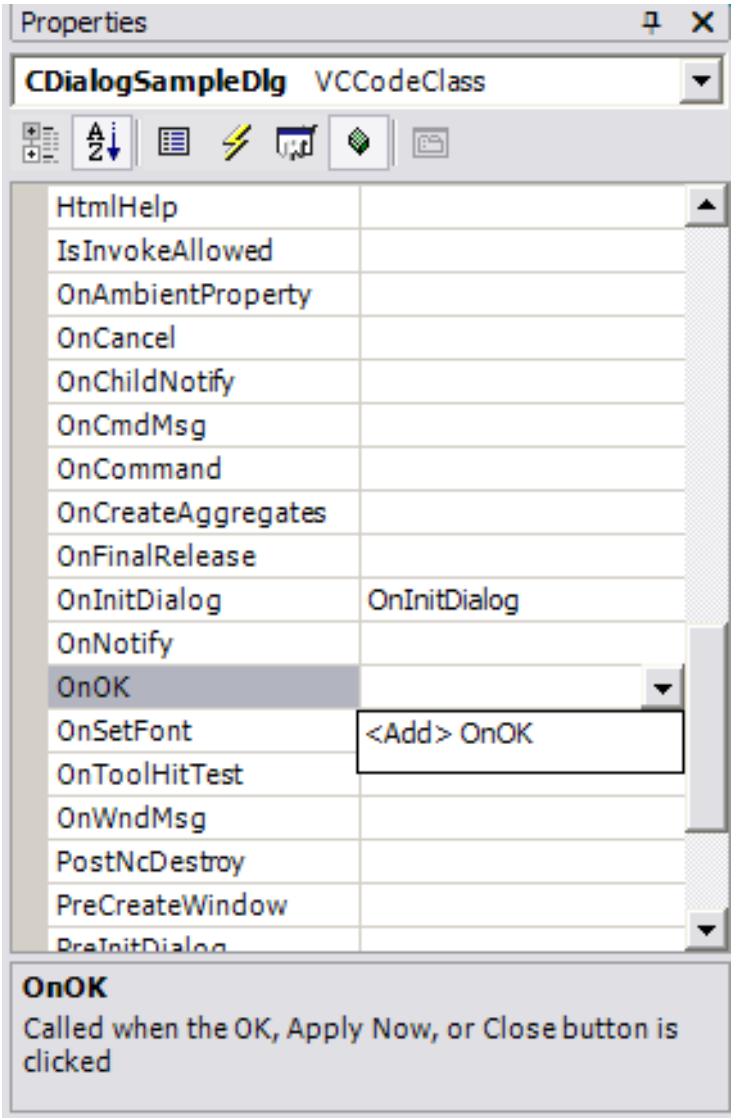

Add Member Variable Wizard - DialogSample
Welcome to the Add Member Variable Wizard
This wizard adds a member variable to your class, struct, or union.
Access:
public
Control variable
Variable type:
CIPAddressCtrl
Control ID:
IDC_IPADDRESS
Category:
Control
Variable name:
m_IPCtrl
Control type:
SysIPAddress32
Max chars:
Min value:
Max value:
.h file:
.cpp file:
Comment (// notation not required):
Finish
Cancel
Help


Class View - DialogSample
CDialogSampleApp
Go To Definition
Browse Definition
Quick Find Symbol
Add
Copy
Sort Alphabetically
Sort By Type
Sort By Access
Group By Type
Properties
Add Function...
Add Variable...
m_hIcon
m_IP
m_IPCtrl
m_policy
m_port
m_transaction
Solutio...
Class ...
Resou...
Index


Add Member Function Wizard - DialogSample
Welcome to the Add Member Function Wizard
This wizard adds a member function to a class, struct, or union.
Return type:
void
Function name:
SetStartButton
Parameter type:
int
Parameter name:
Add
Remove
Parameter list:
Access:
protected
Static
Virtual
Pure
Inline
.cpp file:
dialogsampledlg.cpp
...
Comment (// notation not required):
Function signature:
void SetStartButton(void)
Finish
Cancel
Help

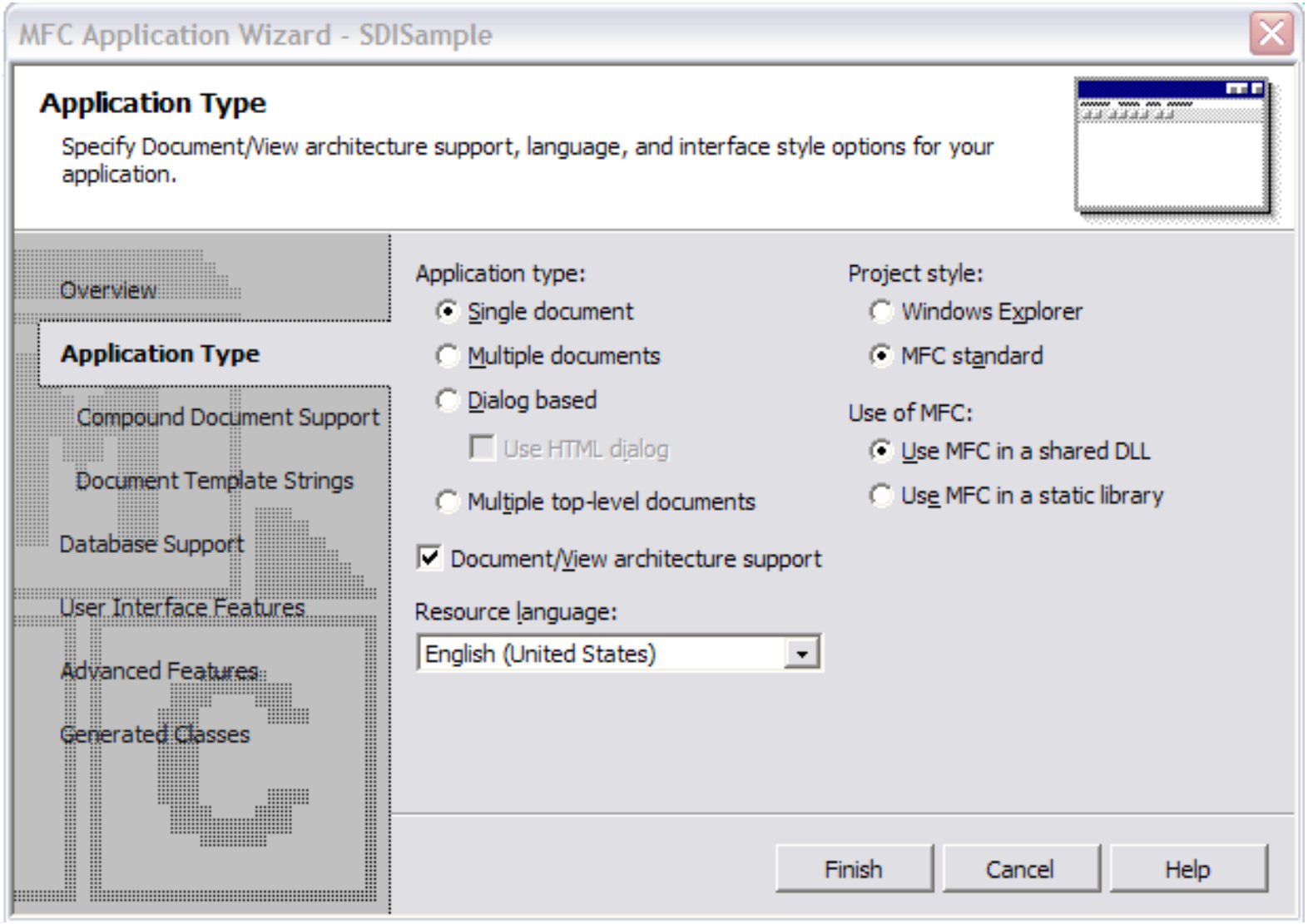
```
void CDialogSampleDlg::OnBnClickedStartButton()
{
    if (m_started){
        //stop process
        m_started = false;
        SetStartButton();
    }else{
        UpdateData();
        if (m_client == 0){
            //client code
            //open file, stop if unable
            if (/*file not OK*/1){
                AfxMessageBox("Cannot open file", MB_APPLMODAL | MB_OK |
            MB_ICONERROR);
                return;
            }
            //parse IP
            //....
            //set button to "Stop"
            m_started = true;
            SetStartButton();
            //start sending
        }else{
            //server code
            //set button to "Stop"
            m_started = true;
            SetStartButton();
            //start server
        }
    }
}
```

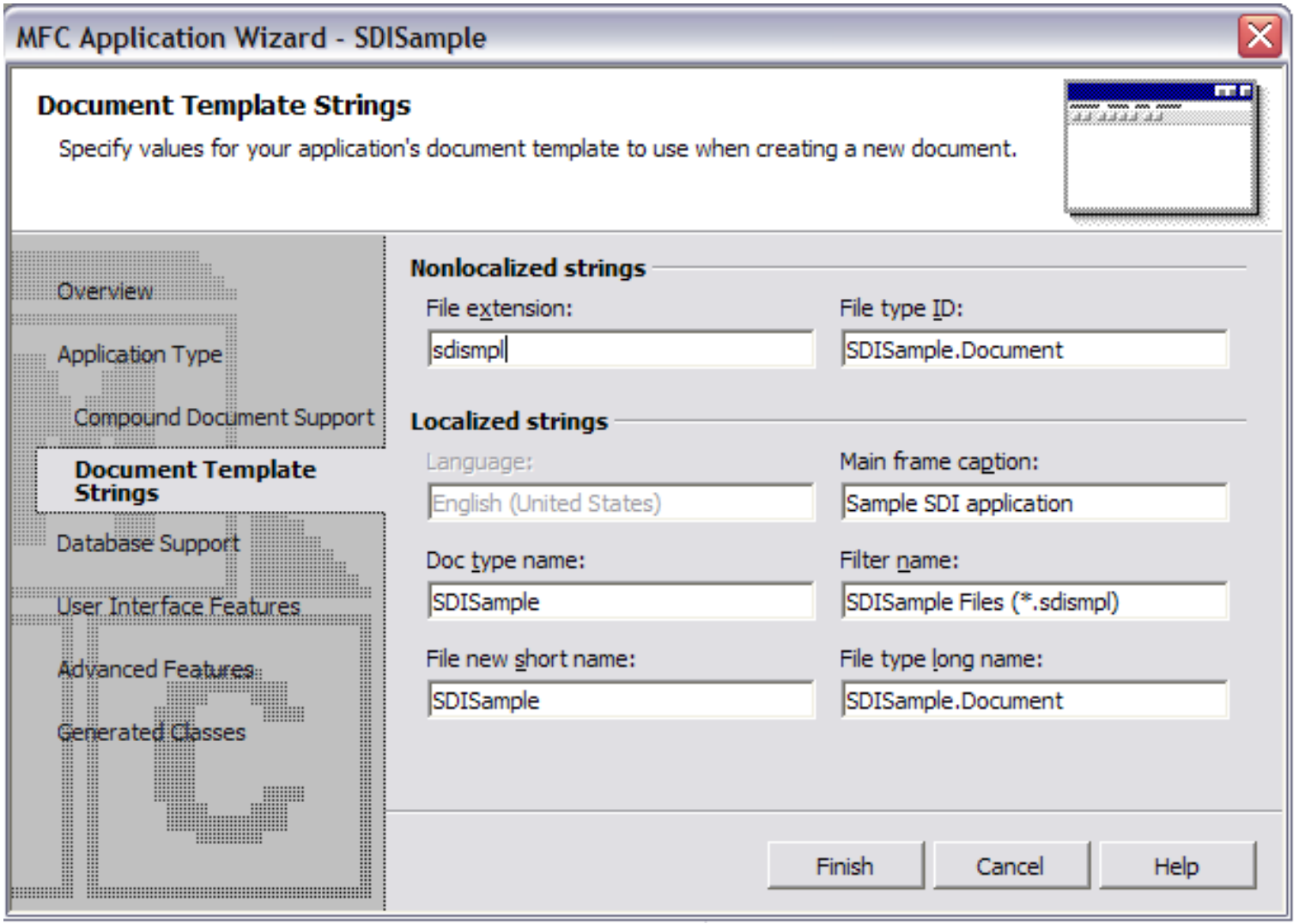
```
void CDialogSampleDlg::SetStartButton()
{
    if (m_started)
    {
        m_startButton.SetWindowText("Stop");
    }else
    {
        m_startButton.SetWindowText("Start");
    }
}
```

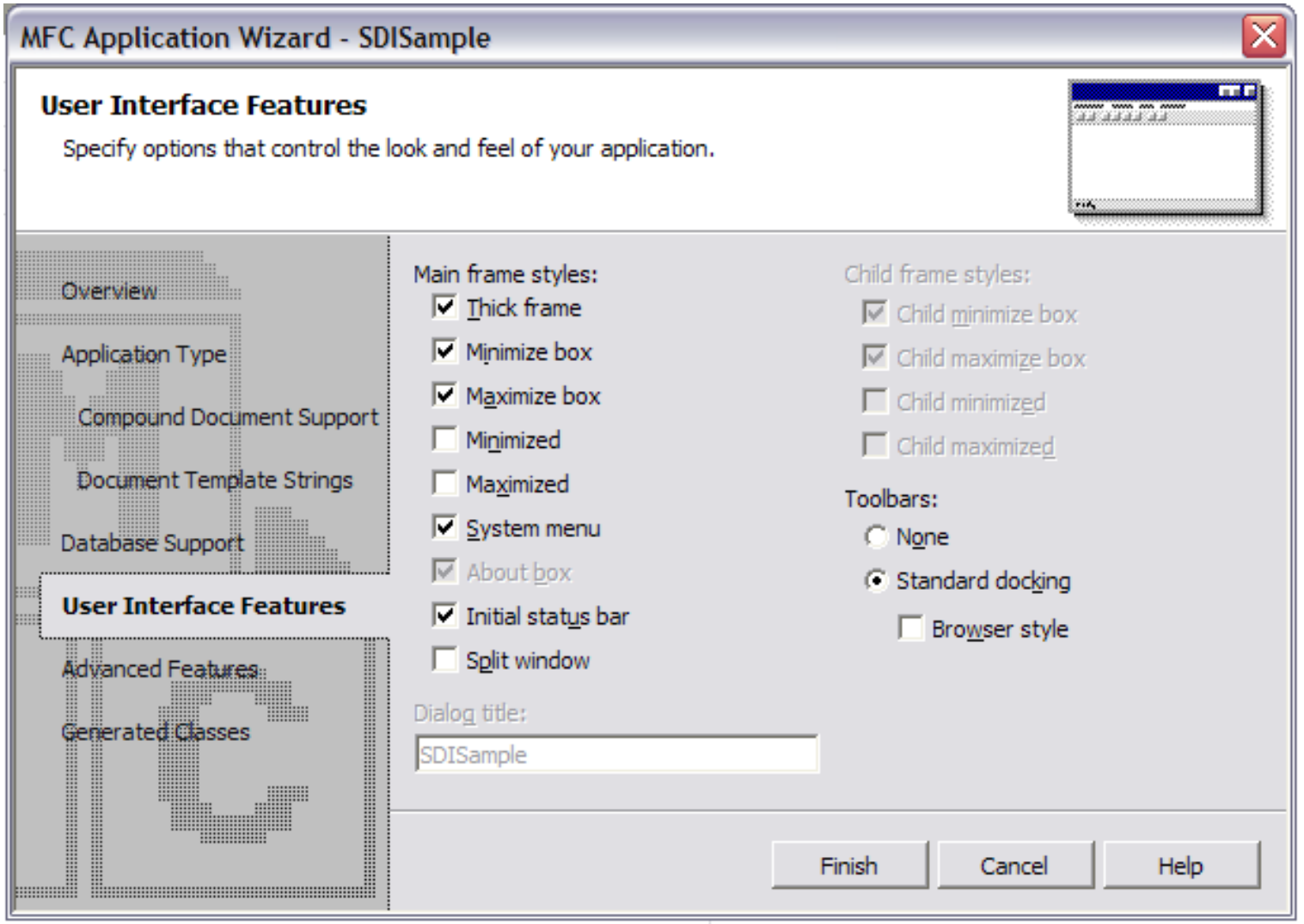

Properties
CDialogSampleDlg VCCodeClass
HtmlHelp
IsInvokeAllowed
OnAmbientProperty
OnCancel
OnChildNotify
OnCmdMsg
OnCommand
OnCreateAggregates
OnFinalRelease
OnInitDialog
OnInitDialog
OnNotify
OnOK
OnSetFont
<Add> OnOK
OnToolHitTest
OnWndMsg
PostNcDestroy
PreCreateWindow
OnOK
Called when the OK, Apply Now, or Close button is clicked

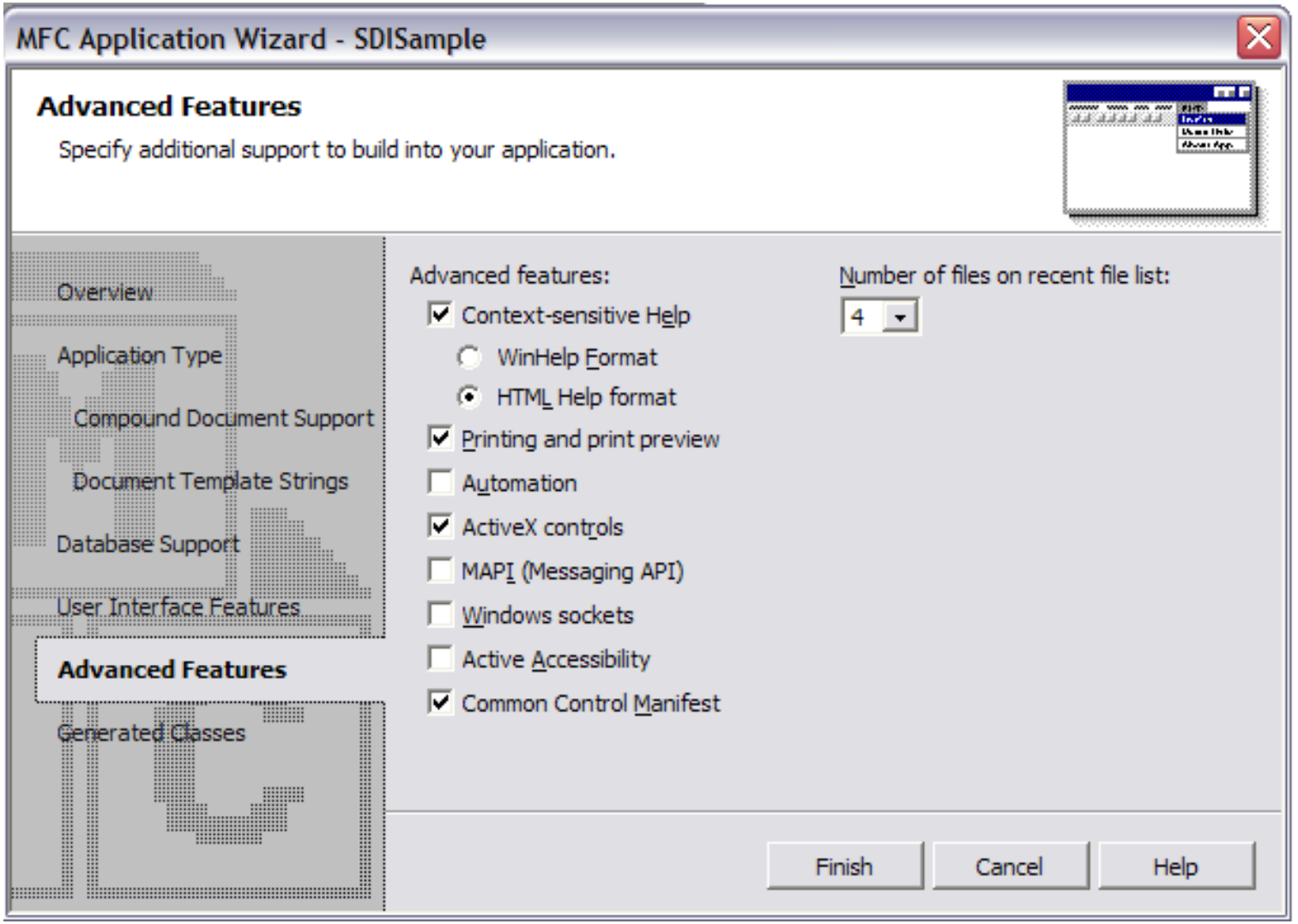
```
void CDialogSampleDlg::OnOK()
{
    if (m_started)
    {
        if (AfxMessageBox("Abort transfer?", MB_APPLMODAL |
        MB_OKCANCEL | MB_ICONQUESTION) != IDOK)
        {
            return;
        }
    }
    CDialog::OnOK();
}
```

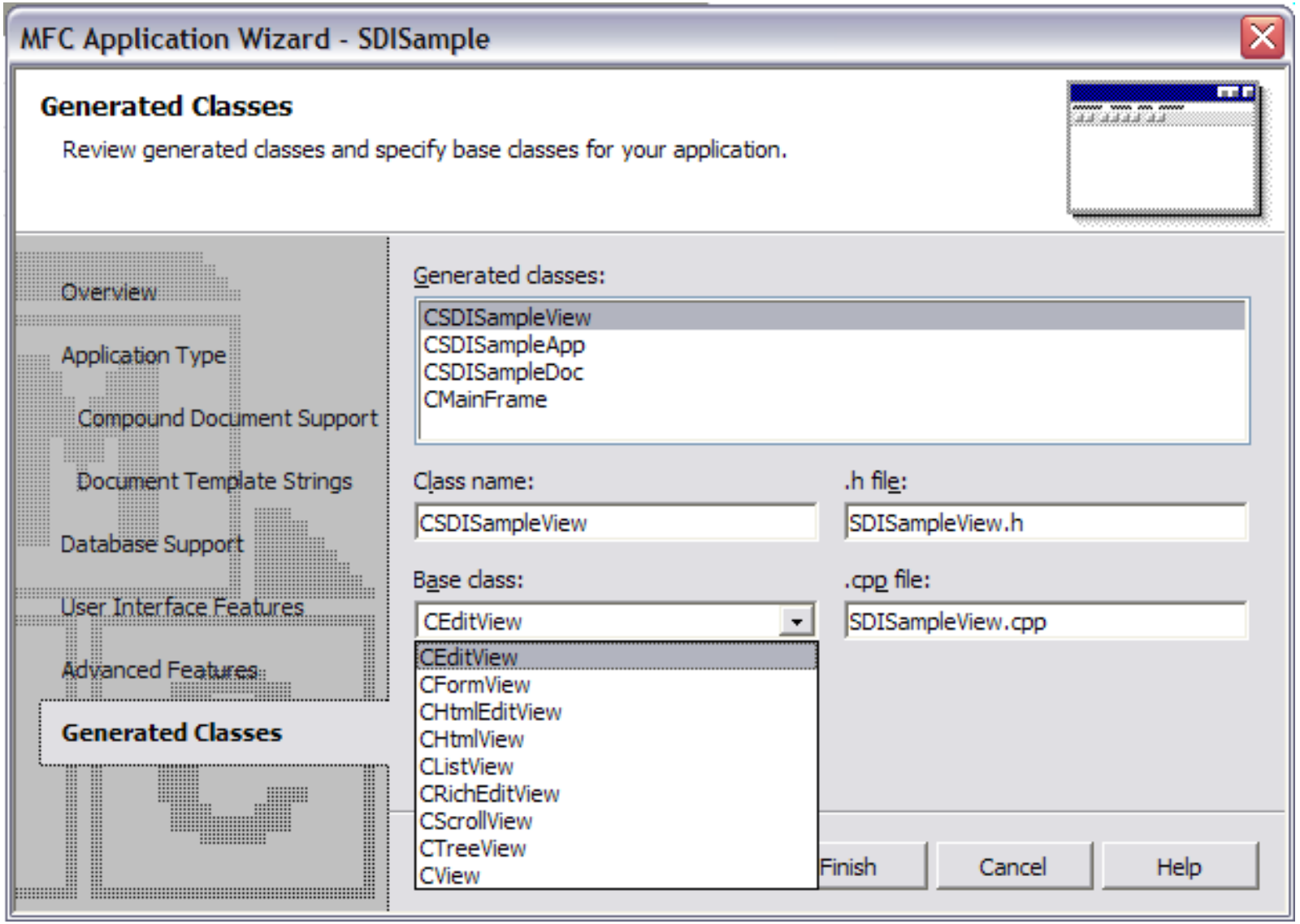
Aplikacja SDI

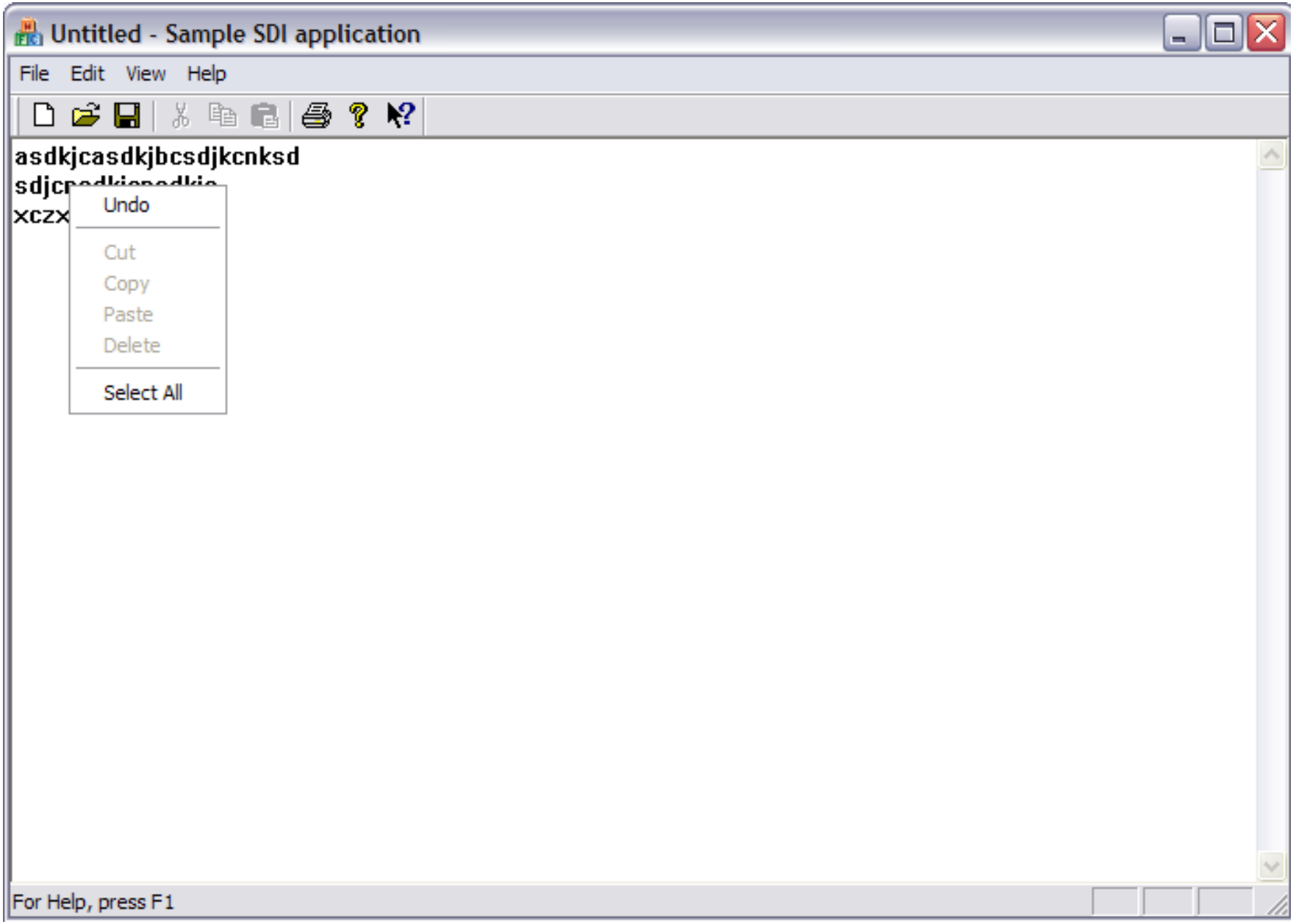



MFC Application Wizard - SDISample
Document Template Strings
Specify values for your application's document template to use when creating a new document.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Nonlocalized strings
File extension:
sdismpl
File type ID:
SDISample.Document
Localized strings
Language:
English (United States)
Main frame caption:
Sample SDI application
Doc type name:
SDISample
Filter name:
SDISample Files (*.sdismpl)
File new short name:
SDISample
File type long name:
SDISample.Document
Finish
Cancel
Help

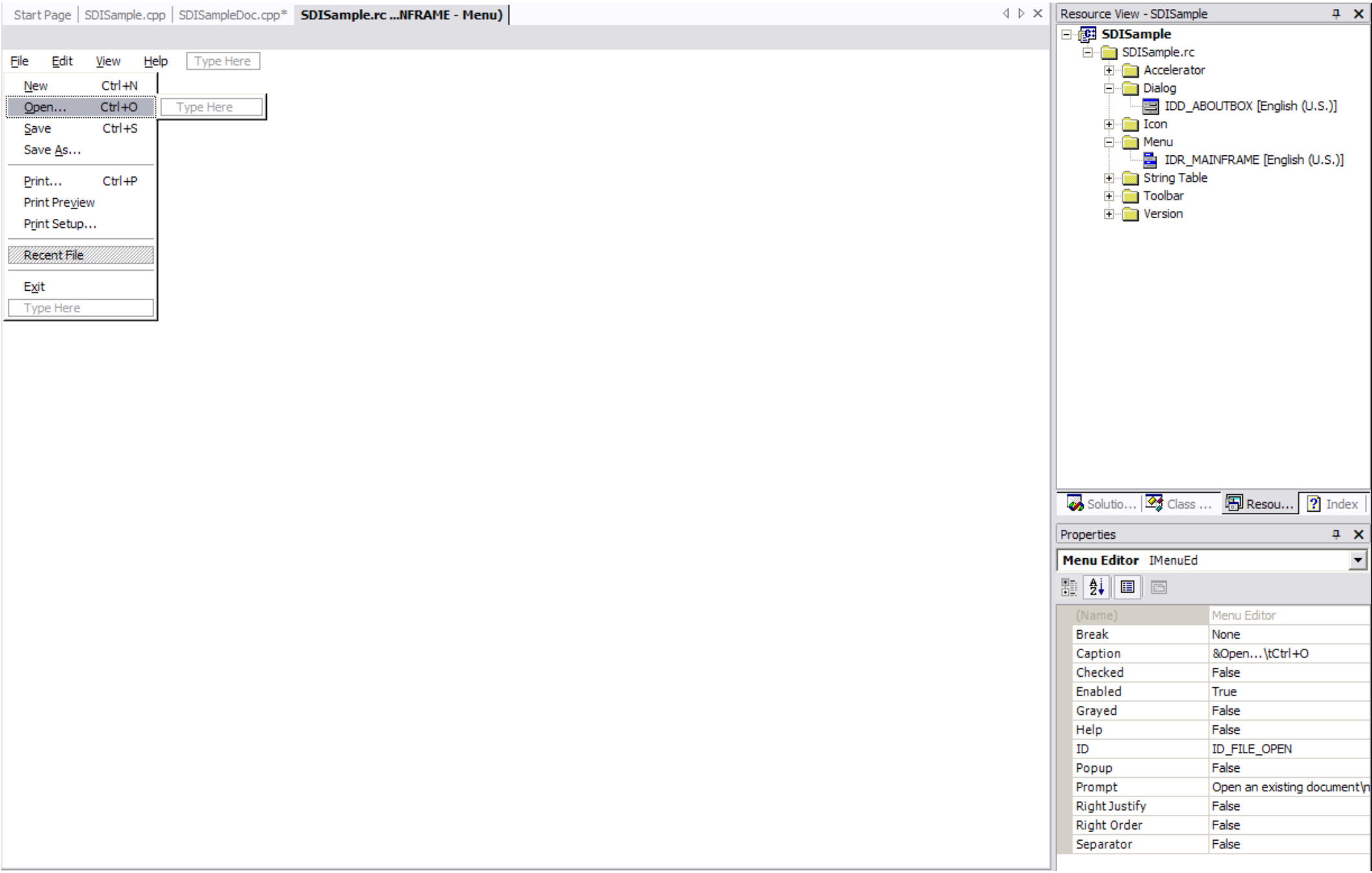

MFC Application Wizard - SDISample
User Interface Features
Specify options that control the look and feel of your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Main frame styles:
Thick frame
Minimize box
Maximize box
Minimized
Maximized
System menu
About box
Initial status bar
Split window
Dialog title:
SDISample
Child frame styles:
Child minimize box
Child maximize box
Child minimized
Child maximized
Toolbars:
None
Standard docking
Browser style
Finish
Cancel
Help

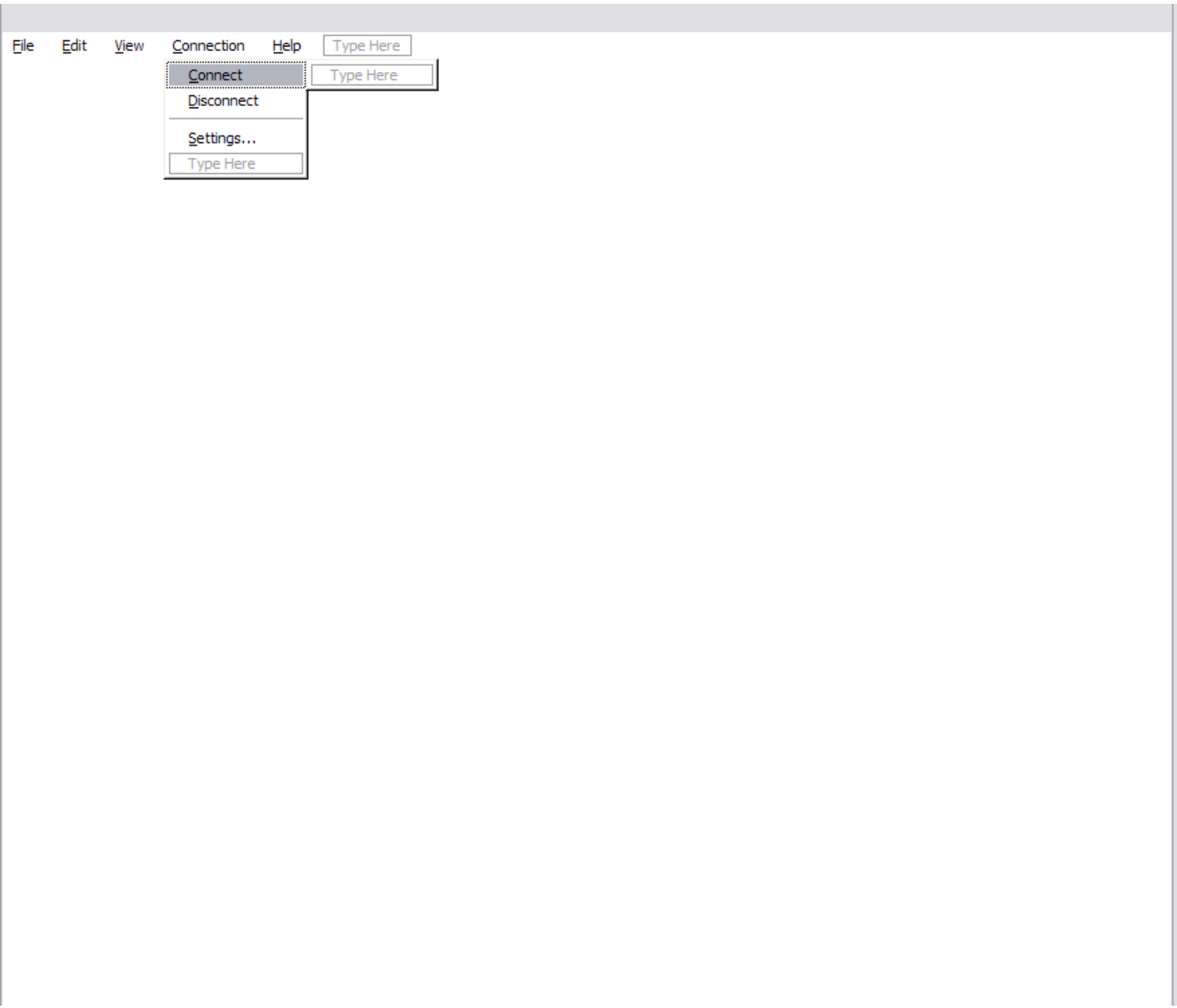

MFC Application Wizard - SDISample
Advanced Features
Specify additional support to build into your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Advanced features:
Context-sensitive Help
WinHelp Format
HTML Help format
Printing and print preview
Automation
ActiveX controls
MAPI (Messaging API)
Windows sockets
Active Accessibility
Common Control Manifest
Number of files on recent file list:
4
Finish
Cancel
Help


MFC Application Wizard - SDISample
Generated Classes
Review generated classes and specify base classes for your application.
Overview
Application Type
Compound Document Support
Document Template Strings
Database Support
User Interface Features
Advanced Features
Generated Classes
Generated classes:
CSDISampleView
CSDISampleApp
CSDISampleDoc
CMainFrame
Class name:
CSDISampleView
.h file:
SDISampleView.h
Base class:
CEditView
.cpp file:
SDISampleView.cpp
CEditView
CFormView
CHtmlEditView
CHtmlView
CListView
CRichEditView
CScrollView
CTreeView
CView
Finish
Cancel
Help


Untitled - Sample SDI application
File
Edit
View
Help
asdkjcasdkjbcsdjkcnksd
xczx
Undo
Cut
Copy
Paste
Delete
Select All
For Help, press F1

```
BOOL CSDISampleDoc::OnNewDocument()
{
if (!CDocument::OnNewDocument())
return FALSE;

reinterpret_cast<CEditView*>(m_viewList.GetHead())-
>SetWindowText(NULL);

// TODO: add reinitialization code here
// (SDI documents will reuse this document)

return TRUE;
}



// CSDISampleDoc serialization

void CSDISampleDoc::Serialize(CArchive& ar)
{
// CEditView contains an edit control which handles all
serialization
reinterpret_cast<CEditView*>(m_viewList.GetHead())-
>SerializeRaw(ar);
}
```


Start Page
SDISample.cpp
SDISampleDoc.cpp*
SDISample.rc ...NFRAME - Menu)
File
Edit
View
Help
Type Here
New Ctrl+N
Open... Ctrl+O
Save Ctrl+S
Save As...
Print... Ctrl+P
Print Preview
Print Setup...
Recent File
Exit
Type Here
Type Here
Resource View - SDISample
SDISample
SDISample.rc
Accelerator
Dialog
IDD_ABOUTBOX [English (U.S.)]
Icon
Menu
IDR_MAINFRAME [English (U.S.)]
String Table
Toolbar
Version
Solutio...
Class ...
Resou...
Index
Properties
Menu Editor IMenuEd
(Name) Menu Editor
Break None
Caption &Open...\tCtrl+O
Checked False
Enabled True
Grayed False
Help False
ID ID_FILE_OPEN
Popup False
Prompt Open an existing document\n
Right Justify False
Right Order False
Separator False



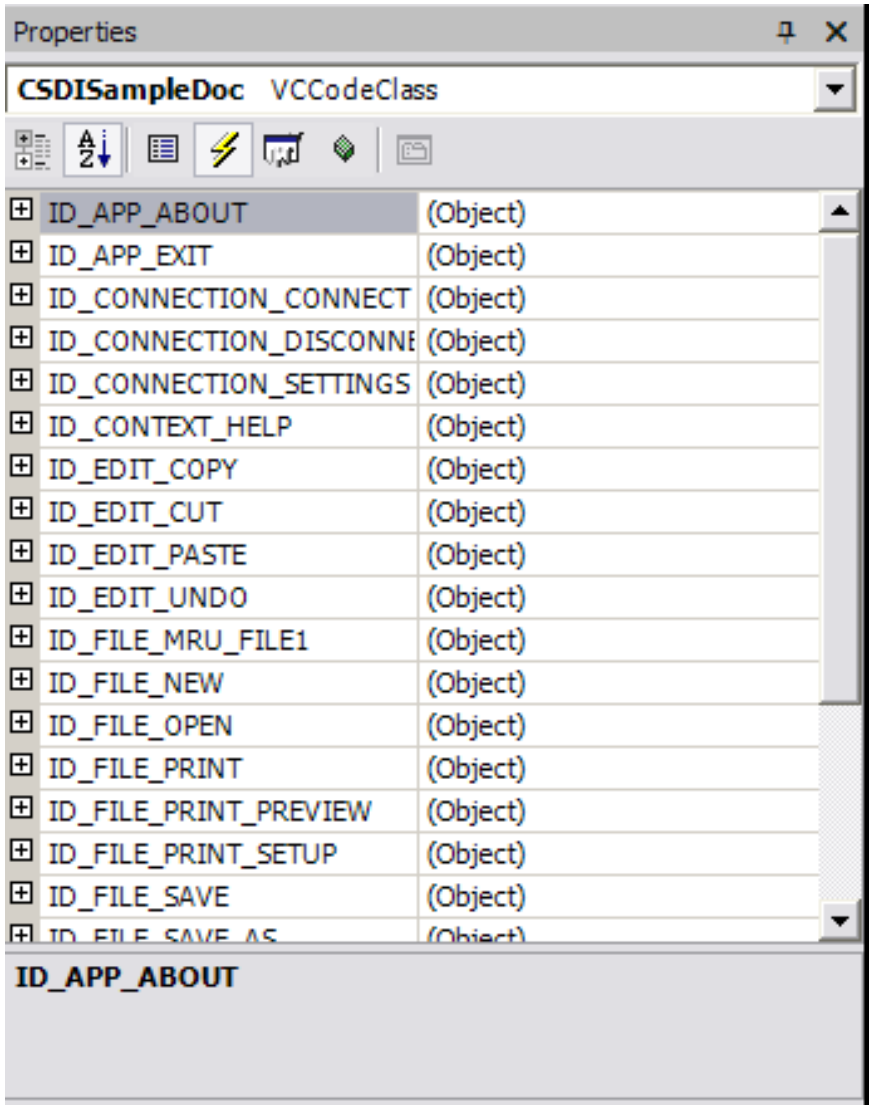
SDISample
SDISample.rc*
Accelerator
Dialog
IDD_ABOUTBOX [English (U.S.)]
Icon
Menu
IDR_MAINFRAME [English (U.S.)]
String Table
Toolbar
Version

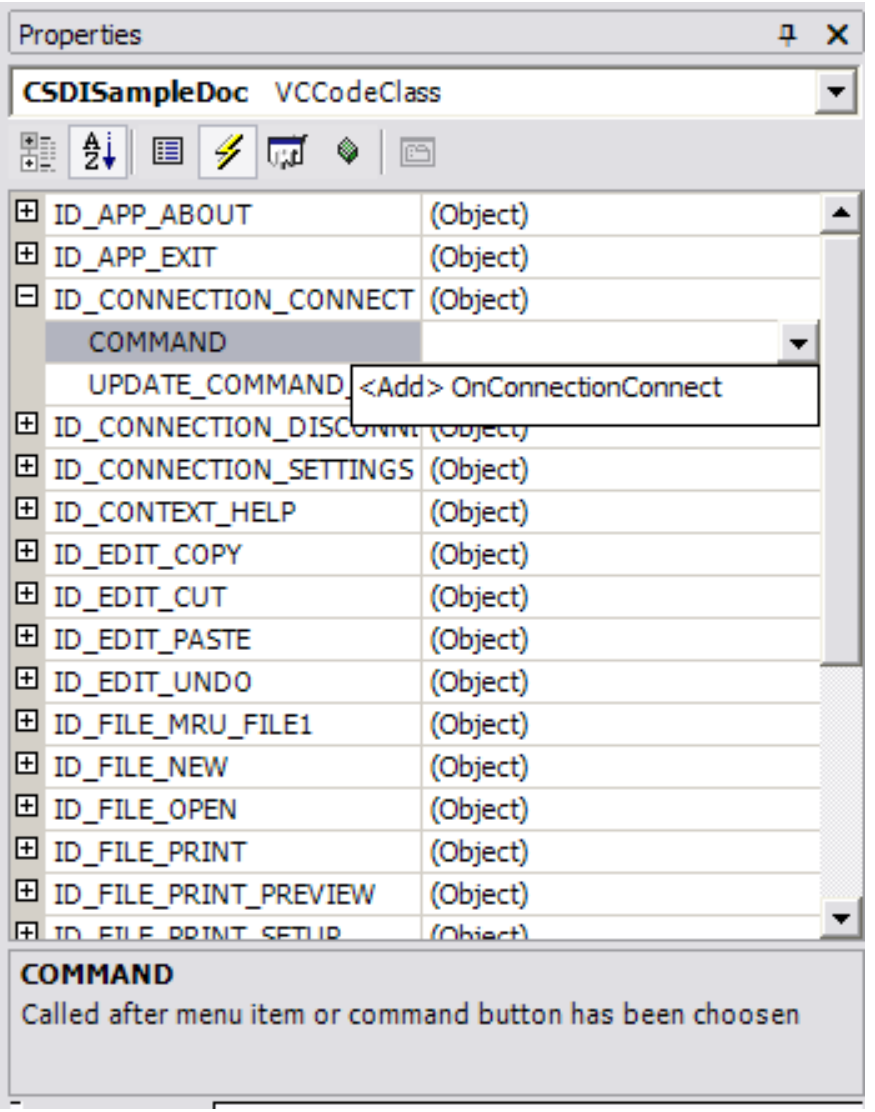
Solution Ex... | Class View | Resource Vi... | Index

Properties

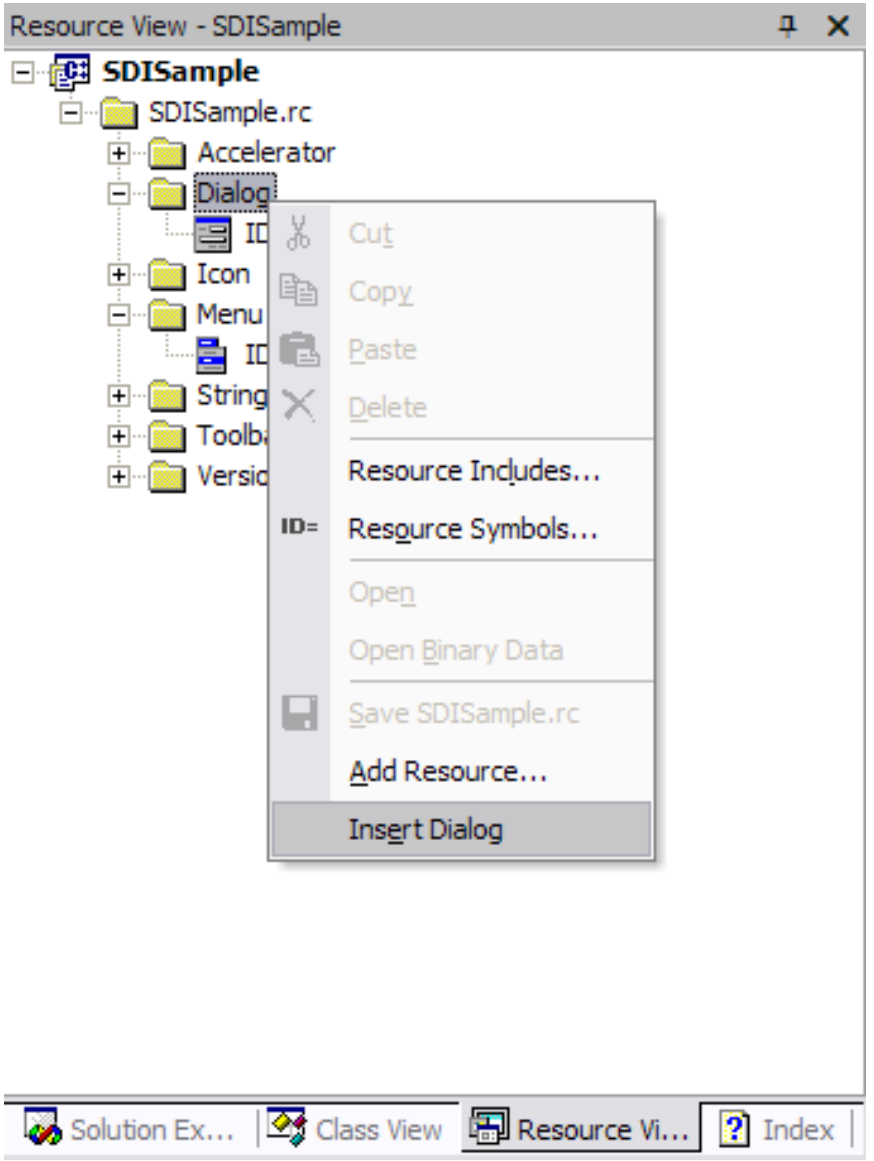
Menu Editor IMenuEd

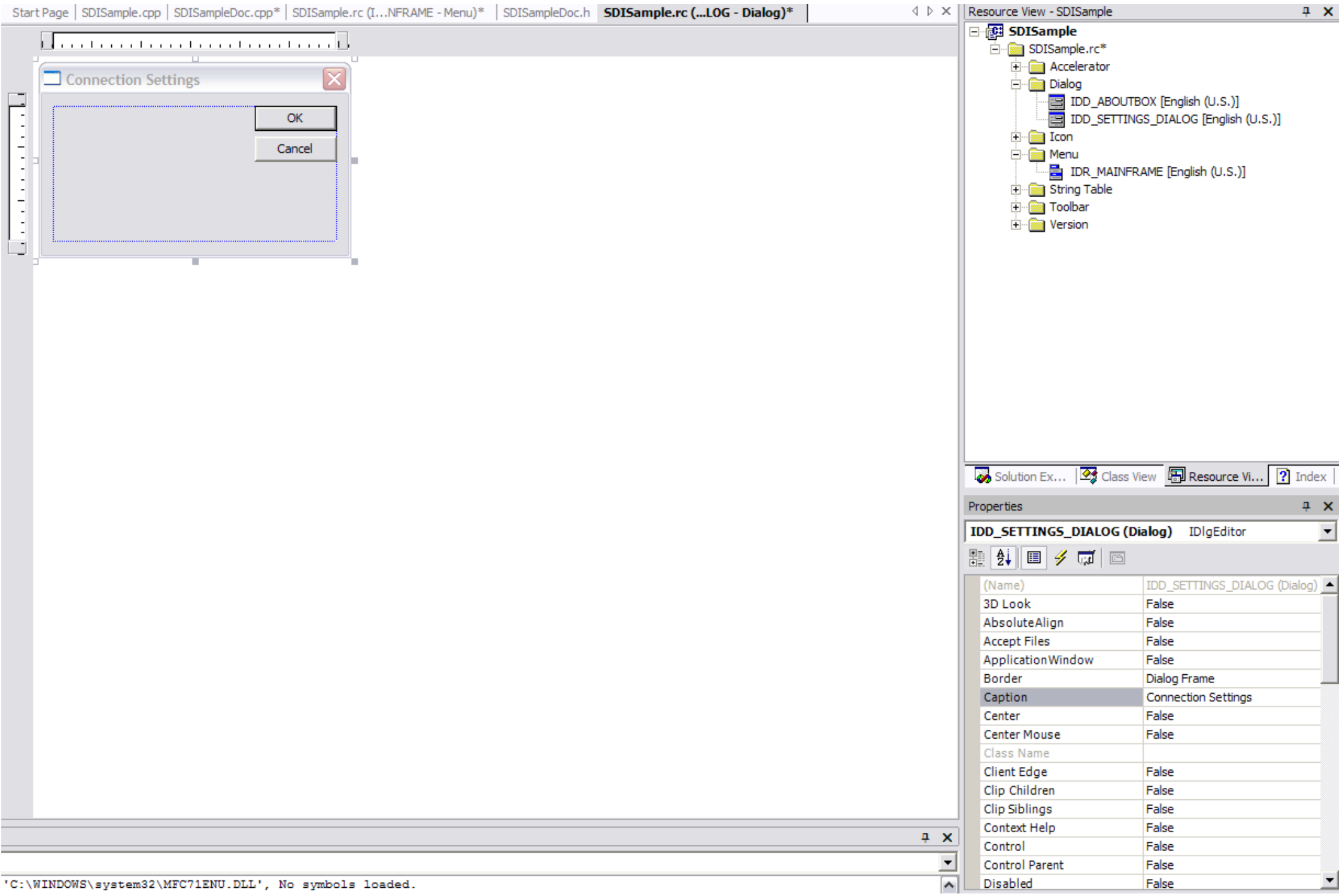
(Name)	Menu Editor
Break	None
Caption	&Connect
Checked	False
Enabled	True
Grayed	False
Help	False
ID	ID_CONNECTION_CONNECT
Popup	False
Prompt	Connect to target
Right Justify	False
Right Order	False
Separator	False

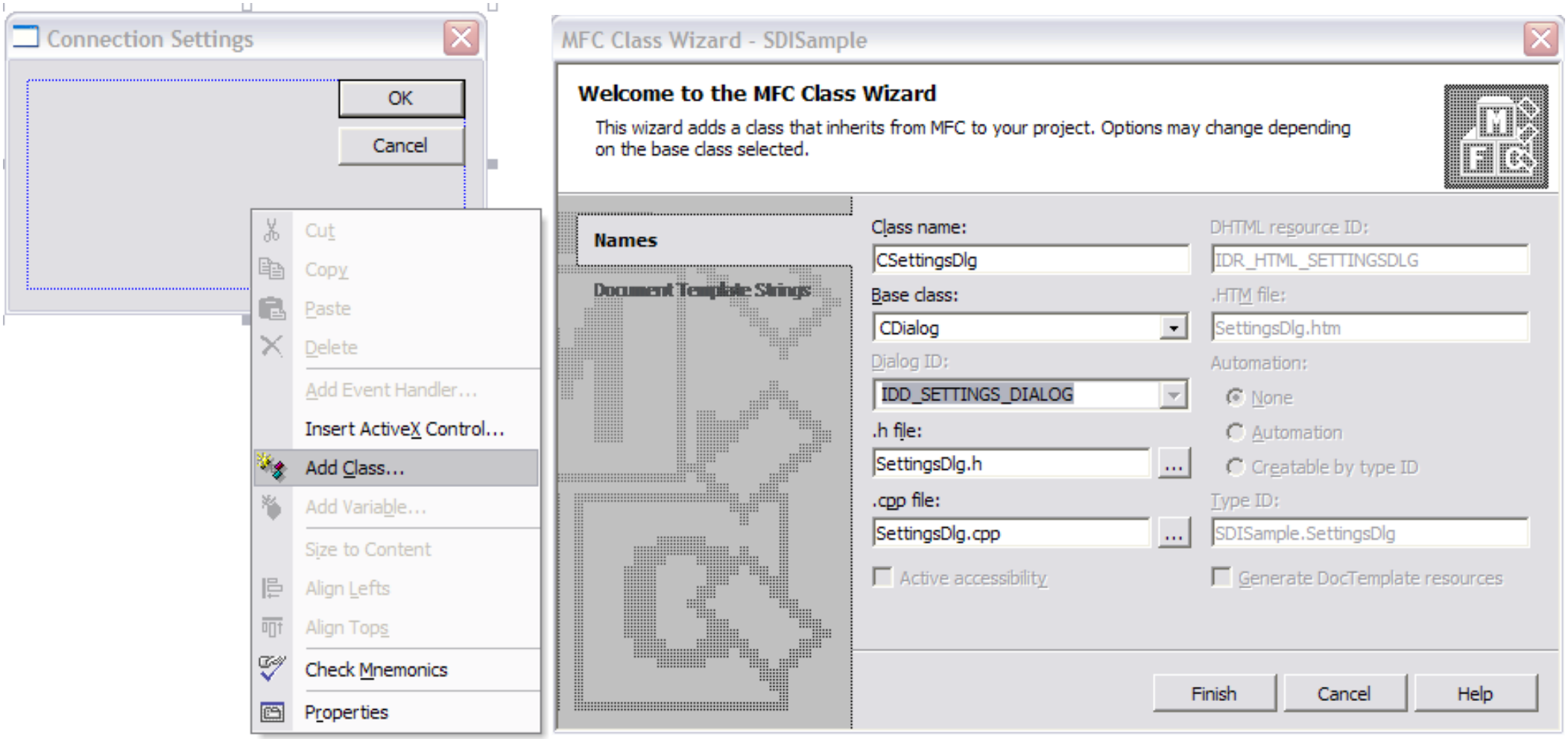

Properties
CSDISampleDoc VCCodeClass
ID_APP_ABOUT (Object)
ID_APP_EXIT (Object)
ID_CONNECTION_CONNECT (Object)
ID_CONNECTION_DISCONNE (Object)
ID_CONNECTION_SETTINGS (Object)
ID_CONTEXT_HELP (Object)
ID_EDIT_COPY (Object)
ID_EDIT_CUT (Object)
ID_EDIT_PASTE (Object)
ID_EDIT_UNDO (Object)
ID_FILE_MRU_FILE1 (Object)
ID_FILE_NEW (Object)
ID_FILE_OPEN (Object)
ID_FILE_PRINT (Object)
ID_FILE_PRINT_PREVIEW (Object)
ID_FILE_PRINT_SETUP (Object)
ID_FILE_SAVE (Object)
ID_APP_ABOUT


Properties
CSDISampleDoc VCCodeClass
ID_APP_ABOUT (Object)
ID_APP_EXIT (Object)
ID_CONNECTION_CONNECT (Object)
COMMAND
UPDATE_COMMAND_
<Add> OnConnectionConnect
ID_CONNECTION_SETTINGS (Object)
ID_CONTEXT_HELP (Object)
ID_EDIT_COPY (Object)
ID_EDIT_CUT (Object)
ID_EDIT_PASTE (Object)
ID_EDIT_UNDO (Object)
ID_FILE_MRU_FILE1 (Object)
ID_FILE_NEW (Object)
ID_FILE_OPEN (Object)
ID_FILE_PRINT (Object)
ID_FILE_PRINT_PREVIEW (Object)
COMMAND
Called after menu item or command button has been choosen

```
void CSDISampleDoc::OnConnectionConnect()
{
    // perform actions necessary for connection
    m_connected = true;
}
void CSDISampleDoc::OnUpdateConnectionConnect(CCmdUI *pCmdUI)
{
    if (m_connected)
    {
        pCmdUI->Enable(FALSE);
    }else
    {
        pCmdUI->Enable(TRUE);
    }
}
void CSDISampleDoc::OnConnectionDisconnect()
{
    // perform actions necessary for disconnection
    m_connected = false;
}
void CSDISampleDoc::OnUpdateConnectionDisconnect(CCmdUI *pCmdUI)
{
    if (!m_connected)
    {
        pCmdUI->Enable(FALSE);
    }else
    {
        pCmdUI->Enable(TRUE);
    }
}
```

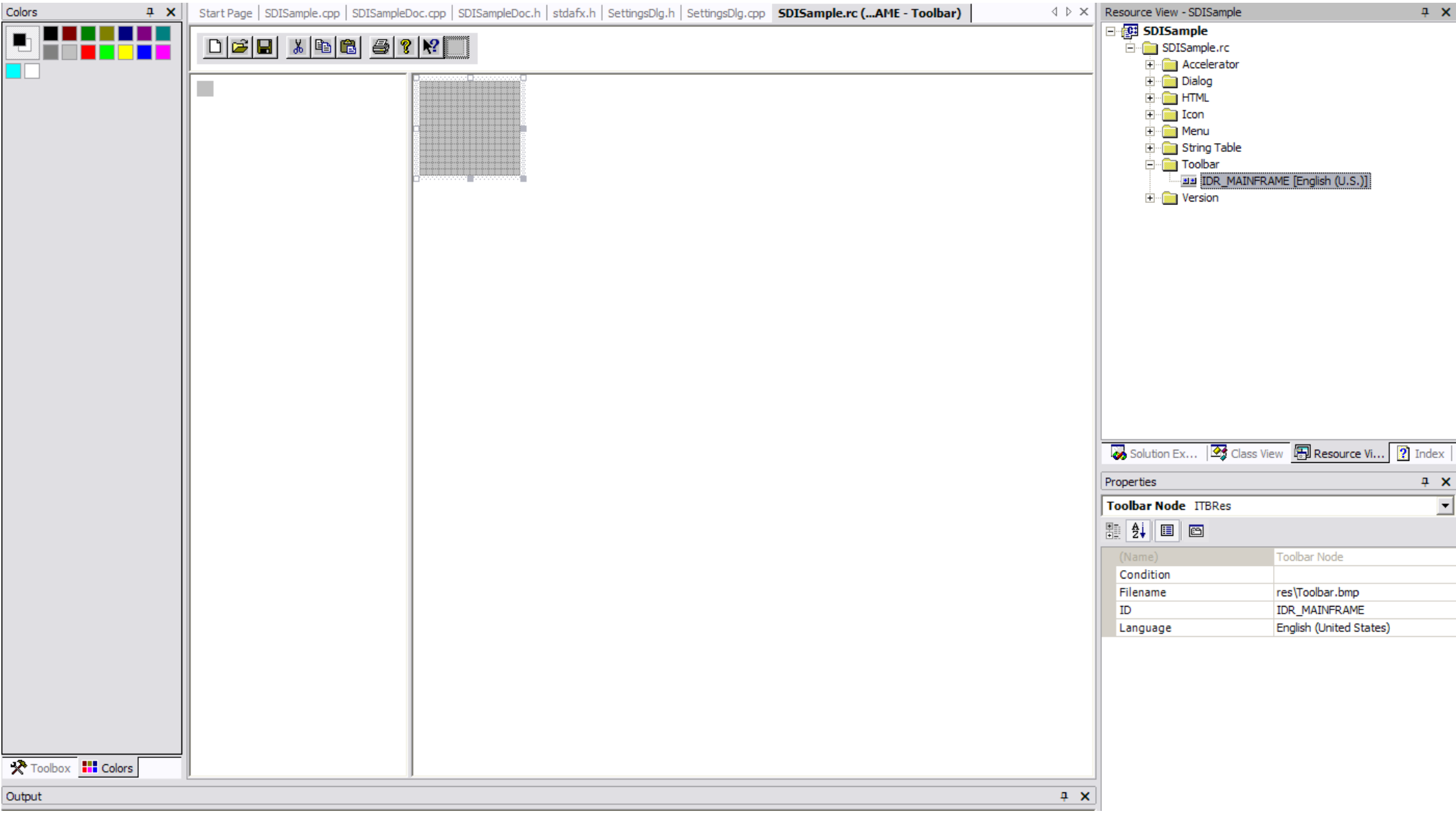

Resource View - SDISample
SDISample
SDISample.rc
Accelerator
Dialog
Icon
Menu
String
Cut
Copy
Paste
Delete
Resource Includes...
Resource Symbols...
Open
Open Binary Data
Save SDISample.rc
Add Resource...
Insert Dialog
Solution Ex...
Class View
Resource Vi...
Index

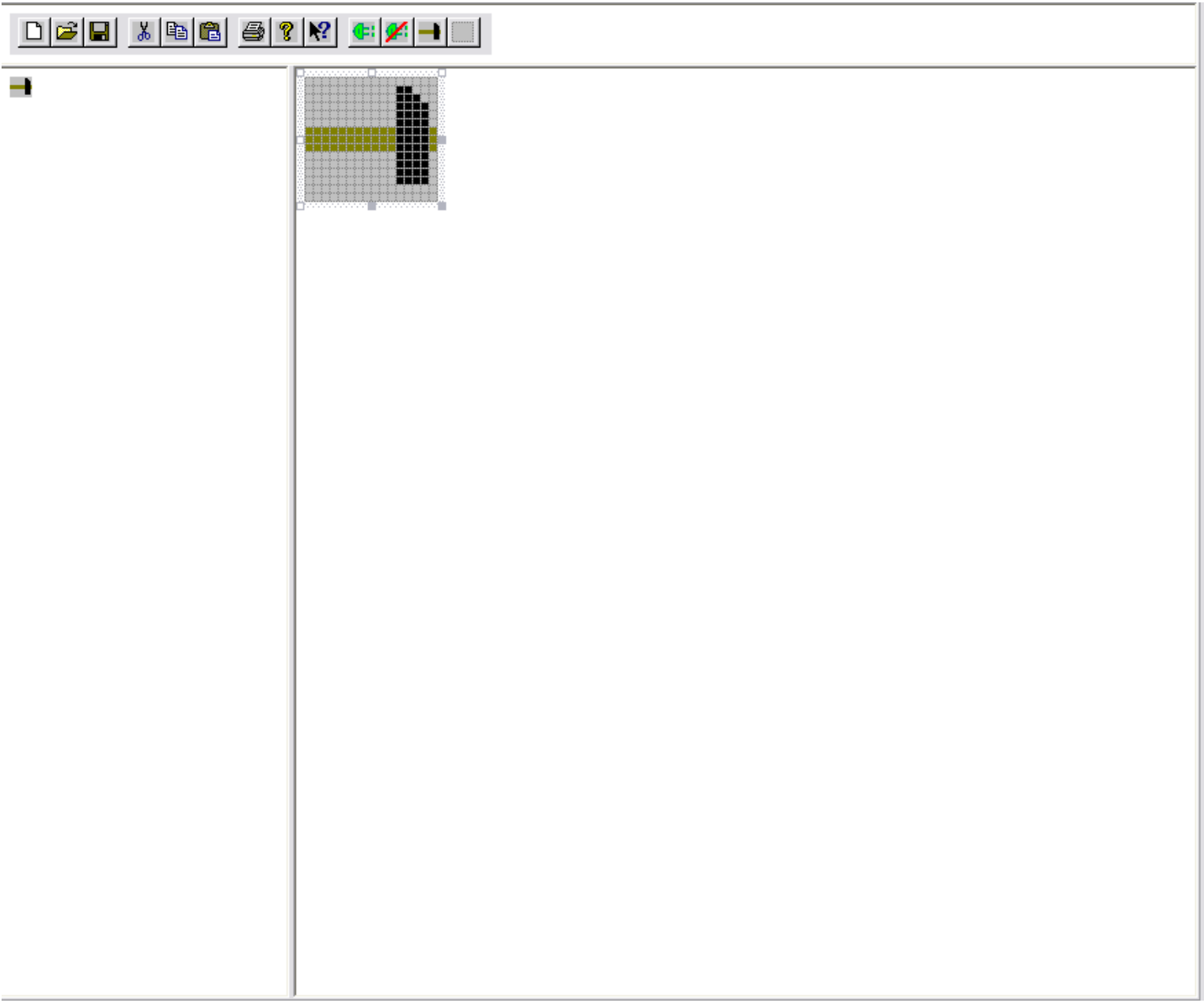

Start Page
SDISample.cpp
SDISampleDoc.cpp*
SDISample.rc (I...NFRAME - Menu)*
SDISampleDoc.h
SDISample.rc (...LOG - Dialog)*
Connection Settings
OK
Cancel
Resource View - SDISample
SDISample
SDISample.rc*
Accelerator
Dialog
IDD_ABOUTBOX [English (U.S.)]
IDD_SETTINGS_DIALOG [English (U.S.)]
Icon
Menu
IDR_MAINFRAME [English (U.S.)]
String Table
Toolbar
Version
Solution Ex...
Class View
Resource Vi...
Index
Properties
IDD_SETTINGS_DIALOG (Dialog)
IDlgEditor
(Name) IDD_SETTINGS_DIALOG (Dialog)
3D Look False
AbsoluteAlign False
Accept Files False
ApplicationWindow False
Border Dialog Frame
Caption Connection Settings
Center False
Center Mouse False
Class Name
Client Edge False
Clip Children False
Clip Siblings False
Context Help False
Control False
Control Parent False
Disabled False
'C:\WINDOWS\system32\MFC71ENU.DLL', No symbols loaded.

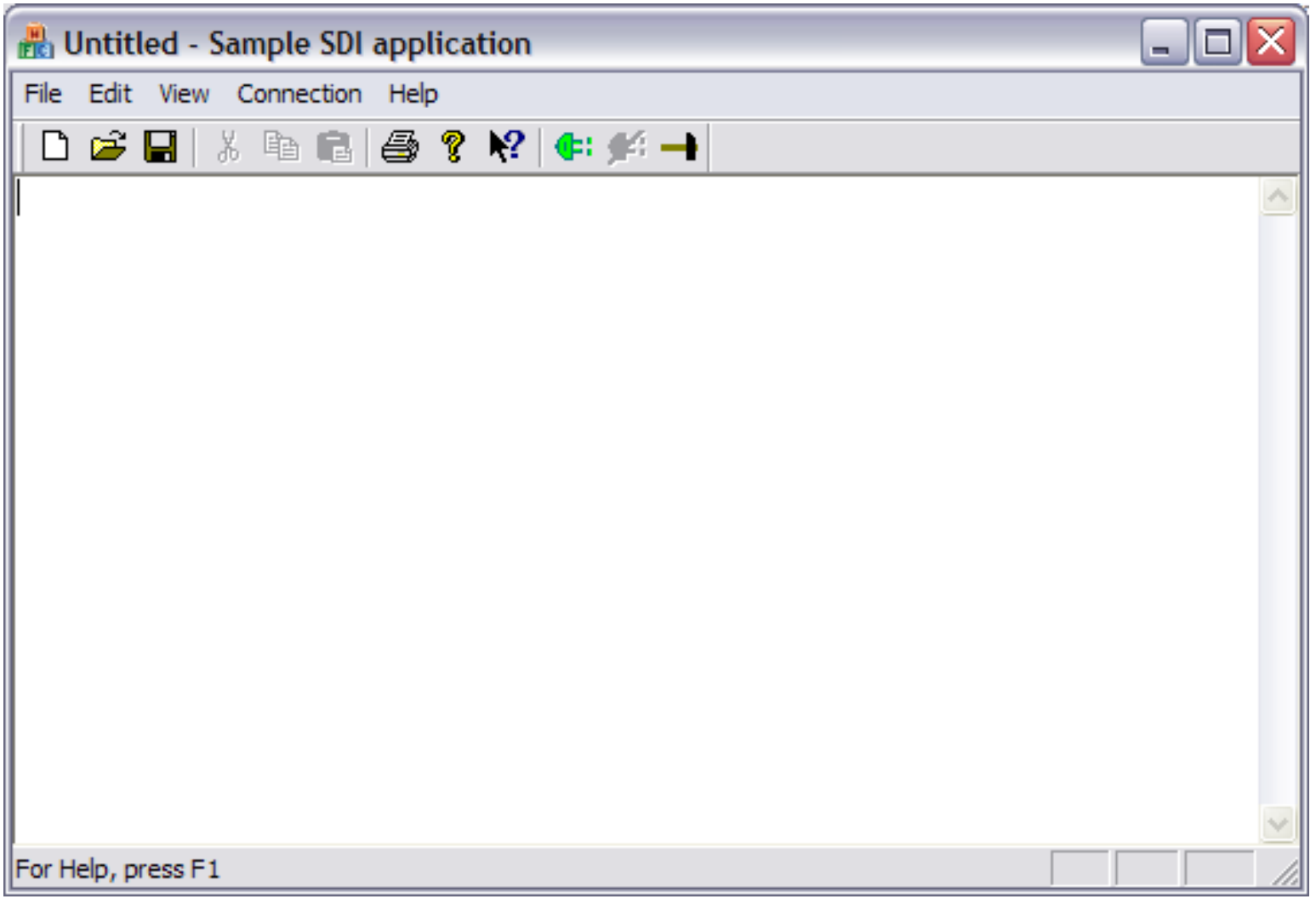

Connection Settings
OK
Cancel
Cut
Copy
Paste
Delete
Add Event Handler...
Insert ActiveX Control...
Add Class...
Add Variable...
Size to Content
Align Lefts
Align Tops
Check Mnemonics
Properties
MFC Class Wizard - SDISample
Welcome to the MFC Class Wizard
This wizard adds a class that inherits from MFC to your project. Options may change depending on the base class selected.
Names
Document Template Strings
Class name:
CSettingsDlg
Base class:
CDialog
Dialog ID:
IDD_SETTINGS_DIALOG
.h file:
SettingsDlg.h
.cpp file:
SettingsDlg.cpp
Active accessibility
DHTML resource ID:
IDR_HTML_SETTINGSDLG
.HTM file:
SettingsDlg.htm
Automation:
None
Automation
Creatable by type ID
Type ID:
SDISample.SettingsDlg
Generate DocTemplate resources
Finish
Cancel
Help

```cpp
#pragma once


// CSettingsDlg dialog

class CSettingsDlg : public CDialog
{
    DECLARE_DYNAMIC(CSettingsDlg)

public:
    CSettingsDlg(CWnd* pParent = NULL);    // standard constructor
    virtual ~CSettingsDlg();

    // Dialog Data
    enum { IDD = IDD_SETTINGS_DIALOG };

protected:
    virtual void DoDataExchange(CDataExchange* pDX);  // DDX/DDV support

    DECLARE_MESSAGE_MAP()
};
```

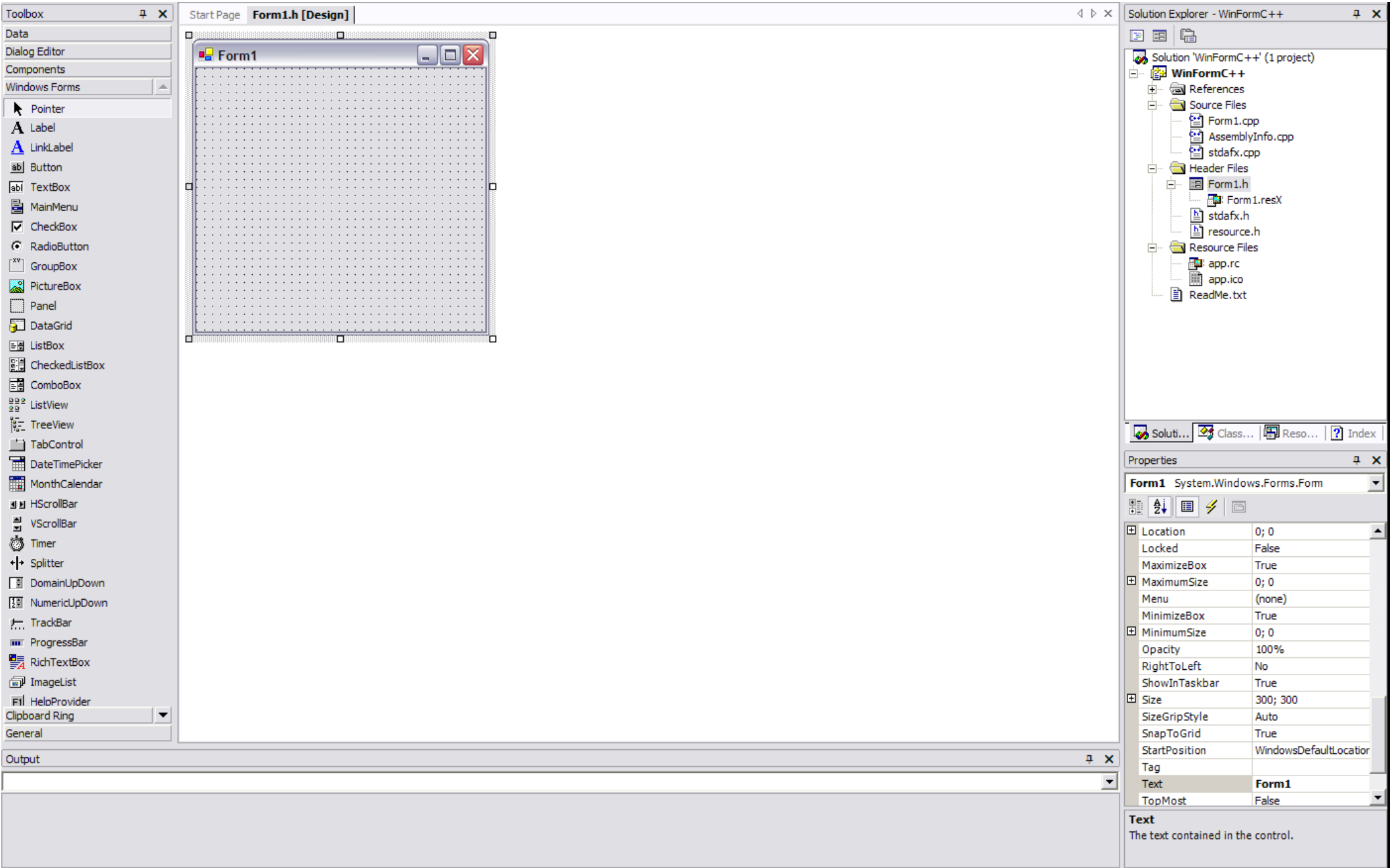
```
// SettingsDlg.cpp : implementation file
//

#include "stdafx.h"
#include "SDISample.h"
#include "SettingsDlg.h"


// CSettingsDlg dialog

IMPLEMENT_DYNAMIC(CSettingsDlg, CDialog)
CSettingsDlg::CSettingsDlg(CWnd* pParent /*=NULL*/)
: CDialog(CSettingsDlg::IDD, pParent)
{
}

CSettingsDlg::~CSettingsDlg()
{
}

void CSettingsDlg::DoDataExchange(CDataExchange* pDX)
{
    CDialog::DoDataExchange(pDX);
}


BEGIN_MESSAGE_MAP(CSettingsDlg, CDialog)
END_MESSAGE_MAP()


// CSettingsDlg message handlers
```

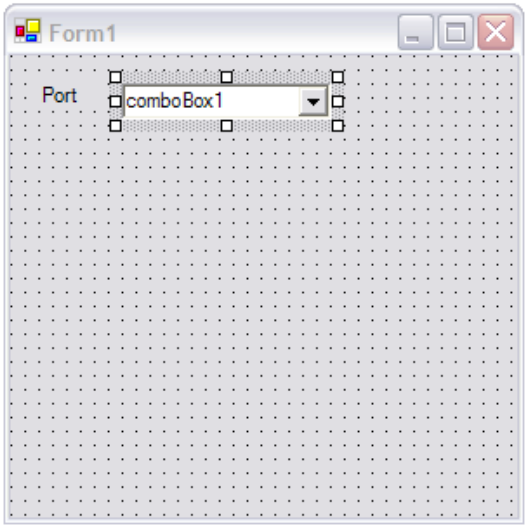

Colors
Start Page
SDISample.cpp
SDISampleDoc.cpp
SDISampleDoc.h
stdafx.h
SettingsDlg.h
SettingsDlg.cpp
SDISample.rc (...AME - Toolbar)
Resource View - SDISample
SDISample
SDISample.rc
Accelerator
Dialog
HTML
Icon
Menu
String Table
Toolbar
IDR_MAINFRAME [English (U.S.)]
Version
Solution Ex...
Class View
Resource Vi...
Index
Properties
Toolbar Node ITBRes
(Name) Toolbar Node
Condition
Filename res\Toolbar.bmp
ID IDR_MAINFRAME
Language English (United States)
Toolbox
Colors
Output


SDISample
SDISample.rc
Accelerator
Dialog
HTML
Icon
Menu
IDR_MAINFRAME [English (U.S.)]
String Table
Toolbar
IDR_MAINFRAME [English (U.S.)]
Version
Solution Ex...
Class View
Resource Vi...
Index
Properties
Toolbar Editor ICTBEd
(Name) Toolbar Editor
Height 15
ID ID_CONNECTION_SETTINGS
Prompt Connection settings
Width 16


Untitled - Sample SDI application
File
Edit
View
Connection
Help
For Help, press F1

Aplikacja Windows Forms w C++





Solution 'WinFormC++' (1 project)
- **WinFormC++**
  - References
  - Source Files
    - Form1.cpp
    - AssemblyInfo.cpp
    - stdafx.cpp
  - Header Files
    - Form1.h
      - Form1.resX
    - stdafx.h
    - resource.h
  - Resource Files
    - app.rc
    - app.ico
  - ReadMe.txt

Soluti... | Class... | Reso... | Index

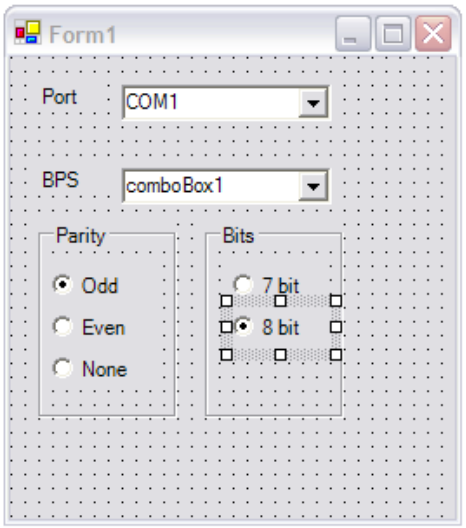
Properties

comboBox1 System.Windows.Forms.ComboE

ItemHeight	13
Items	**(Collection)**
Location	**64; 16**
Locked	False
MaxDropDownItems	8
MaxLength	0
Modifiers	Private
RightToLeft	No
Size	**121; 21**
Sorted	False
TabIndex	**0**
TabStop	True
Tag	
Text	**comboBox1**
ValueMember	
Visible	True

```
namespace WinFormC
{
using namespace System;
using namespace System::ComponentModel;
using namespace System::Collections;
using namespace System::Windows::Forms;
using namespace System::Data;
using namespace System::Drawing;

public __gc class Form1 : public System::Windows::Forms::Form
{
public:
    Form1(void)
    {
        InitializeComponent();
    }
protected:
    void Dispose(Boolean disposing)
    {
        if (disposing && components)
        {
            components->Dispose();
        }
        __super::Dispose(disposing);
    }
private: System::Windows::Forms::ComboBox *  COMcomboBox;
private: System::Windows::Forms::Label *  label1;
private:
    System::ComponentModel::Container * components;
```

```
        void InitializeComponent(void)
        {   this->COMcomboBox = new System::Windows::Forms::ComboBox();
            this->label1 = new System::Windows::Forms::Label();
            this->SuspendLayout();
            this->COMcomboBox->DisplayMember = S"value";
            System::Object* __mcTemp__1[] = new System::Object*[4];
            __mcTemp__1[0] = S"COM1";
            __mcTemp__1[1] = S"COM2";
            __mcTemp__1[2] = S"COM3";
            __mcTemp__1[3] = S"COM4";
            this->COMcomboBox->Items->AddRange(__mcTemp__1);
            this->COMcomboBox->Location = System::Drawing::Point(64, 16);
            this->COMcomboBox->Name = S"COMcomboBox";
            this->COMcomboBox->Size = System::Drawing::Size(121, 21);
            this->COMcomboBox->TabIndex = 0;
            this->COMcomboBox->Text = S"COM1";
            this->label1->Location = System::Drawing::Point(16, 16);
            this->label1->Name = S"label1";
            this->label1->Size = System::Drawing::Size(40, 16);
            this->label1->TabIndex = 1;
            this->label1->Text = S"Port";
            this->AutoScaleBaseSize = System::Drawing::Size(5, 13);
            this->ClientSize = System::Drawing::Size(292, 266);
            this->Controls->Add(this->label1);
            this->Controls->Add(this->COMcomboBox);
            this->Name = S"Form1";
            this->Text = S"Form1";
            this->ResumeLayout(false);
        }
    };
}
```



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  - ReadMe.txt

Soluti... | Class... | Reso... | Index

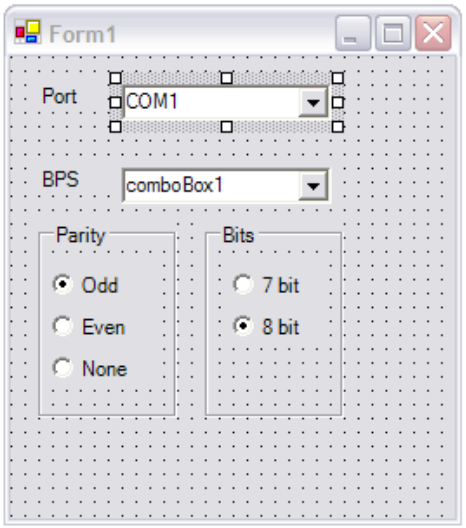
Properties

radioButton5 System.Windows.Forms.Radio

AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	Top, Left
Appearance	Normal
AutoCheck	True
BackColor	Control
BackgroundImage	(none)
CausesValidation	True
CheckAlign	MiddleLeft
Checked	**True**
ContextMenu	(none)
Cursor	Default
Dock	None
Enabled	True
FlatStyle	Standard

Checked
Indicates whether the radio button is checked or not.

```
'c:\windows\assembly\gac\system.drawing\1.0.5000.0__b03f5f7f11d50a3a\system.drawing.dll', No symbols loaded.
'C:\WINDOWS\WinSxS\x86_Microsoft.Windows.GdiPlus_6595b64144ccf1df_1.0.2600.2180_x-ww_522f9f82\GdiPlus.dll', No symbols loaded.
'C:\WINDOWS\system32\mslbui.dll', No symbols loaded.
'C:\WINDOWS\system32\dciman32.dll', No symbols loaded.
```



Solution 'WinFormC++' (1 project)
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Form1.resX
stdafx.h
resource.h
Resource Files
app.rc
app.ico
ReadMe.txt

Soluti... Class... Reso... Index

Properties

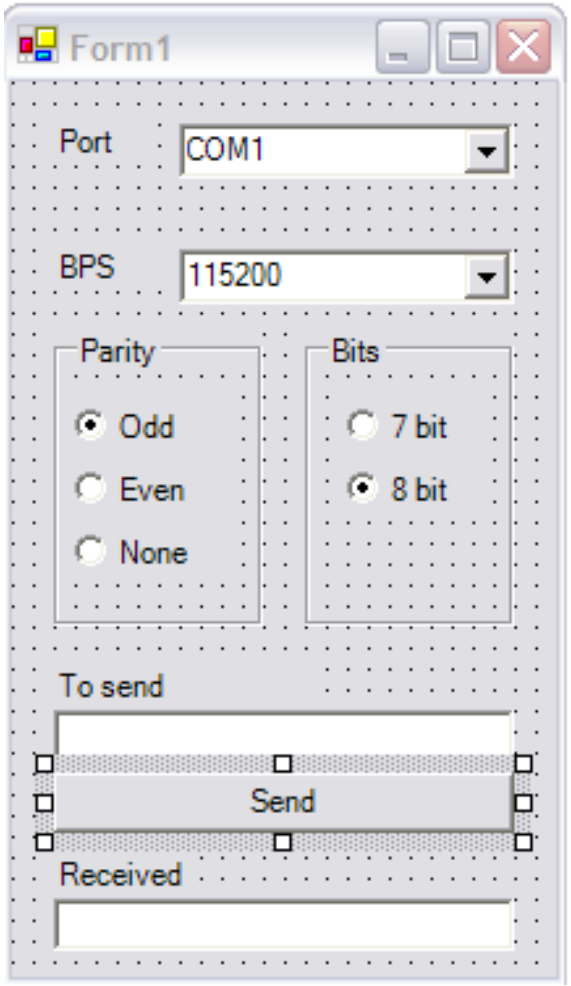
COMcomboBox System.Windows.Forms.Con

Action
Click
DoubleClick
Behavior
ChangeUICues
DrawItem
DropDown
DropDownStyleChang
HelpRequested
ImeModeChanged
MeasureItem
QueryAccessibilityHel
SelectedIndexChange
SelectionChangeComr COMcomboBox_Sele
StyleChanged
SystemColorsChange
Data

'C:\WINDOWS\system32\MSCTF.dll', No symbols loaded.

```
private: System::Void
COMcomboBox_SelectionChangeCommitted(System::Object *  sender,
System::EventArgs *  e)
        {
        }


private: System::Void COMcomboBox_Leave(System::Object *  sender,
System::EventArgs *  e)
        {
            if (COMcomboBox->Text->CompareTo("COM13") == 0)
            {
                MessageBox::Show("Ugly port! Will change to COM7");
                COMcomboBox->Text = "COM7";
            }
        }
```




```
private: System::Void sendButton_Click(System::Object *  sender,
System::EventArgs *  e)
 {
 //get text to send
 sendTextBox->Text;
 // send it
 }
```

Aplikacja Windows Forms w C#

```
using System;
using System.Drawing;
using System.Collections;
using System.ComponentModel;
using System.Windows.Forms;
using System.Data;

namespace WinFormCsharp
{
	public class Form1 : System.Windows.Forms.Form
	{
		private System.ComponentModel.Container components = null;

		public Form1(){
			InitializeComponent();
		}
		protected override void Dispose( bool disposing ){
			if( disposing ){
				if (components != null){
					components.Dispose();
				}
			}
			base.Dispose( disposing );
		}
```

```
#region Windows Form Designer generated code
        private void InitializeComponent()
        {
            this.components = new System.ComponentModel.Container();
            this.Size = new System.Drawing.Size(300,300);
            this.Text = "Form1";
        }
#endregion

        [STAThread]
        static void Main()
        {
            Application.Run(new Form1());
        }
    }
}
```

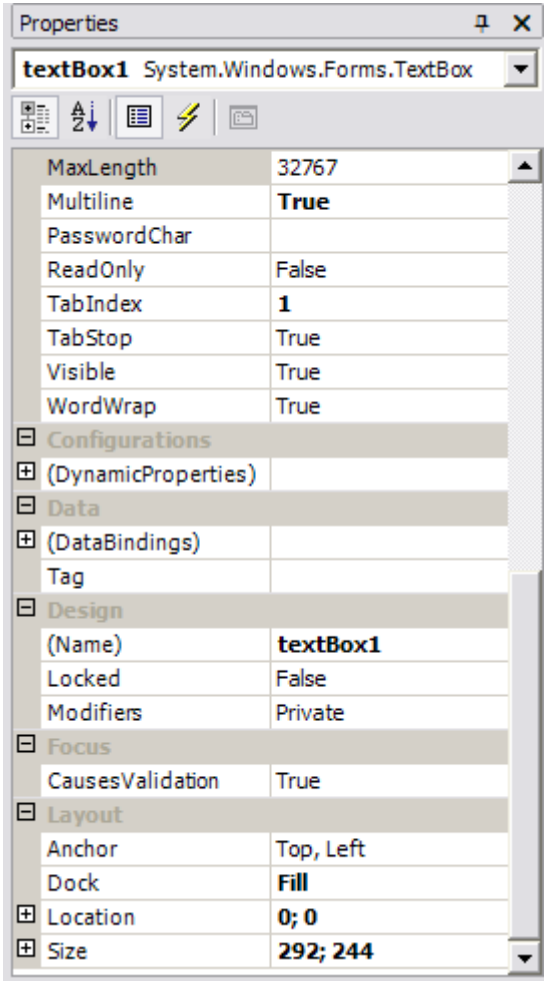
```
private void COMcomboBox_Leave(object sender, System.EventArgs e)
{
 if (COMcomboBox.Text.CompareTo("COM13") == 0)
 {
    MessageBox.Show("Ugly port! Will change to COM7");
   COMcomboBox.Text = "COM7";
 }

}

private void COMcomboBox_SelectionChangeCommitted(object sender,
System.EventArgs e)
{
}

private void sendButton_Click(object sender, System.EventArgs e)
{
    //get text to send
    String s = sendTextBox.Text;
    // send it
}
```

Jak zrobić SDI?



+ Menu, status bar =