CodeBlocks - the open source cross platform C++ IDE

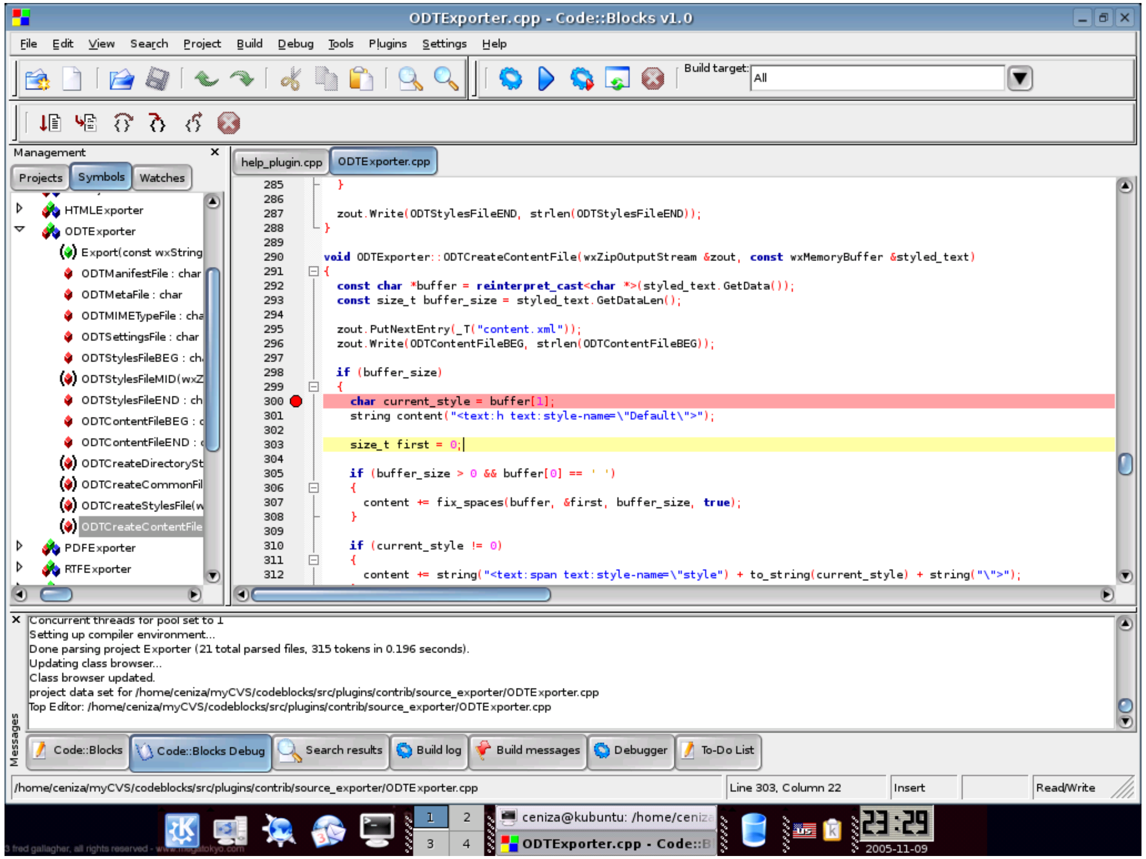
Julius Parulek

Background

- What is IDE (**I**ntegrated **D**evelopment **E**nvironment)?
  - A set of tools to develop libraries or applications (debugger, compiler, linker, libs, ...)
  - A windowed GUI environment for
    - Project(s) management
    - Build settings
    - Comfortable programming

Why to use IDE?

- Build in text highlighting editors



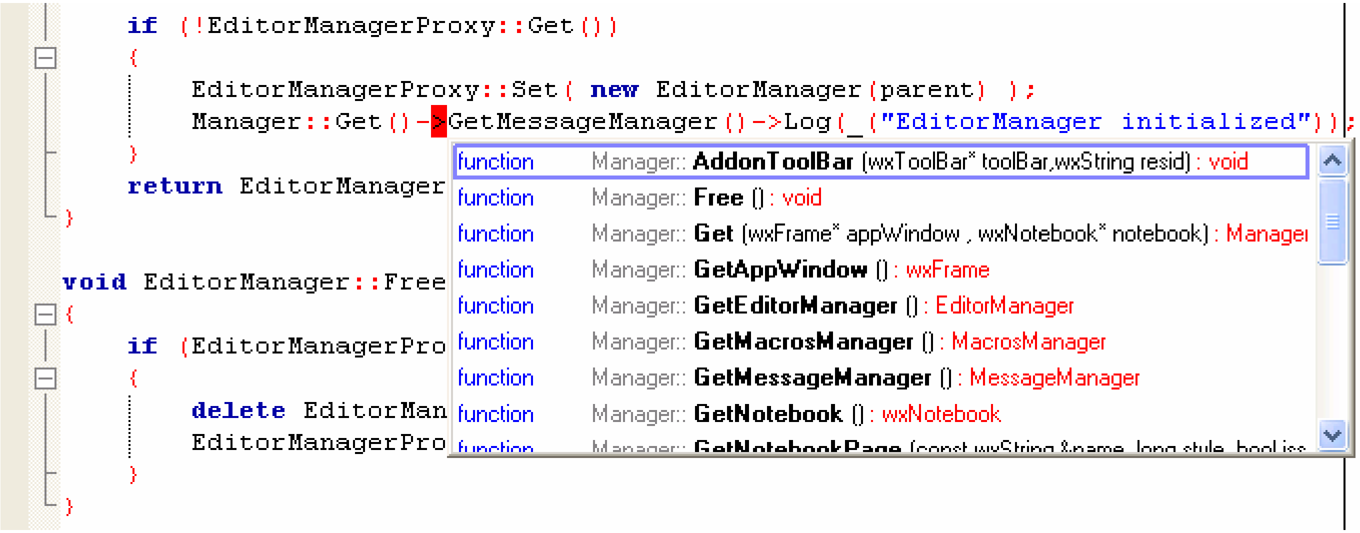
```
  }

  zout.Write(ODTStylesFileEND, strlen(ODTStylesFileEND));
}

void ODTExporter::ODTCreateContentFile(wxZipOutputStream &zout, const wxMemoryBuffer &styled_text)
{
  const char *buffer = reinterpret_cast<char *>(styled_text.GetData());
  const size_t buffer_size = styled_text.GetDataLen();

  zout.PutNextEntry(_T("content.xml"));
  zout.Write(ODTContentFileBEG, strlen(ODTContentFileBEG));

  if (buffer_size)
  {
    char current_style = buffer[1];
    string content("<text:h text:style-name=\"Default\">");

    size_t first = 0;

    if (buffer_size > 0 && buffer[0] == ' ')
    {
      content += fix_spaces(buffer, &first, buffer_size, true);
    }

    if (current_style != 0)
    {
      content += string("<text:span text:style-name=\"style") + to_string(current_style) + string("\">");
```

```
Concurrent threads for pool set to 1
Setting up compiler environment...
Done parsing project Exporter (21 total parsed files, 315 tokens in 0.196 seconds).
Updating class browser...
Class browser updated.
project data set for /home/ceniza/myCVS/codeblocks/src/plugins/contrib/source_exporter/ODTExporter.cpp
Top Editor: /home/ceniza/myCVS/codeblocks/src/plugins/contrib/source_exporter/ODTExporter.cpp
```

/home/ceniza/myCVS/codeblocks/src/plugins/contrib/source_exporter/ODTExporter.cpp

Why to use IDE?

- Code completion as you type

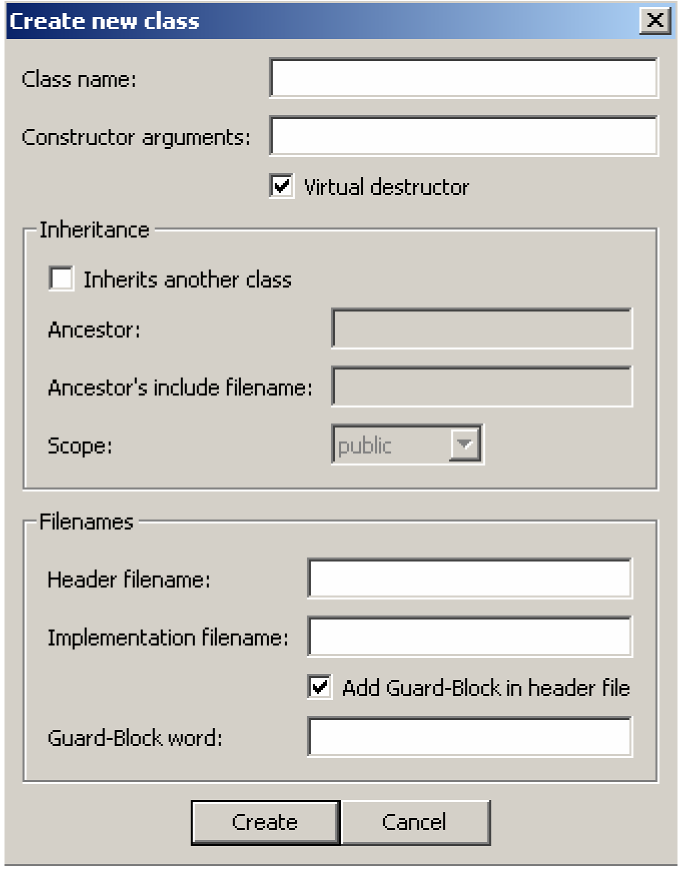


```
    if (!EditorManagerProxy::Get())
    {
        EditorManagerProxy::Set( new EditorManager(parent) );
        Manager::Get()->GetMessageManager()->Log(_("EditorManager initialized"));
    }
    return EditorManager
}

void EditorManager::Free
{
    if (EditorManagerPro
    {
        delete EditorMan
        EditorManagerPro
    }
}
```

```
function    Manager:: AddonToolBar (wxToolBar* toolBar,wxString resid) : void
function    Manager:: Free () : void
function    Manager:: Get (wxFrame* appWindow , wxNotebook* notebook) : Manager
function    Manager:: GetAppWindow () : wxFrame
function    Manager:: GetEditorManager () : EditorManager
function    Manager:: GetMacrosManager () : MacrosManager
function    Manager:: GetMessageManager () : MessageManager
function    Manager:: GetNotebook () : wxNotebook
function    Manager:: GetNotebookPage (const wxString &name, long style, bool iss
```

Why to use IDE?

- Automatically create classes, methods, and properties



Create new class

Class name:

Constructor arguments:

☑ Virtual destructor

Inheritance

□ Inherits another class

Ancestor:

Ancestor's include filename:

Scope: public

Filenames

Header filename:

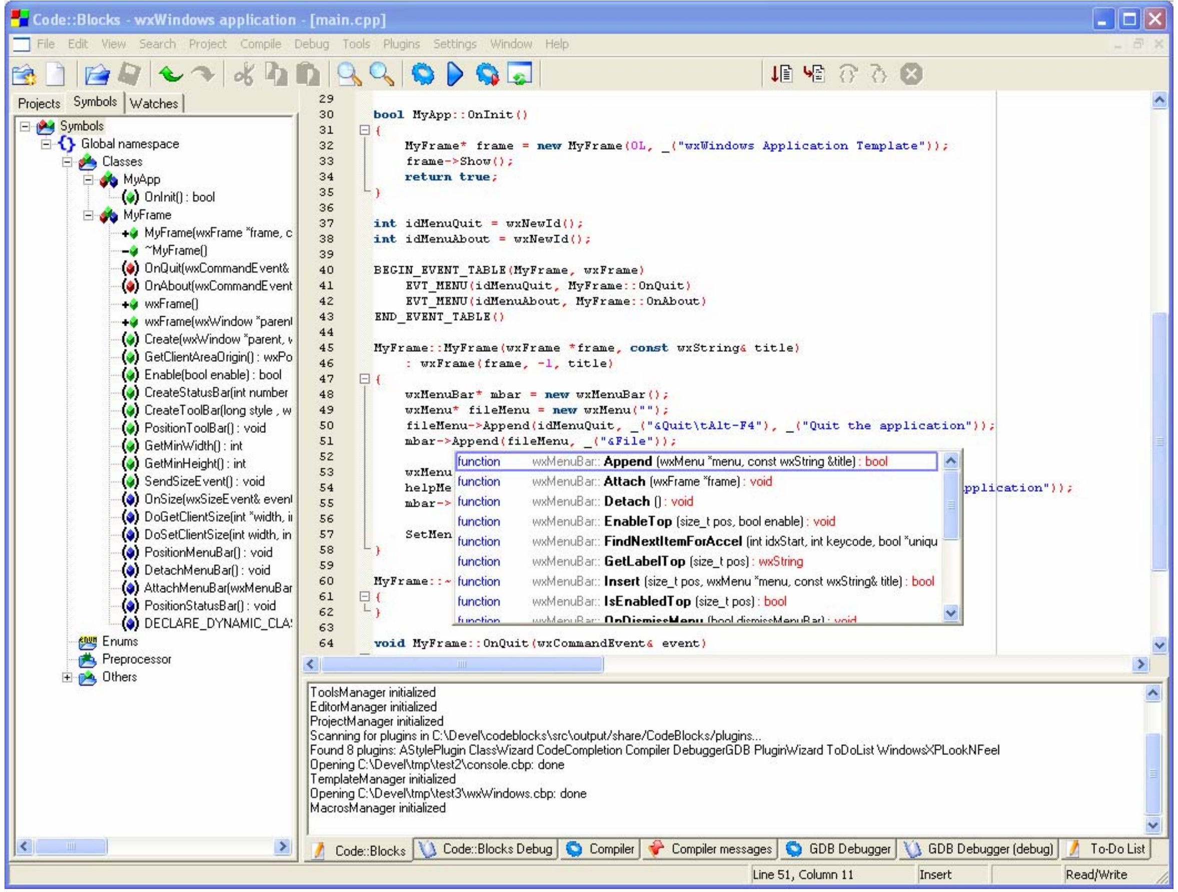
Implementation filename:

☑ Add Guard-Block in header file

Guard-Block word:

Why to use IDE?

- Browser of namespaces and classes



```
Symbols
  Global namespace
    Classes
      MyApp
        OnInit() : bool
      MyFrame
        MyFrame(wxFrame *frame, c
        ~MyFrame()
        OnQuit(wxCommandEvent&
        OnAbout(wxCommandEvent
        wxFrame()
        wxFrame(wxWindow *parent
        Create(wxWindow *parent, v
        GetClientAreaOrigin() : wxPo
        Enable(bool enable) : bool
        CreateStatusBar(int number
        CreateToolBar(long style , w
        PositionToolBar() : void
        GetMinWidth() : int
        GetMinHeight() : int
        SendSizeEvent() : void
        OnSize(wxSizeEvent& event
        DoGetClientSize(int *width, i
        DoSetClientSize(int width, in
        PositionMenuBar() : void
        DetachMenuBar() : void
        AttachMenuBar(wxMenuBar
        PositionStatusBar() : void
        DECLARE_DYNAMIC_CLA!
    Enums
    Preprocessor
    Others
```

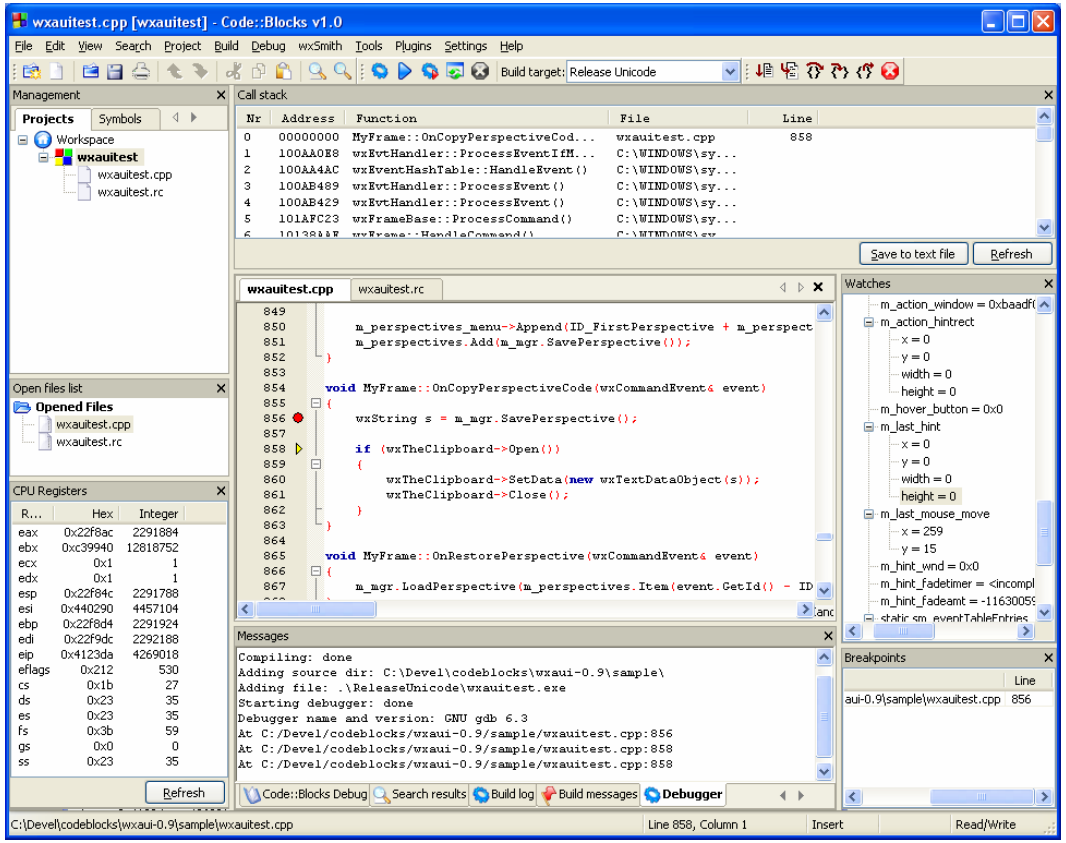
```

bool MyApp::OnInit()
{
    MyFrame* frame = new MyFrame(0L, _("wxWindows Application Template"));
    frame->Show();
    return true;
}

int idMenuQuit = wxNewId();
int idMenuAbout = wxNewId();

BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_MENU(idMenuQuit, MyFrame::OnQuit)
    EVT_MENU(idMenuAbout, MyFrame::OnAbout)
END_EVENT_TABLE()

MyFrame::MyFrame(wxFrame *frame, const wxString& title)
    : wxFrame(frame, -1, title)
{
    wxMenuBar* mbar = new wxMenuBar();
    wxMenu* fileMenu = new wxMenu("");
    fileMenu->Append(idMenuQuit, _("&Quit\tAlt-F4"), _("Quit the application"));
    mbar->Append(fileMenu, _("&File"));

    wxMenu
    helpMe                                                          pplication"));
    mbar->

    SetMen
}

MyFrame::~
{
}

void MyFrame::OnQuit(wxCommandEvent& event)
```

```
function    wxMenuBar:: Append (wxMenu *menu, const wxString &title) : bool
function    wxMenuBar:: Attach (wxFrame *frame) : void
function    wxMenuBar:: Detach () : void
function    wxMenuBar:: EnableTop (size_t pos, bool enable) : void
function    wxMenuBar:: FindNextItemForAccel (int idxStart, int keycode, bool *uniqu
function    wxMenuBar:: GetLabelTop (size_t pos) : wxString
function    wxMenuBar:: Insert (size_t pos, wxMenu *menu, const wxString& title) : bool
function    wxMenuBar:: IsEnabledTop (size_t pos) : bool
function    wxMenuBar:: OnDismissMenu (bool dismissMenuBar) : void
```

```
ToolsManager initialized
EditorManager initialized
ProjectManager initialized
Scanning for plugins in C:\Devel\codeblocks\src\output/share/CodeBlocks/plugins...
Found 8 plugins: AStylePlugin ClassWizard CodeCompletion Compiler DebuggerGDB PluginWizard ToDoList WindowsXPLookNFeel
Opening C:\Devel\tmp\test2\console.cbp: done
TemplateManager initialized
Opening C:\Devel\tmp\test3\wxWindows.cbp: done
MacrosManager initialized
```

Why to use IDE?

- Build in debugging tools



Nr	Address	Function	File	Line
0	00000000	MyFrame::OnCopyPerspectiveCod...	wxauitest.cpp	858
1	100AA0E8	wxEvtHandler::ProcessEventIfM...	C:\WINDOWS\sy...	
2	100AA4AC	wxEventHashTable::HandleEvent()	C:\WINDOWS\sy...	
3	100AB489	wxEvtHandler::ProcessEvent()	C:\WINDOWS\sy...	
4	100AB429	wxEvtHandler::ProcessEvent()	C:\WINDOWS\sy...	
5	101AFC23	wxFrameBase::ProcessCommand()	C:\WINDOWS\sy...	
6	10138AAF	wxFrame::HandleCommand()	C:\WINDOWS\sy...	

```
849
850        m_perspectives_menu->Append(ID_FirstPerspective + m_perspect
851        m_perspectives.Add(m_mgr.SavePerspective());
852    }
853
854    void MyFrame::OnCopyPerspectiveCode(wxCommandEvent& event)
855    {
856        wxString s = m_mgr.SavePerspective();
857
858        if (wxTheClipboard->Open())
859        {
860            wxTheClipboard->SetData(new wxTextDataObject(s));
861            wxTheClipboard->Close();
862        }
863    }
864
865    void MyFrame::OnRestorePerspective(wxCommandEvent& event)
866    {
867        m_mgr.LoadPerspective(m_perspectives.Item(event.GetId() - ID
```

```
m_action_window = 0xbaadf(
m_action_hintrect
    x = 0
    y = 0
    width = 0
    height = 0
m_hover_button = 0x0
m_last_hint
    x = 0
    y = 0
    width = 0
    height = 0
m_last_mouse_move
    x = 259
    y = 15
m_hint_wnd = 0x0
m_hint_fadetimer = <incompl
m_hint_fadeamt = -11630059
static sm_eventTableEntries
```

R...	Hex	Integer
eax	0x22f8ac	2291884
ebx	0xc39940	12818752
ecx	0x1	1
edx	0x1	1
esp	0x22f84c	2291788
esi	0x440290	4457104
ebp	0x22f8d4	2291924
edi	0x22f9dc	2292188
eip	0x4123da	4269018
eflags	0x212	530
cs	0x1b	27
ds	0x23	35
es	0x23	35
fs	0x3b	59
gs	0x0	0
ss	0x23	35

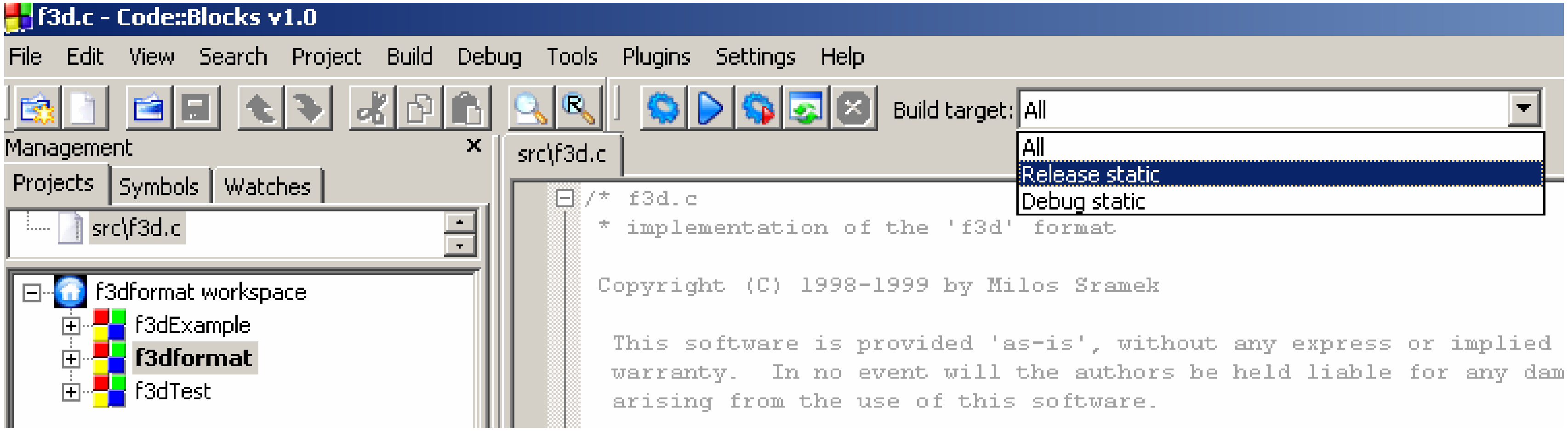
```
Compiling: done
Adding source dir: C:\Devel\codeblocks\wxaui-0.9\sample\
Adding file: .\ReleaseUnicode\wxauitest.exe
Starting debugger: done
Debugger name and version: GNU gdb 6.3
At C:/Devel/codeblocks/wxaui-0.9/sample/wxauitest.cpp:856
At C:/Devel/codeblocks/wxaui-0.9/sample/wxauitest.cpp:858
At C:/Devel/codeblocks/wxaui-0.9/sample/wxauitest.cpp:858
```

	Line
aui-0.9\sample\wxauitest.cpp	856

C:\Devel\codeblocks\wxaui-0.9\sample\wxauitest.cpp | Line 858, Column 1 | Insert | Read/Write

Why to use IDE?

- Workspace include projects that provide various build targets



Build target: All

All
Release static
Debug static

```
/* f3d.c
 * implementation of the 'f3d' format

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  arising from the use of this software.
```

Free C++ IDEs

- Windows system
  - Visual C++ Toolkit 2003, Dev-C++, Eclipse, CodeBlocks
- GNU\Linux system
  - Text: TIA, RHIDE, vi (+gcc)
  - Graphical: Anjuta, jGRASP, CodeForge, KDevelop, Eclipse, CodeBlocks

Problems with IDEs

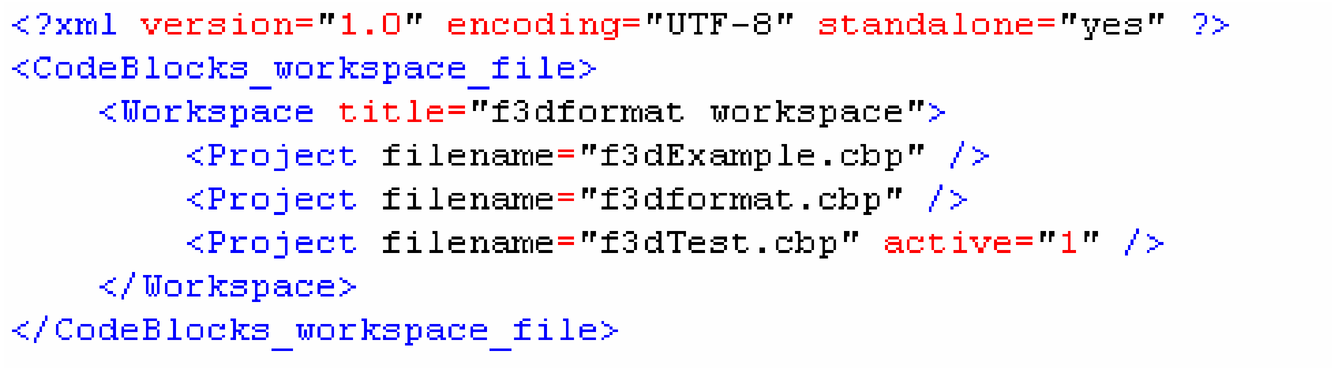
- Individually project files format
  - Information incompatibility
- Few cross-platform developers
- Deployment to other IDEs
  - Team projects, project porting

CodeBlocks overview

- Cross-platform IDE (wxWidgets)
- Useful set of pluggings (svn, ...)
- Supports many compilers (gcc, MinGW, MSVC, ...)
  - Compiles directly or with makefiles
- Well written format (XML) of project (.cbp) and workspace (.workspace) files

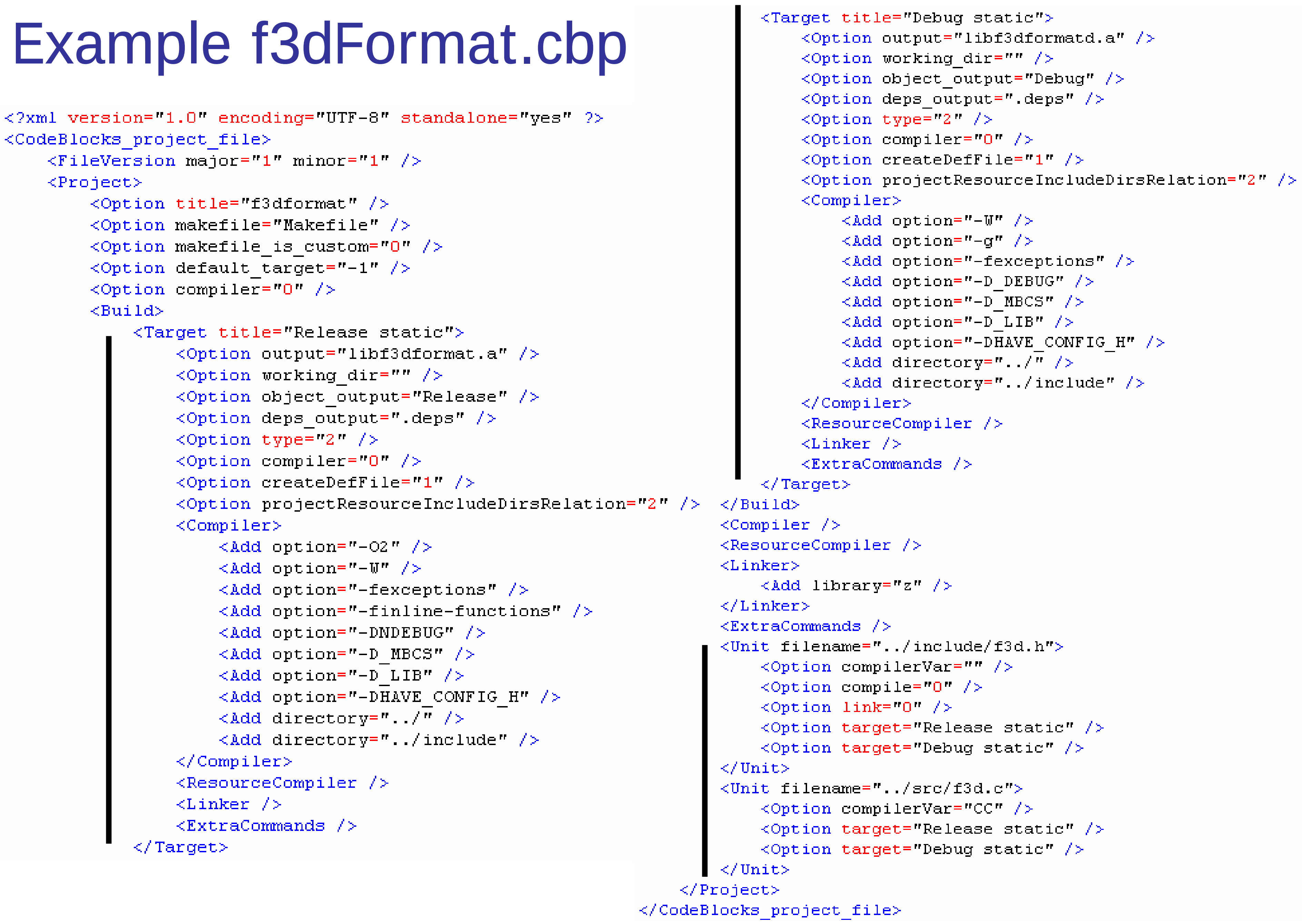
Example f3dFormat

- File - f3dFormat.workspace
  - include 3 projects



```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<CodeBlocks_workspace_file>
    <Workspace title="f3dformat workspace">
        <Project filename="f3dExample.cbp" />
        <Project filename="f3dformat.cbp" />
        <Project filename="f3dTest.cbp" active="1" />
    </Workspace>
</CodeBlocks_workspace_file>
```

Example f3dFormat.cbp



```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<CodeBlocks_project_file>
    <FileVersion major="1" minor="1" />
    <Project>
        <Option title="f3dformat" />
        <Option makefile="Makefile" />
        <Option makefile_is_custom="0" />
        <Option default_target="-1" />
        <Option compiler="0" />
        <Build>
            <Target title="Release static">
                <Option output="libf3dformat.a" />
                <Option working_dir="" />
                <Option object_output="Release" />
                <Option deps_output=".deps" />
                <Option type="2" />
                <Option compiler="0" />
                <Option createDefFile="1" />
                <Option projectResourceIncludeDirsRelation="2" />
                <Compiler>
                    <Add option="-O2" />
                    <Add option="-W" />
                    <Add option="-fexceptions" />
                    <Add option="-finline-functions" />
                    <Add option="-DNDEBUG" />
                    <Add option="-D_MBCS" />
                    <Add option="-D_LIB" />
                    <Add option="-DHAVE_CONFIG_H" />
                    <Add directory="../" />
                    <Add directory="../include" />
                </Compiler>
                <ResourceCompiler />
                <Linker />
                <ExtraCommands />
            </Target>
            <Target title="Debug static">
                <Option output="libf3dformatd.a" />
                <Option working_dir="" />
                <Option object_output="Debug" />
                <Option deps_output=".deps" />
                <Option type="2" />
                <Option compiler="0" />
                <Option createDefFile="1" />
                <Option projectResourceIncludeDirsRelation="2" />
                <Compiler>
                    <Add option="-W" />
                    <Add option="-g" />
                    <Add option="-fexceptions" />
                    <Add option="-D_DEBUG" />
                    <Add option="-D_MBCS" />
                    <Add option="-D_LIB" />
                    <Add option="-DHAVE_CONFIG_H" />
                    <Add directory="../" />
                    <Add directory="../include" />
                </Compiler>
                <ResourceCompiler />
                <Linker />
                <ExtraCommands />
            </Target>
        </Build>
        <Compiler />
        <ResourceCompiler />
        <Linker>
            <Add library="z" />
        </Linker>
        <ExtraCommands />
        <Unit filename="../include/f3d.h">
            <Option compilerVar="" />
            <Option compile="0" />
            <Option link="0" />
            <Option target="Release static" />
            <Option target="Debug static" />
        </Unit>
        <Unit filename="../src/f3d.c">
            <Option compilerVar="CC" />
            <Option target="Release static" />
            <Option target="Debug static" />
        </Unit>
    </Project>
</CodeBlocks_project_file>
```

Example f3dFormat.cbp

Output library name

Static library

Produce debug symbols

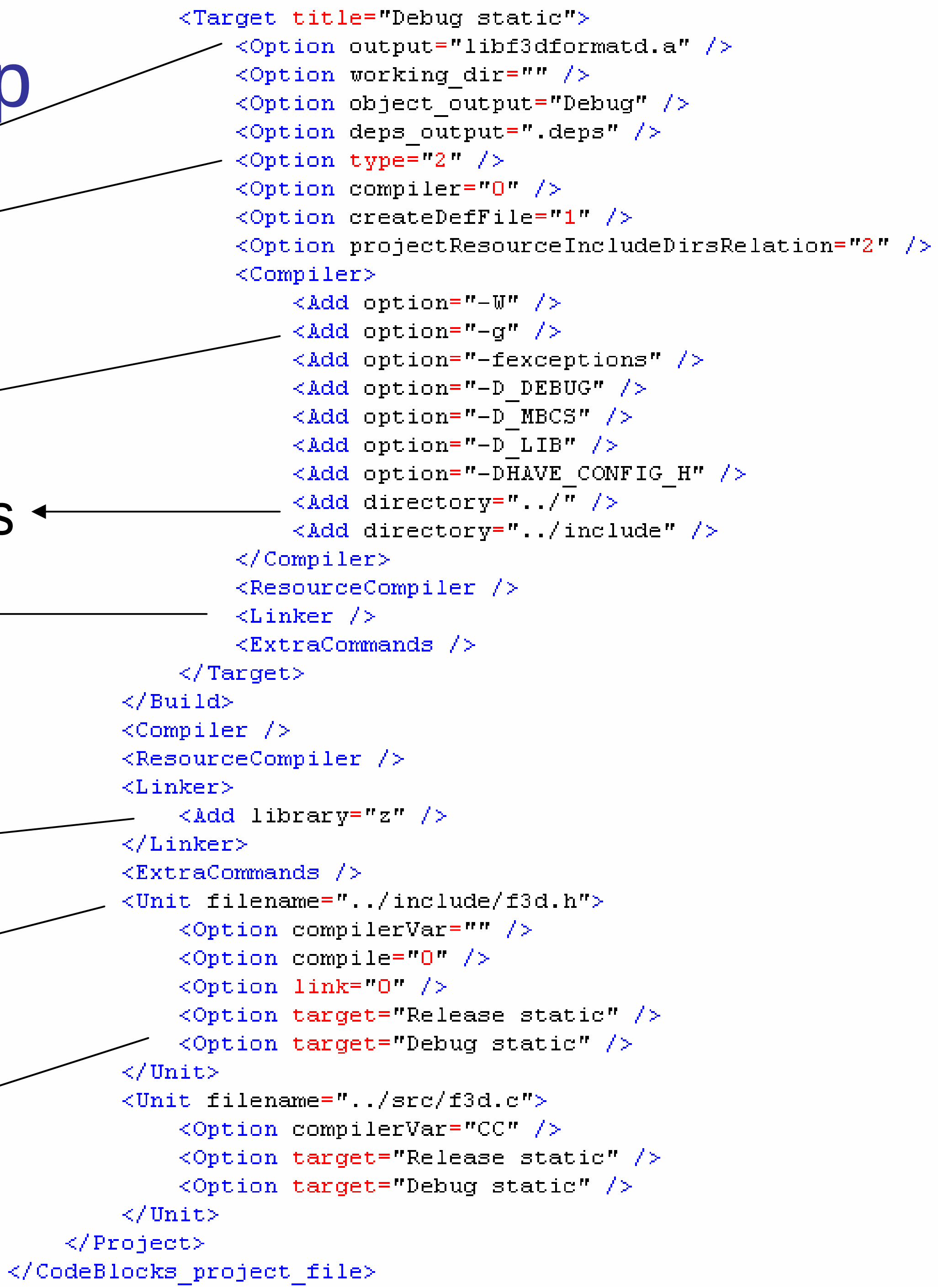
Additional include directories

Linker option for target (empty)

Linker option for the whole project

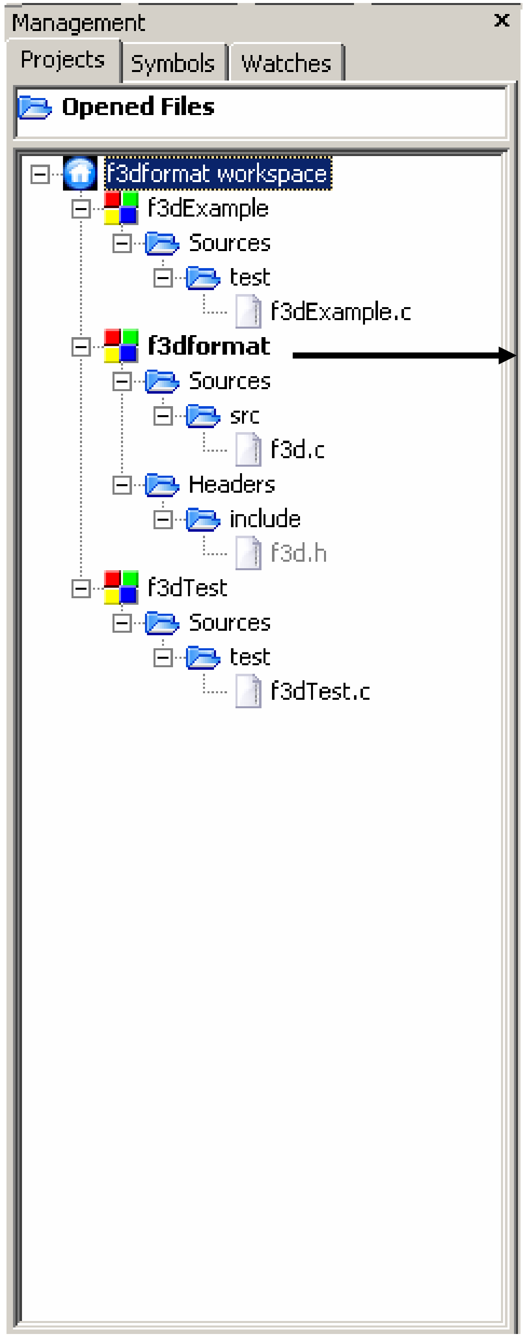
Project files

Relation to targets

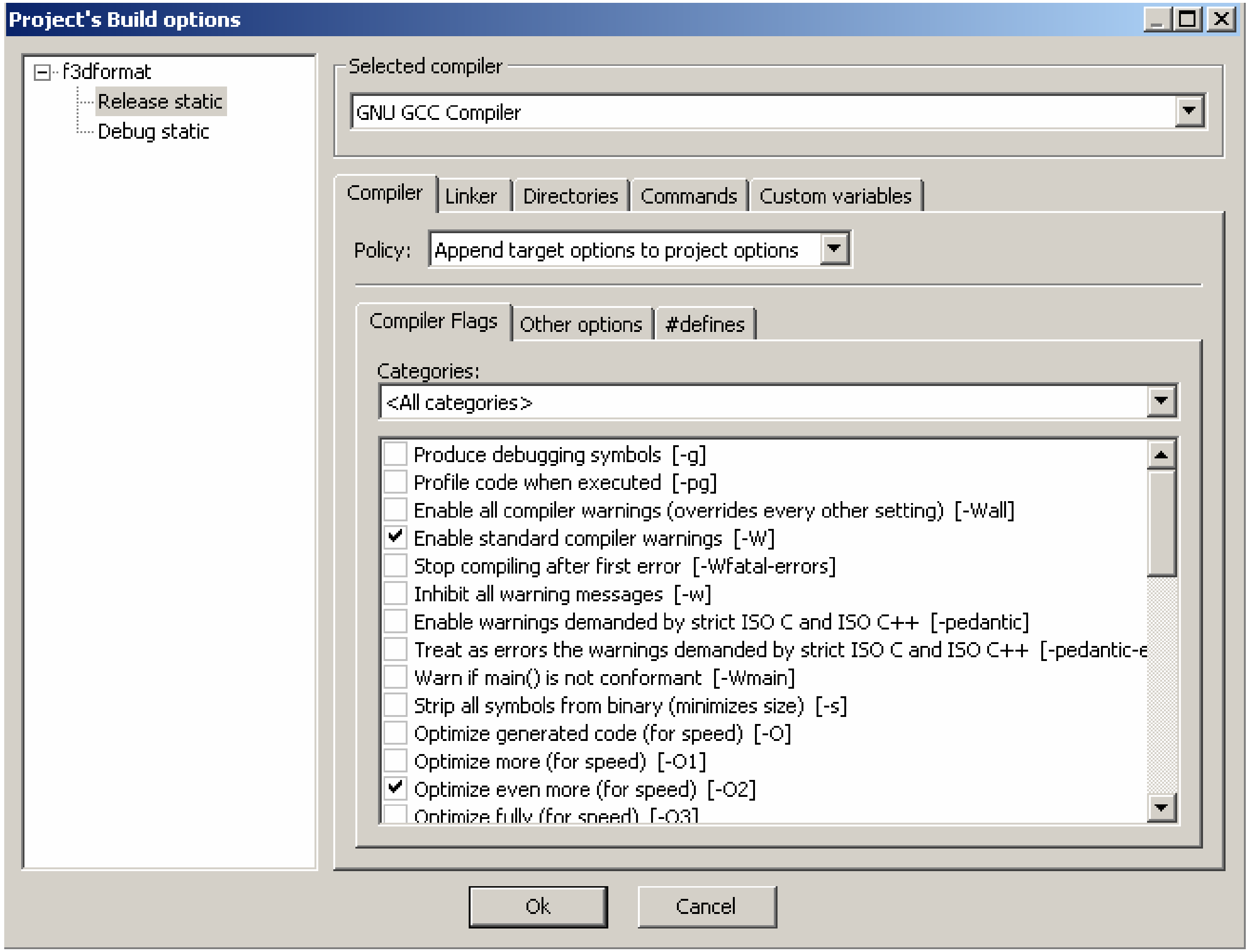


```
            <Target title="Debug static">
                <Option output="libf3dformatd.a" />
                <Option working_dir="" />
                <Option object_output="Debug" />
                <Option deps_output=".deps" />
                <Option type="2" />
                <Option compiler="0" />
                <Option createDefFile="1" />
                <Option projectResourceIncludeDirsRelation="2" />
                <Compiler>
                    <Add option="-W" />
                    <Add option="-g" />
                    <Add option="-fexceptions" />
                    <Add option="-D_DEBUG" />
                    <Add option="-D_MBCS" />
                    <Add option="-D_LIB" />
                    <Add option="-DHAVE_CONFIG_H" />
                    <Add directory="../" />
                    <Add directory="../include" />
                </Compiler>
                <ResourceCompiler />
                <Linker />
                <ExtraCommands />
            </Target>
        </Build>
        <Compiler />
        <ResourceCompiler />
        <Linker>
            <Add library="z" />
        </Linker>
        <ExtraCommands />
        <Unit filename="../include/f3d.h">
            <Option compilerVar="" />
            <Option compile="0" />
            <Option link="0" />
            <Option target="Release static" />
            <Option target="Debug static" />
        </Unit>
        <Unit filename="../src/f3d.c">
            <Option compilerVar="CC" />
            <Option target="Release static" />
            <Option target="Debug static" />
        </Unit>
    </Project>
</CodeBlocks_project_file>
```

Using GUI



- f3dformat workspace
  - f3dExample
    - Sources
      - test
        - f3dExample.c
  - f3dformat
    - Sources
      - src
        - f3d.c
    - Headers
      - include
        - f3d.h
  - f3dTest
    - Sources
      - test
        - f3dTest.c



- f3dformat
  - Release static
  - Debug static

Selected compiler: GNU GCC Compiler

Policy: Append target options to project options

Categories: <All categories>

- ☐ Produce debugging symbols [-g]
- ☐ Profile code when executed [-pg]
- ☐ Enable all compiler warnings (overrides every other setting) [-Wall]
- ☑ Enable standard compiler warnings [-W]
- ☐ Stop compiling after first error [-Wfatal-errors]
- ☐ Inhibit all warning messages [-w]
- ☐ Enable warnings demanded by strict ISO C and ISO C++ [-pedantic]
- ☐ Treat as errors the warnings demanded by strict ISO C and ISO C++ [-pedantic-e
- ☐ Warn if main() is not conformant [-Wmain]
- ☐ Strip all symbols from binary (minimizes size) [-s]
- ☐ Optimize generated code (for speed) [-O]
- ☐ Optimize more (for speed) [-O1]
- ☑ Optimize even more (for speed) [-O2]
- ☐ Optimize fully (for speed) [-O3]

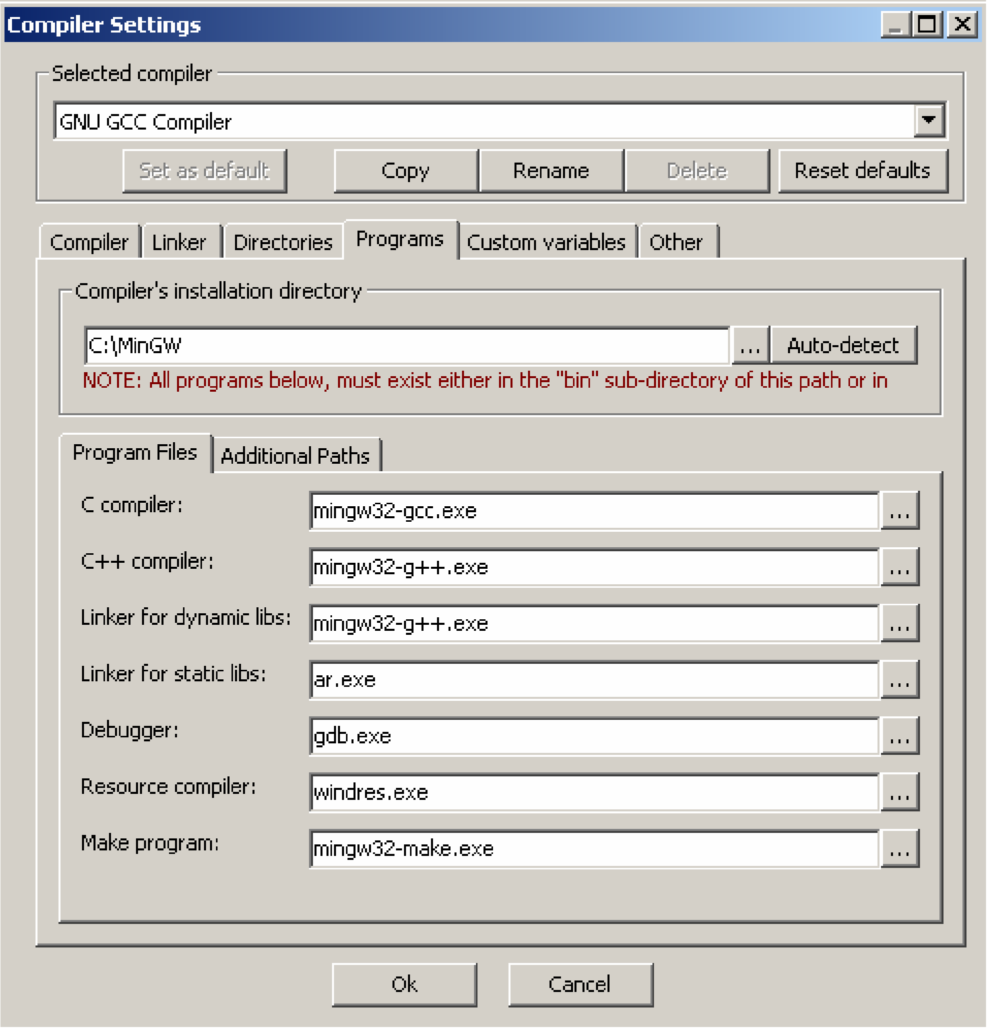
CodeBlocks and MinGW – I.

- MinGW - Minimalist GNU-Windows
  - GNU toolset (gcc,gdb,...)
  - Collection of freely available standard headers and libraries (do not require Windows specific DLLs)
- CodeBlocks is very suitable tool to work with MinGW

CodeBlocks and MinGW – II.

Set upping the MinGW

1) Install MinGW
2) Edit settings in CodeBlocks



Selected compiler: GNU GCC Compiler

Compiler's installation directory: C:\MinGW

NOTE: All programs below, must exist either in the "bin" sub-directory of this path or in

C compiler: mingw32-gcc.exe

C++ compiler: mingw32-g++.exe

Linker for dynamic libs: mingw32-g++.exe

Linker for static libs: ar.exe

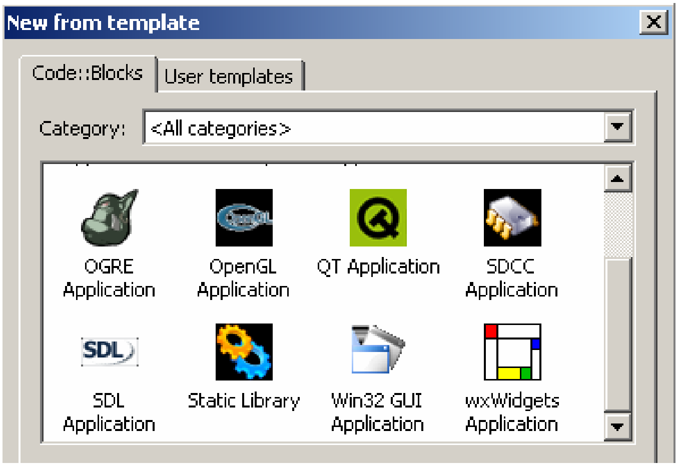
Debugger: gdb.exe

Resource compiler: windres.exe

Make program: mingw32-make.exe

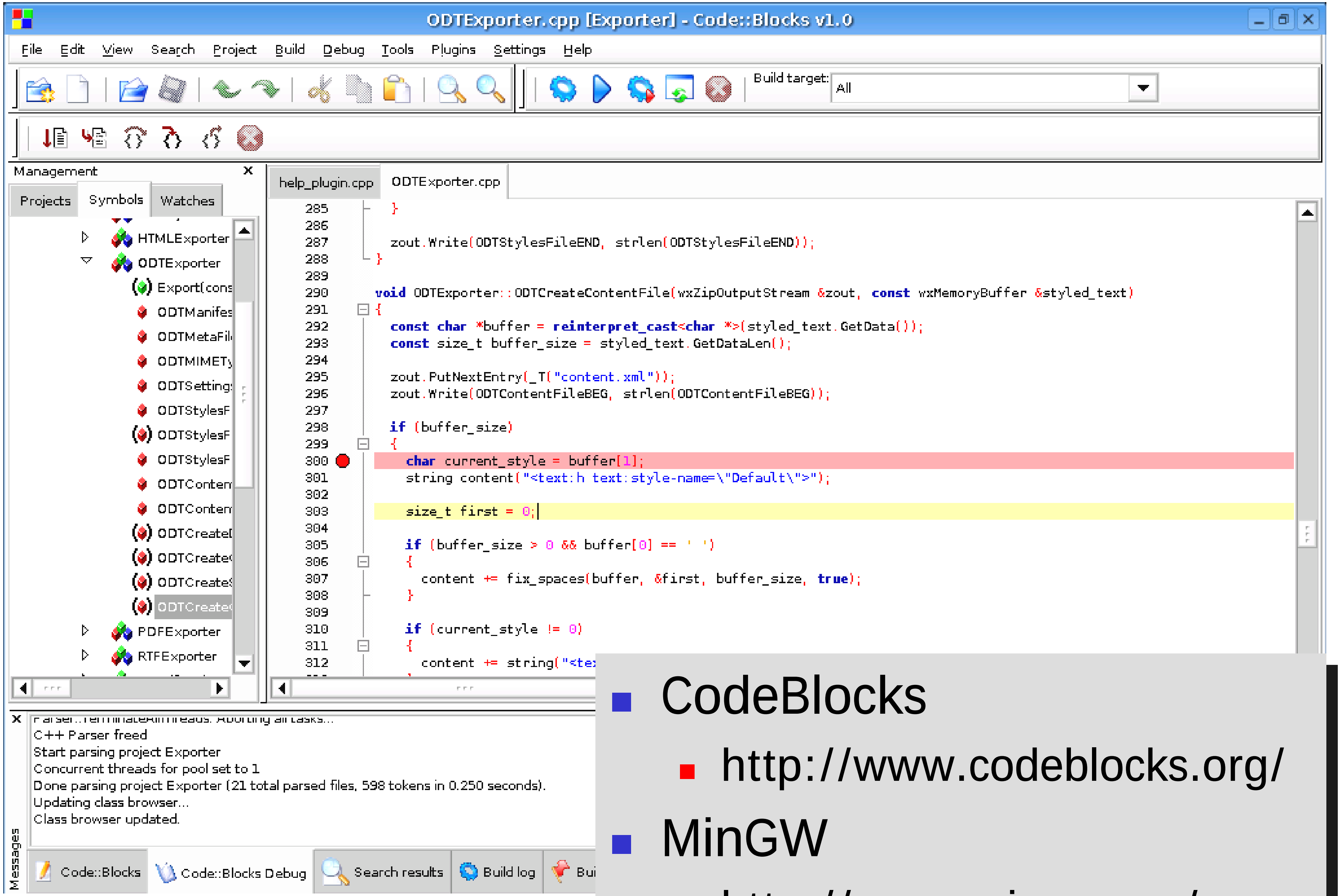
CodeBlocks features

- Import MSVC (*.dsw,*.dsp) and Dev-C++ files
- Support custom template projects
  - CodeBlocks creates basic project (.cbp) file instead of you



New from template

Category: <All categories>



```
  }

  zout.Write(ODTStylesFileEND, strlen(ODTStylesFileEND));
}

void ODTExporter::ODTCreateContentFile(wxZipOutputStream &zout, const wxMemoryBuffer &styled_text)
{
  const char *buffer = reinterpret_cast<char *>(styled_text.GetData());
  const size_t buffer_size = styled_text.GetDataLen();

  zout.PutNextEntry(_T("content.xml"));
  zout.Write(ODTContentFileBEG, strlen(ODTContentFileBEG));

  if (buffer_size)
  {
    char current_style = buffer[1];
    string content("<text:h text:style-name=\"Default\">");

    size_t first = 0;

    if (buffer_size > 0 && buffer[0] == ' ')
    {
      content += fix_spaces(buffer, &first, buffer_size, true);
    }

    if (current_style != 0)
    {
      content += string("<te
```

```
Parser::TerminateAllThreads: Aborting all tasks...
C++ Parser freed
Start parsing project Exporter
Concurrent threads for pool set to 1
Done parsing project Exporter (21 total parsed files, 598 tokens in 0.250 seconds).
Updating class browser...
Class browser updated.
```

- CodeBlocks
  - http://www.codeblocks.org/
- MinGW
  - http://www.mingw.org/