




INFOVIS PROGRAMMING

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wxVisTool

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wxVisTool Overview

- GUI (Graphical User Interface)
platform: wxWidgets
- IDE: VC 2005 (you can use other IDEs that support C++ and wxWidgets)
- Graphics: OpenGL

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What is wxWidgets?

- A C++ framework providing GUI (Graphical User Interface) and other facilities on more than one platform
- Version 2 currently supports all desktop versions of MS Windows, Unix with GTK+, Unix with Motif, and MacOS
- Free
- Open source
- Powerful

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MainApplication

- To set a wxWidgets application going, you will need to derive a [wxApp](#) class and override [wxApp::OnInit](#).
- An application must have a top-level [wxFrame](#) or [wxDialog](#) window. Each frame may contain one or more instances of classes such as [wxPanel](#), [wxSplitterWindow](#) or other windows and controls.
- Example: MainApplication

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Program Entrance

```
bool MainApplication::OnInit()
{
    MainFrame* frame = new MainFrame("Visualization
    Tool Demo", 50, 50, 450, 300);
    frame->Show(TRUE);

    return TRUE;
}
```

- An application must have a top-level [wxFrame](#) or [wxDialog](#) window .

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wxFrame

- MainFrame is derived from GLFrame
- GLFrame is derived from wxFrame
- Each frame may contain one or more instances of classes such as [wxPanel](#), [wxSplitterWindow](#) or other windows and controls.
- A frame can have a [wxMenuBar](#), a [wxToolBar](#), a status line, and a [wxIcon](#) for when the frame is iconized.
- Take a look at wxFrame

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GLFrame

- GLFrame is derived from wxFrame
- GLFrame contains a canvas that you can draw your displays on it
`grCanvas* GetCanvas();`

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MainFrame

- Add more menu buttons than GLFrame
- Take a look at GLFrame and MainFrame

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How to draw a line (1)

- wxMenuBar, wxMenu
- Event table
 - Header file:
 - Declare the handler
 - DECLARE_EVENT_TABLE()
 - Source file:
 - Declare an event (such as a menu click) in the event table, associate it with its handler
 - Define the handler

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grCanvas and wxGLCanvas

- grCanvas is derived from wxGLCanvas
- wxGLCanvas is a class for displaying OpenGL graphics

```
void grCanvas::DrawLine( double x1, double y1, double x2,
double y2)
{
    BeginDraw();
    glBegin(GL_LINES);
    glVertex2f((float) x1, (float) y1);
    glVertex2f((float) x2, (float) y2);
    glEnd();
    EndDraw();
}
```

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grCanvas and wxGLCanvas

- If you want to draw a line on grCanvas* canv, you do this:
canv->DrawLine(x1, y1, x2, y2);
 - x1, y1, x2, y2 should be a double between 0 and 1 since the drawing area of grCanvas is mapped to [0,0] to [1,1] in the data space.

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grCanvas and Drawers

- Each instance of grCanvas is binded with a drawer
- grCanvas captures mouse moving, clicking, and refreshing events. It passes it to the associated drawer so you draw the canvas and handle your mouse events from the drawers
- The drawers call the grCanvas functions to draw lines and other items on the grCanvas
- In this way you can draw different displays on the same grCanvas by binding it with different drawers

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Drawer

- You should derive your drawers from the Drawer class and override the functions such as
- `void OnDraw();`
- `void OnLeftButtonDoubleClick(Vec2 p);`
 - `p` is in the `[0,0]` to `[1,1]` data space converted from the current mouse position

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DemoDrawer

- DemoDrawer is the example drawer I provide to you.

A simpler example of the OnDraw function:

```
void DemoDrawer::OnDraw()
{
    PrepareCanvas();
    canvas->SetForeground(RGBt(0.3f, 0.6f, 0.9f));
    canvas->DrawLine(0.2, 0.2, 0.8, 0.8);
}
```

Currently the line, circle, arc, partial disk, and text drawing are working (you can try them from the menu)

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Binding Drawer and Canvas

- Don't forget to do this:
 - drawer = new DemoDrawer();
 - drawer->SetCanvas(GetCanvas());
 - GetCanvas()->SetDrawer(drawer);
 - GetCanvas()->Refresh();
 - in MainFrame::MainFrame(...

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How to draw a line (2)

- Let's look at it again in a bigger picture...

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Dialogs

- Instances of [wxDialog](#) can also be used for controls and they have the advantage of not requiring a separate frame.
- Instead of creating a dialog box and populating it with items, it is possible to choose one of the convenient common dialog classes, such as [wxMessageDialog](#) and [wxFileDialog](#).
- See the function
`void MainFrame::OpenFile(wxCommandEvent& event)`
for an example. You can modify the function to read your files (current a file is selected without doing anything).

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Download and Install VC 2005

- <http://msdn2.microsoft.com/en-us/express/default.aspx>

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Using Visual C++ 2005

- Build solution, start without debugging, start debugging, F9 (add/remove breakpoints), F10 (step over), F11 (step in), call stack, value watching

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