UWPLib: Include XAML Controls in Plain Win32

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A quick way to add UWP controls into plain Win32 apps

Download project @ GitHub: https://github.com/WindowsNT/uwplib

FluentTorrent @ GitHub: https://github.com/WindowsNT/FluentTorrent

Introduction

Microsoft keeps inventing new frameworks but eventually it's plain old Win32 that wins. Here is a way, based on the new C++ 17/WinRT API to wrap any UWP control inside a plain C++ Win32 Application.

You need VS 2017+, Windows 10 build 1903 or later, a recent Windows SDK (17763+) and link against "*windowsapp.lib*" (Nothing related to precompiled headers discussed in the above page is required).

UWP

UWP provides us some nice controls, found here. We first have to initialize `winrt` and then WindowsXamlManager:

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```
#include <winrt/base.h>
#include <atlbase.h>
#include <winrt/Windows.system.h>
#include <winrt/Windows.UI.Core.h>
#include <winrt/Windows.UI.Input.Inking.h>
#include <winrt/Windows.UI.Text.h>
#include <winrt/Windows.Foundation.h>
#include <winrt/Windows.Foundation.Collections.h>
#include <winrt/Windows.UI.Xaml.Hosting.h>
#include <winrt/Windows.UI.Xaml.Controls.h>
#include <winrt/Windows.UI.Xaml.Controls.Primitives.h>
#include <winrt/Windows.UI.Xaml.Data.h>
#include <winrt/Windows.UI.Xaml.Media.h>
#include <windows.ui.xaml.hosting.desktopwindowxamlsource.h>
#include <winrt/Windows.UI.Xaml.Markup.h>
#pragma comment(lib, "windowsapp")

using namespace winrt;
using namespace Windows::Foundation;
```

```
using namespace Windows::Foundation::Collections;
using namespace Windows::Foundation::Numerics;
using namespace Windows::UI;
using namespace Windows::UI::Composition;
using namespace Windows::UI::Core;
using namespace Windows::UI::Text;
using namespace Windows::UI::Input::Inking;
using namespace Windows::UI::Xaml;
using namespace Windows::UI::Xaml::Data;
using namespace Windows::UI::Xaml::Hosting;
using namespace Windows::UI::Xaml::Controls;
using namespace Windows::Media::Core;
using namespace Windows::UI::Xaml::Markup;

winrt::init_apartment(apartment_type::single_threaded);
WindowsXamlManager windowsXamlManager = WindowsXamlManager::InitializeForCurrentThread();
```

The operations are provided by `DesktopWindowXamlSource` as an interop interface:

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```
DesktopWindowXamlSource xs;
auto interopDetail = xs.as<IDesktopWindowXamlSourceNative>();
interopDetail->AttachToWindow(hh);
interopDetail->get_WindowHandle(&s->hwndDetailXamlIsland);

winrt::param::hstring str(LR"(
    <Grid Name="MainGrid" xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
        xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml">
<CalendarView />
    </Grid>)");

winrt::Windows::Foundation::IInspectable ins = XamlReader::Load(str);
xs.Content(ins.as<UIElement>());
```

All this is really plain COM. `as()` is like the old `QueryInterface` in a template form. We attach the control to our own `HWND` and we also get an "inner" `HWND`, created by the framework. To create the control, we use XAML, XML or HTML like control configuration. In this case, we specify a calendar inside a grid. We need a `hstring` (a `winrt string`). We can use the `winrt::param::hstring` wrapper (like `_bstr_t`). Finally, we load the `string` to an `IInspectable` (the base interface like `IUnknown`) using XamlReader and finally, we load it to the `DesktopWindowXamlSource`.

To interact with the control, we can use the `as()` to get a type. For example, if I load a button:

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```
<Button xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"

        xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml" Name="BX">BBBB</Button>
```

We can mess with it:

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```
Button butt = ins.as<Button>();
butt.Content(box_value(L"Hi"));
```

I found the class from Button in MSDN so you can use any "member function".

To get events about the button, we can use WinRT event handling along with some nice lambdas:

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```
butt.Click([](const IInspectable&  sender, const RoutedEventArgs& rea)
            {
                sender.as<winrt::Windows::UI::Xaml::Controls::Button>().Content
                        (box_value(L"Clicked"));
            });
```

Each "callback" takes the `IInspectable` reference as the first parameter. The rest of the parameters are found in the documentation, for example, the `Click()` takes a `RouterEventArgs` argument.

UWPLib

`UWPLib` is a project to represent UWP controls as Win32 controls with messages and notifications.

1. Create an app with the attached manifest
2. Call `winrt::init_apartment(apartment_type::single_threaded)`
3. Call `WindowsXamlManager::InitializeForCurrentThread()`
4. Call function `Register()`

After that, you create UWP windows with the `UWP_Custom` class, then use `WM_SETTEXT` to load the markup. This is used by my new TurboTransfer app:

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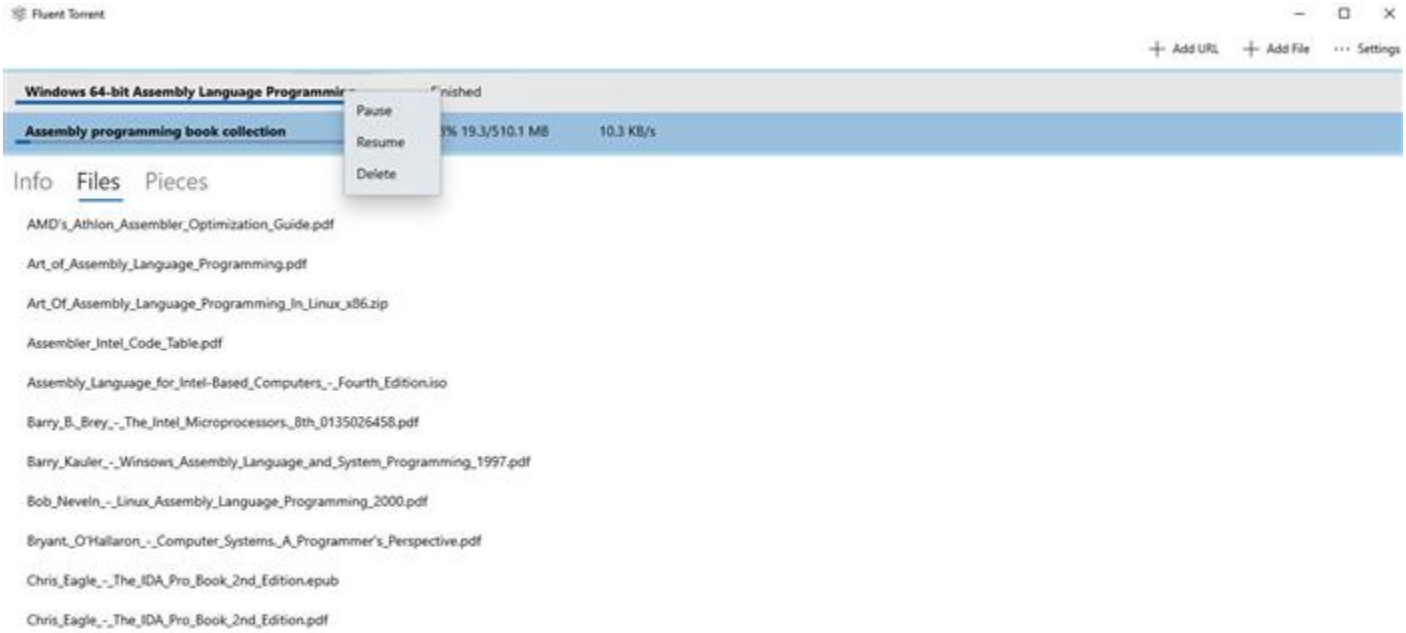
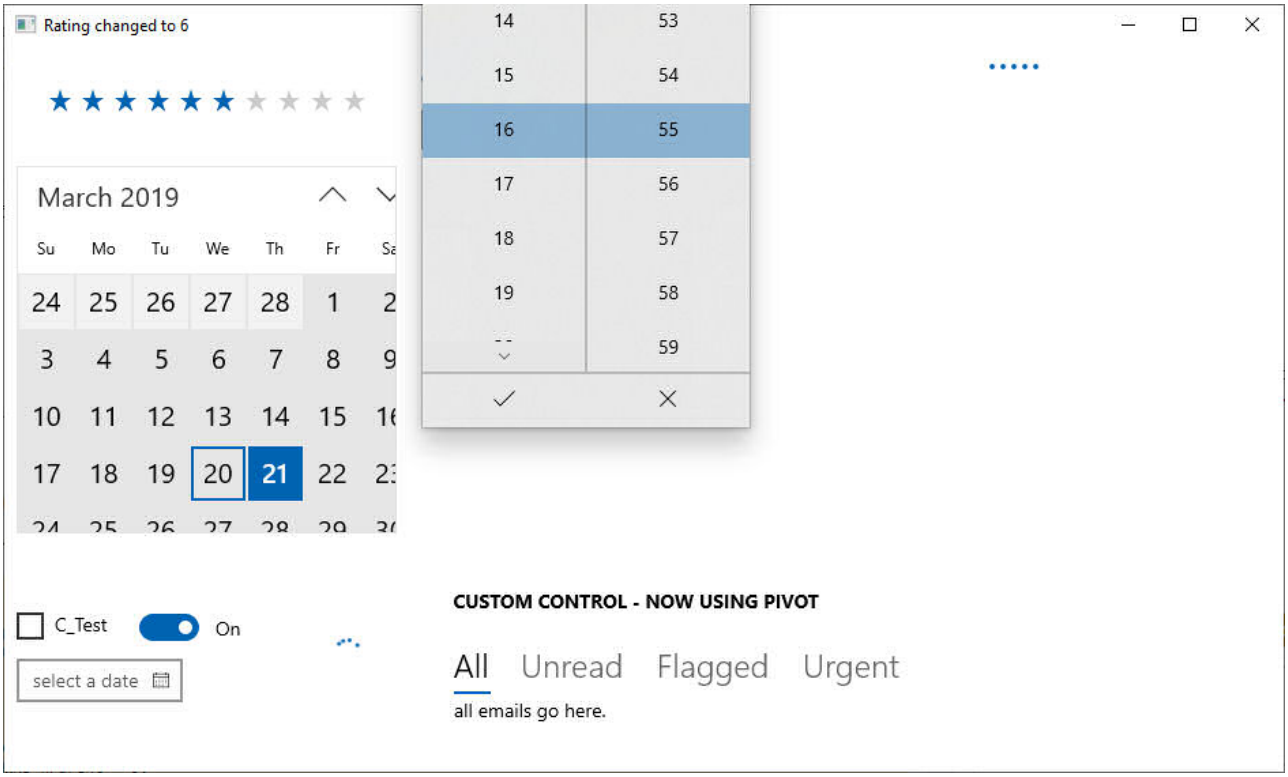
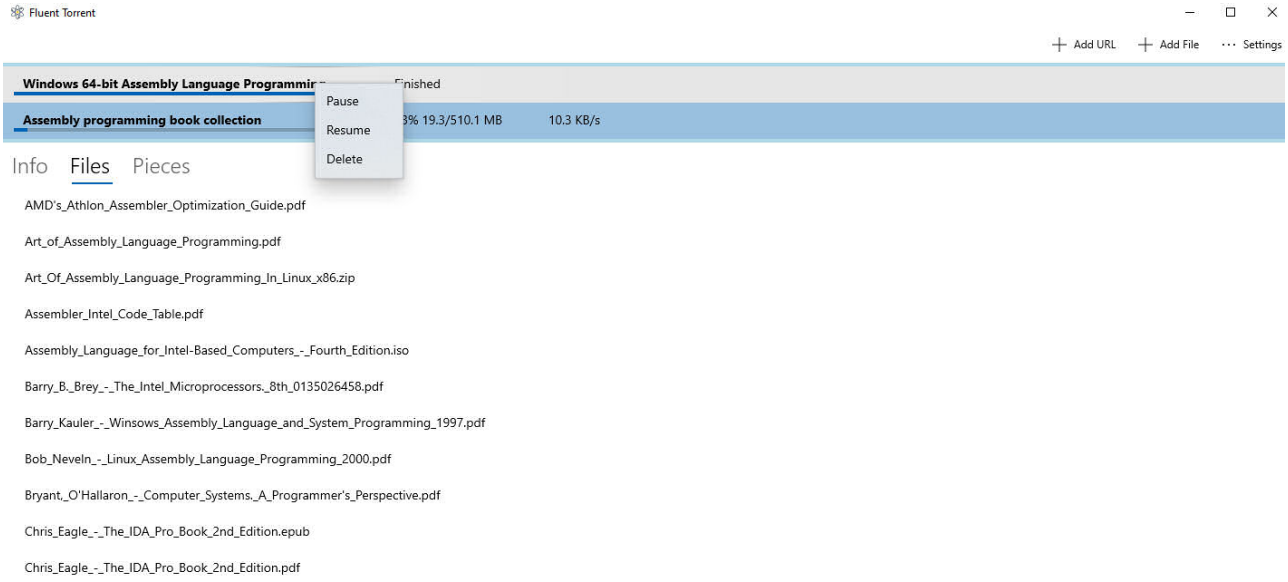
```
    auto pv = LR"(<Pivot xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"

        xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml" >
    <PivotItem Header="Items">
            <ListView Name="GridItems"/>
    </PivotItem>
    <PivotItem Header="Transfers">
            <ListView Name="TransferItems"/>
    </PivotItem>
    <PivotItem Header="Add">
        <StackPanel>
            <Button x:Name="btn1" Content="Add Files" Margin="5" Width="150" />
            <Button x:Name="btn2" Content="Add Directory" Margin="5" Width="150" />
        </StackPanel>
    </PivotItem>
    <PivotItem Header="Upload">
        <StackPanel>
        </StackPanel>
    </PivotItem>
    <PivotItem Header="Configuration">
        <StackPanel>
            <TextBox Name="portnum" Margin="5" Header="Port Number" Text="7001"/>
            <CheckBox Name="CB_RightClick" Content="Enable right click" />
            <CheckBox Name="CB_ForceOctetStream"

             Content="Force MIME application/octet-stream" />
            <TextBox x:Name="ip" Margin="5" Header="IP or Hostname (Empty = default) " />
        </StackPanel>
    </PivotItem>
</Pivot>)";

        SetWindowText(GetDlgItem(hh, 901), pv);
        UWPLIB::UWPCONTROL* u = (UWPLIB::UWPCONTROL*)SendDlgItemMessage
                                (hh, 901, UWPM_GET_CONTROL, 0, 0);
        pivot = u->ins.as<Pivot>();
```





The Project

The project uses the programming aspects discussed here to create some UWP controls. Have fun with it. I used it in my big **FluentTorrent**:



History

- 20/3/2019: Converted to single lib file
- 18/3/2019: Added UWP library
- 14/3/2019: First release

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About the Author

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It doesn't work
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Re: It doesn't work
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