

# **The EWL book**

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by dan 'dj2' sinclair

This book is an tutorial on the use of the EWL (Enlightened Widget Library).

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# Chapter 1. Introduction

The EWL (Enlightened Widget Library) is a library for creating graphical user interfaces based upon the EFL (Enlightenment Foundation Libraries).

The primary author of EWL is:

- Nathan 'RbdPngn' Ingersoll

EWL works in a similar fashion to other widget libraries, being based on a callback system. As elements are created and added to the interface, any desired event callbacks are registered, these functions will be triggered when the specified event happens.

This tutorial is an attempt to familiarize the user with the different aspects of the EWL system. The tutorial will probably never completely document all aspects of EWL as the system continues to grow. A good understanding of C programming is assumed throughout the tutorial.

If you have any troubles with either this tutorial, or using EWL in general, any feedback is grealy appreciated as it would help improve either the tutorial or EWL itself. Please see Contributing section for more information.

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# Chapter 2. Getting Started

## Getting EWL installed

Before using EWL you need to have the libraries installed on your computer. EWL can be retrieved from the Enlightenment CVS and directions on how this is done can be found at: <http://www.enlightenment.org/pages/source.html> [http://www.enlightenment.org/pages/source.html] along with detailed installation directions.

You will need to install a lot of dependencies before being able to install EWL, this is because it depends on many of the EFL libraries being present on the system.

Once you have the other EFL libraries installed, installing EWL is as simple as:

```
./configure;  
make;  
sudo make install;
```

## Creating a simple Window

The first step in creating an EWL application is to get the main window to be displayed on the screen.

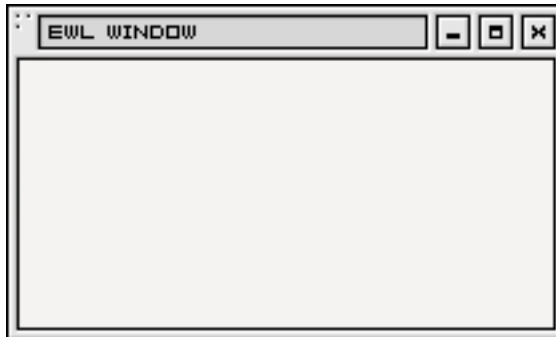
```
#include <Ewl.h>  
  
void destroy_cb(Ewl_Widget *w, void *event, void *data) {  
    ewl_widget_destroy(w);  
    ewl_main_quit();  
}  
  
int main(int argc, char ** argv) {  
    Ewl_Widget *win = NULL;  
  
    if (!ewl_init(&argc, argv)) {  
        printf("Unable to init ewl\n");  
        return 1;  
    }  
  
    win = ewl_window_new();  
    ewl_window_set_title(EWL_WINDOW(win), "EWL Window");  
    ewl_window_set_name(EWL_WINDOW(win), "EWL_WINDOW");  
    ewl_window_set_class(EWL_WINDOW(win), "EWLWindow");  
    ewl_object_request_size(EWL_OBJECT(win), 200, 100);  
    ewl_callback_append(win, EWL_CALLBACK_DELETE_WINDOW, destroy_cb, NULL);  
    ewl_widget_show(win);  
  
    ewl_main();  
    return 0;  
}
```

This program can be compiled with a simple:

```
zero@oberon [create_window] -> gcc -o create_window main.c \
```

```
`ewl-config --cflags --libs`
```

And if executed should produce something similar to:



Now that we know what we're making, lets go over the code in more detail.

```
#include <Ewl.h>
```

All EWL applications will start with the `<Ewl.h>` include. This will pull in all of the other header files that EWL requires to function.

```
void destroy_cb(Ewl_Widget *w, void *event, void *data) {  
    ewl_widget_destroy(w);  
    ewl_main_quit();  
}
```

The `destroy_cb` will be setup as the callback EWL will make when the window manager requests the application terminate. Callbacks will be described further in the Callbacks section.

The `ewl_widget_destroy()` is used to signal to EWL that we no longer need the given widget, in this case the window, and for EWL to clean up the resources used by that widget.

Finally, we call `ewl_main_quit()` which causes EWL to exit its main processing loop and return from the `ewl_main()` function.

```
int main(int argc, char ** argv) {  
    Ewl_Widget *win = NULL;  
  
    if (!ewl_init(&argc, argv)) {  
        printf("Unable to init ewl\n");  
        return 1;  
    }  
}
```

Before we can actually use EWL we must initialize the library. This is done through the call to `ewl_init()`. We pass the `argc` and `argv` parameters from `main` to EWL as there are a few specific switches EWL parses from the arguments.

These switches currently include:

## **EWL command line switches**

- `--ewl-theme <name>`
- `--ewl-segv`
- `--ewl-software-x11`
- `--ewl-gl-x11`
- `--ewl-fb`

The `<name>` parameter to the `--ewl-theme` switch is the name of the theme you wish to be used. This can be either located in one of the system directories, or in the local directory.

If EWL was able to successfully initialize itself the call to `ewl_init()` will return a value `> 0`. If it was unsuccessful there is no real point in continuing as EWL will not function correctly.

```
win = ewl_window_new();
ewl_window_set_title(EWL_WINDOW(win), "EWL Window");
ewl_window_set_name(EWL_WINDOW(win), "EWL_WINDOW");
ewl_window_set_class(EWL_WINDOW(win), "EWLWindow");
ewl_object_request_size(EWL_OBJECT(win), 200, 100);
ewl_callback_append(win, EWL_CALLBACK_DELETE_WINDOW, destroy_cb, NULL);
ewl_widget_show(win);
```

This is where the actual window is created. A call to `ewl_window_new()` creates the new, empty window. We then take that window and start attaching data. We begin by setting the title with `ewl_window_set_title()`, which will set the string to be displayed by the window manager on the top of the window. The next two function calls, `ewl_window_set_name()` and `ewl_window_set_class()` set data that will be used by the window manager to better manage your application.

We then proceed to set the base size for the window with a call to `ewl_object_request_size()`. The second and third parameters (200, 100) specify the width and height we wish the window to have on creation. You'll notice that this call casts to `EWL_OBJECT()`. This is because of the hierarchy of widgets that EWL provides, (further described in the Object Hierarchy chapter) an `ewl_window` is a `ewl_object` so we can use the `ewl_object` operations on an `ewl_window`.

We then proceed to add the delete callback to the window with a call to `ewl_callback_append`. The second parameter of which is the type of signal we wish to listen too, the third is the function to call and finally the fourth is any user data to be sent to the callback.

Once the window is all set up and ready to go a simple call to `ewl_widget_show()` will have EWL display the window.

```
ewl_main();
return 0;
}
```

The call to `ewl_main()` will tell EWL to start its main processing loop waiting on any signals. `ewl_main()` will handle the shutdown of EWL when the main processing loop is exited.

Thats it. Although its probably one of the simplest EWL applications that can be produced it will be used as a basis for many of the other examples presented in this tutorial, and many EWL applications that are produced.

## Hello World

Once you have a window on the screen its time to do something more fun with it. So, following in the grand tradition, something with Hello in it.



I am only going to explain the portions of the program which have not already been seen. If there is something you do not understand please reference the previous section and it should be explained there.

```
#include <stdio.h>
#include <Ewl.h>

void destroy_cb(Ewl_Widget *w, void *event, void *data) {
    ewl_widget_destroy(w);
    ewl_main_quit();
}

void text_update_cb(Ewl_Widget *w, void *event, void *data) {
    char *s = NULL;
    Ewl_Widget *label = NULL;
    char buf[BUFSIZ];

    s = ewl_entry_get_text(EWL_ENTRY(w));
    label = (Ewl_Widget *)data;

    snprintf(buf, BUFSIZ, "Hello %s", s);
    ewl_text_text_set(EWL_TEXT(label), buf);

    free(s);
    return;
}

int main(int argc, char ** argv) {
    Ewl_Widget *win = NULL;
    Ewl_Widget *box = NULL;
    Ewl_Widget *label = NULL;
    Ewl_Widget *o = NULL;

    /* init the library */
    if (!ewl_init(&argc, argv)) {
        printf("Unable to initialize EWL\n");
        return 1;
    }

    /* create the window */
    win = ewl_window_new();
    ewl_window_set_title(EWL_WINDOW(win), "Hello world");
    ewl_window_set_class(EWL_WINDOW(win), "hello");
    ewl_window_set_name(EWL_WINDOW(win), "hello");
    ewl_object_request_size(EWL_OBJECT(win), 200, 50);
    ewl_callback_append(win, EWL_CALLBACK_DELETE_WINDOW, destroy_cb, NULL);
    ewl_widget_show(win);

    /* create the container */
    box = ewl_vbox_new();
    ewl_container_append_child(EWL_CONTAINER(win), box);
    ewl_object_set_fill_policy(EWL_OBJECT(box), EWL_FLAG_FILL_ALL);
    ewl_widget_show(box);

    /* create text label */
    label = ewl_text_new("Hello");
    ewl_container_append_child(EWL_CONTAINER(box), label);
    ewl_object_set_alignment(EWL_OBJECT(label), EWL_FLAG_ALIGN_CENTER);
    ewl_text_style_set(EWL_TEXT(label), "soft_shadow");
    ewl_text_color_set(EWL_TEXT(label), 255, 0, 0, 255);
    ewl_widget_show(label);

    /* create the entry */
    o = ewl_entry_new("");
}
```

```
ewl_container_append_child(EWL_CONTAINER(box), o);
ewl_object_set_alignment(EWL_OBJECT(o), EWL_FLAG_ALIGN_CENTER);
ewl_object_set_padding(EWL_OBJECT(o), 5, 5, 5, 0);
ewl_text_color_set(EWL_TEXT(EWL_ENTRY(o)->text), 0, 0, 0, 255);
ewl_callback_append(o, EWL_CALLBACK_VALUE_CHANGED, text_update_cb, label);
ewl_widget_show(o);

ewl_main();
return 0;
}
```

If you compile and run this application, in the same fashion as the first example, you should see something similar to the following window.



This one's a bit longer than the simple creating of a window, but then it also includes more functionality. If you run this program you should see a simple window with a bit of text saying 'Hello' at the top and a text area. Typing in the text area and hitting 'Enter' will display 'Hello' plus whatever you've typed.

The 'Hello' string has had a bit of text styling applied. You can see that the text has had a simple colour change applied and is now set to display a drop shadow.

Now that you know what it does, let's take a look at the new bits of code this example introduces.

```
void text_update_cb(Ewl_Widget *w, void *event, void *data) {
    char *s = NULL;
    Ewl_Widget *label = NULL;
    char buf[BUFSIZ];

    s = ewl_entry_get_text(EWL_ENTRY(w));
    label = (Ewl_Widget *)data;

    snprintf(buf, BUFSIZ, "Hello %s", s);
    ewl_text_text_set(EWL_TEXT(label), buf);

    free(s);
    return;
}
```

The `text_update_cb()` is the callback we are going to register for when the user has pressed 'Enter' in the text field. It has the same signature as the destroy callback, and all other EWL callbacks that we will be registering.

The text that has been entered is retrieved with a call to `ewl_entry_get_text()` giving the text widget we want to retrieve from. This will return a pointer to the text string, it is the applications responsibility to free this pointer.

We then cast the data parameter into a `Ewl_Widget`. This is because, as you will see in the register callback, we are attaching a widget to this callback as a data parameter.

We can then take this new text and replace the contents of the current text label by calling

`ewl_text_text_set()` passing the text object and the text to be displayed.

```
box = ewl_vbox_new();
ewl_container_append_child(EWL_CONTAINER(win), box);
ewl_object_set_fill_policy(EWL_OBJECT(box), EWL_FLAG_FILL_ALL);
ewl_widget_show(box);
```

While we could just attach any widgets onto the main application window, it is a bit cleaner to attach the widgets into a box that is attached to the main window. The box is created with a call to `ewl_vbox_new()` creating a vertical box layout. We could have used `ewl_hbox_new()` if we desired a horizontal box instead of a vertical one. Once the box is created we attach it to the window by calling `ewl_container_append_child()`. This places the given widget into the container as the next element. Containers are packed from top to bottom, or left to right, so the order elements are inserted into the container effect there appearance on screen. Lastly, before showing the widget, we attach a fill policy with `ewl_object_set_fill_policy()`. The fill policy changes the way the object fills in its available space.

The possible fill policies are:

### EWL Fill Flags

- `EWL_FLAG_FILL_NONE`
- `EWL_FLAG_FILL_HSHRINK`
- `EWL_FLAG_FILL_VSHRINK`
- `EWL_FLAG_FILL_SHRINK`
- `EWL_FLAG_FILL_HFILL`
- `EWL_FLAG_FILL_VFILL`
- `EWL_FLAG_FILL_FILL`
- `EWL_FLAG_FILL_ALL`

All of which should be pretty self explanatory, with the exceptions of, `EWL_FLAG_FILL_SHRINK`, `EWL_FLAG_FILL_FILL` and `EWL_FLAG_FILL_ALL`. The `SHRINK` flag is the or of the two `HSHRINK` and `VSHRINK` flags. The `FILL` flag is the or of the two `HFILL` and `VFILL` flags. Finally the `ALL` flag is the or of the two `SHRINK` and `FILL` flags.

```
label = ewl_text_new("Hello");
ewl_container_append_child(EWL_CONTAINER(box), label);
ewl_object_set_alignment(EWL_OBJECT(label), EWL_FLAG_ALIGN_CENTER);
ewl_text_style_set(EWL_TEXT(label), "soft_shadow");
ewl_text_color_set(EWL_TEXT(label), 255, 0, 0, 255);
ewl_widget_show(label);
```

Now that we have our containing box setup we create the actual text element that is going to function as our label. The label is created with a call to `ewl_text_new()` specifying the text we wish to display. Once the widget is created we attach it to the box with `ewl_container_append_child()`. Next we set the alignment on the text object though `ewl_object_set_alignment()`. This specifies how the contents will be aligned within the widget itself.

The alignment function will accept one of:

### EWL Alignment Flags

- `EWL_FLAG_FILL_CENTER`
- `EWL_FLAG_FILL_LEFT`

- EWL\_FLAG\_FILL\_RIGHT
- EWL\_FLAG\_FILL\_TOP
- EWL\_FLAG\_FILL\_BOTTOM

Once all the widget properties are specified we attach some text formatting properties to the widget. The first, `ewl_text_style_set()` sets the style of the text object. The styles change the appearance of the text by applying some kind of filter, in this case, creating a 'soft shadow' appearance to the widget. We then set the colour of the text to red by calling `ewl_text_color_set()`. There are four parameters to the colour function, those being, red, green, blue and alpha.

```
o = ewl_entry_new("");
ewl_container_append_child(EWL_CONTAINER(box), o);
ewl_object_set_alignment(EWL_OBJECT(o), EWL_FLAG_ALIGN_CENTER);
ewl_object_set_padding(EWL_OBJECT(o), 5, 5, 5, 0);
ewl_text_color_set(EWL_TEXT(EWL_ENTRY(o)->text), 0, 0, 0, 255);
ewl_callback_append(o, EWL_CALLBACK_VALUE_CHANGED, text_update_cb, label);
ewl_widget_show(o);
```

The final widget we create is a text entry box. This is done with a call to `ewl_entry_new()`. In this case we are giving "" as the value, but an initial string could be given to be displayed in the entry box. We do a similar set of initializations to the entry box, setting the alignment and setting the text colour to black. The call to `ewl_object_set_padding()` sets the amount of padding around the widget. The four parameters are, left, right, top and bottom.

With that you should have a basic understanding of how EWL functions and how different widgets are created and setup.

## Callbacks

The EWL is powered through the use of callbacks. A large amount of the internal work of the library itself also works on callbacks.

A callback is a function that will be called when a specific event happens. These events can be anything from the user clicking a button, or the window being destroyed by the window manager.

For all the events that an application wishes to know about, a callback is registered through EWL. This is done with the `ewl_callback_append()`. This function takes four parameters, the object to attach the callback too, the callback desired, the callback function and any user data.

Some of the possible callbacks include:

### Possible EWL Callbacks

EWL_CALLBACK_DESTROY	The widget is freed
EWL_CALLBACK_DELETE_WINDOW	The window is being closed
EWL_CALLBACK_KEY_DOWN	A key was pressed down
EWL_CALLBACK_KEY_UP	A key was released
EWL_CALLBACK_MOUSE_DOWN	Mouse button was pressed down
EWL_CALLBACK_MOUSE_UP	Mouse button was released

EWL_CALLBACK_MOUSE_MOVE	Mouse was moved
EWL_CALLBACK_MOUSE_WHEEL	Mouse wheel scrolled
EWL_CALLBACK_FOCUS_IN	Mouse was placed over the widget
EWL_CALLBACK_FOCUS_OUT	Mouse was moved away from the widget
EWL_CALLBACK_SELECT	Widget was selected by mouse or key
EWL_CALLBACK_DESELECT	Widget was deselected by mouse or key
EWL_CALLBACK_CLICKED	Mouse was pressed and released on a widget
EWL_CALLBACK_DOUBLE_CLICKED	Mouse was clicked twice quickly
EWL_CALLBACK_HILITED	Mouse is over the widget
EWL_CALLBACK_VALUE_CHANGED	Value in widget changed

The callback function has a signature like `void fcn(Ewl_Widget *, void *, void *)` the first parameter is the widget that activated this callback. The second parameter is the event data and the third parameter is the user attached data.

The event data is a type that relates to the callback itself. So, for example, when the callback for `EWL_CALLBACK_MOUSE_WHEEL` is called the event data will have a struct of type `Ewl_Event_Mouse_Wheel` and this struct contains additional information about the event. In the wheel case, the key modifiers, the mouse position and the direction of scroll.

The last parameter to the callback attach function is the user data. This allows you to attach any data desired to be passed to the callback when it is executed. This data will be provided to the callback in the form of its third parameter.

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## Chapter 3. Config

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## Chapter 4. Object Hierarchy

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# Chapter 5. Widget Packing



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# **Chapter 6. Widgets**

## **File Dialog**

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# Chapter 7. Contributing

If you found this document useful, but lacking in some fashion, please consider contributing back to the document itself. This document is available under an open license and any submissions are greatly appreciated. Any submissions can be sent to [zero@perplexity.org](mailto:zero@perplexity.org) [<mailto:zero@perplexity.org>].

Note that any contributions to this document need to be licensed under the Creative Commons NonCommercial-ShareAlike 1.0 License, which is what this document uses.

If you wish to contribute to the EWL or another part of the EFL, take a look at the [www.enlightenment.org](http://www.enlightenment.org) [<http://www.enlightenment.org>] website, all the information on accessing CVS and the mailing lists can be found there.

Thank you.