The EWL book

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This book is a 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 familarize 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 tutoral, 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.

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.

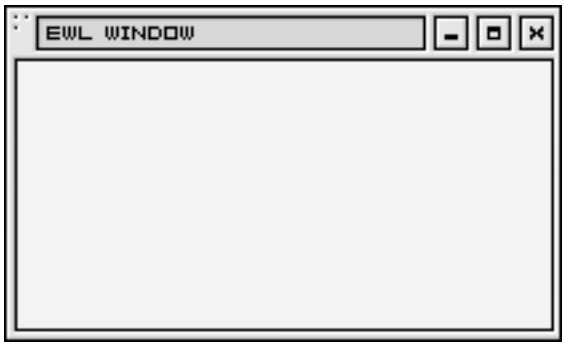
```
#include <Ewl.h>

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 ones a bit longer then 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, lets take a look at the new bits of code this example introduce.

```
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.

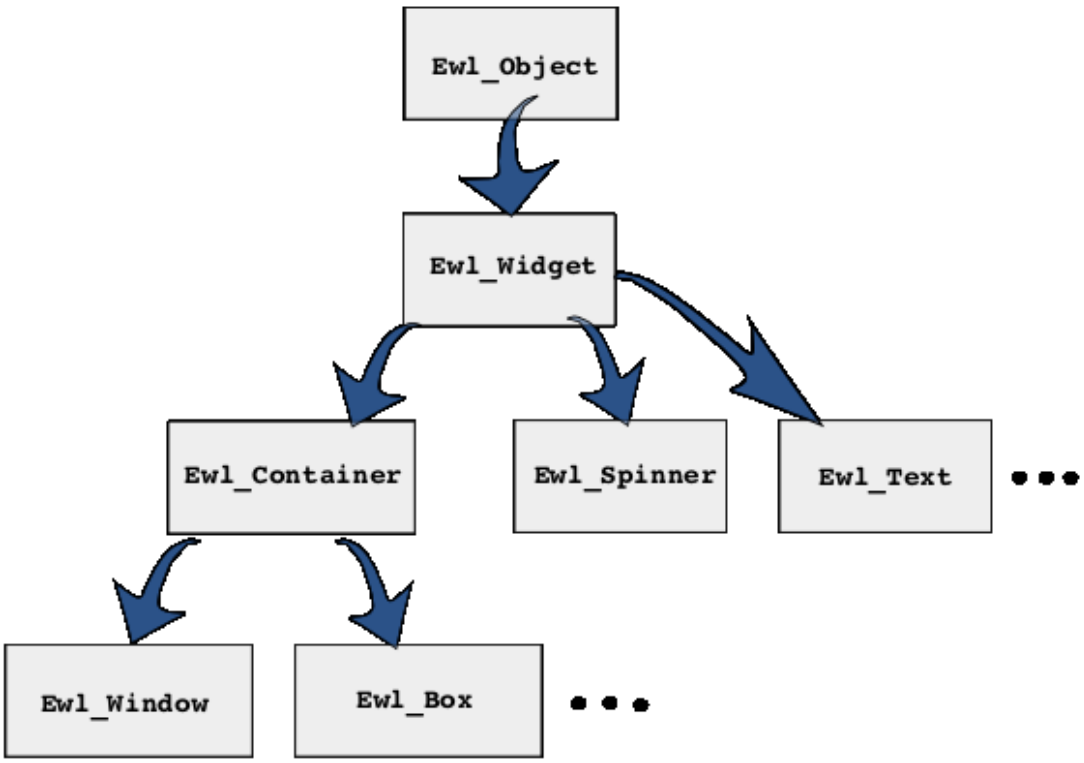
Chapter 3. Object Hierarchy

The EWL widgets are setup in a hierarcy. The base widget that everything extends from is the `Ewl_Object`. The `Ewl_Object` provides all of the base functionality for each widget including the sizing, alignment, fill policies, padding and others. This is the main building block of the EWL. An application using EWL will never need to allocate an `Ewl_Object`

Sitting just above the `Ewl_Object` is the `Ewl_Widget`. Again, all widgets inheret from this object, which in turn inherits from the `Ewl_Object`. This object provides the base functinality for a widget to interact with users. Like the `Ewl_Object` an application will never need to allocate an `Ewl_Widget` itself.

With the `Ewl_Widget` in place we can start to build up the hierarchy of widgets that form the EWL. The hierarchy looks something similar to that in the EWL Object Hierarcy figure below.

Figure 3.1. The EWL Object Hierarchy



The `Ewl_Container` object is built off of the `Ewl_Widget` object and provides the functionality for widgets that are to hold other widgets. This includes anything from the main window, to boxes, to scrollpanes.

To add new widgets into EWL you just need to create a new struct that has the appropriate type of subclass as the first element. This subclass object must not be a pointer.

Example 3.1. Creating EWL Widgets

```
struct Ewl_Foo {
    Ewl_Container container;
    int bar;
}
```

This would create a new Ewl_Foo widget that inherits from the `Ewl_Container` so you would be able to pack other widgets into this new widget type.

Chapter 4. Widget Packing

As your writting an EWL application you will need to start laying out the widgets into the different boxes. To do so, you'll need a bit of information on how EWL packs widgets together.

Chapter 5. Configuration

Configuration type stuff.

Chapter 6. EWL Themes

Theming information.

Chapter 7. Widgets

We will now look at each widget individually. See the code that creates the widget and a screen shot of the widget in action (if applicable).

ewl_hbox and ewl_vbox

The box widgets allow you to specify different ways in which the application will be laid out. You can create either a horizontal (hbox) or vertical (vbox) box. A vertical box will have its children packed from top to bottom, while a horizontal box will have its widgets packed from left to right.

A box widget will not show up in the application itself, it is just used as a container for other widgets.

Example 7.1. Creating EWL boxes

```
Ewl_Widget *hbox = ewl_hbox_new();
ewl_widget_show(hbox);

Ewl_Widget *vbox = ewl_vbox_new();
ewl_widget_show(vbox);
```

The box widgets are relativly simple to create and use, only requiring a call to the new function.

The functions to manipulate the boxes include:

- `void ewl_box_set_orientation(Ewl_Box *, Ewl_Orientation)`
- `Ewl_Orientation ewl_box_get_orientation(Ewl_Box *)`
- `void ewl_box_set_spacing(Ewl_Box *, int)`
- `void ewl_box_set_homogeneous(Ewl_Box *, int)`

The `Ewl_Orientation` flag can be one of:

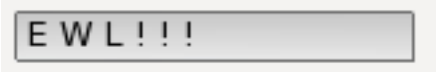
- EWL_ORIENTATION_HORIZONTAL
- EWL_ORIENTATION_VERTICAL

The `ewl_box_set_spacing()` will set the amount of spacing between the items in the box to the given value. While the `ewl_box_set_homogeneous()` will set the box to give all items in it the same size if this is set to true, otherwise they will have their required size.

ewl_button

The button widget is simply a widget with a label attached. When the user clicks on the button the call-back attached to `EWL_CALLBACK_CLICKED` will be executed.

Figure 7.1. An Ewl Button



Example 7.2. Creating a button

```
    Ewl_Widget *button = ewl_button_new("A button");
    ewl_object_set_alignment(EWL_OBJECT(button), EWL_FLAG_ALIGN_CENTER);
    ewl_callback_append(button, EWL_CALLBACK_CLICKED, button_cb, NULL);
    ewl_widget_show(button);
```

The label portion of the button can be aligned to any of the `EWL_FLAG_ALIGN_*` settings.

Example 7.3. Button Callback

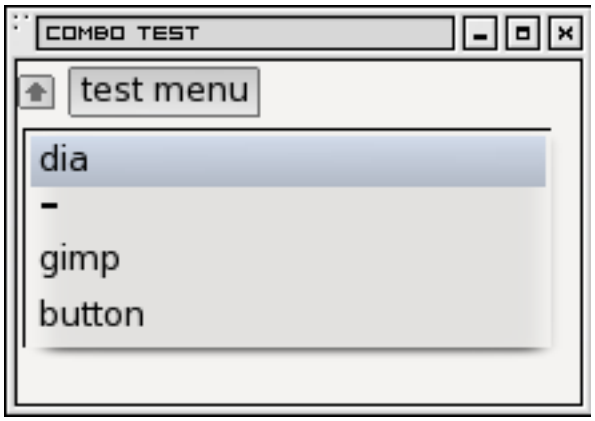
```
void button_cb(Ewl_Widget *w, void *event, void *data) {
    printf("button pressed\n");
}
```

The label on a button can be manipulated after the button has been created through the two calls:

- `char *ewl_button_get_label(EwlButton *)`
- `void ewl_button_set_label(EwlButton *, char *)`

ewl_combo

Figure 7.2. An Ewl Combo box



Example 7.4. Creating a combo box

```
    Ewl_Widget *combo = ewl_combo_new("combo box");
    ewl_callback_append(combo, EWL_CALLBACK_VALUE_CHANGED, combo_change_cb, NULL);
    ewl_widget_show(combo);

    Ewl_widget *item1 = ewl_menu_item_new(NULL, "foo");
    ewl_container_append_child(EWL_CONTAINER(combo));
    ewl_widget_show(item1);
```

Example 7.5. combo box value changed callback

```
void combo_change_cb(Ewl_Widget *w, void *event, void *data) {
    char *text = (char *)event;
    printf("Value changed to %s\n", text);
}
```

ewl_dialog

The `Ewl_Dialog` widget provides a way to display a simple dialog box to the user which can then prompt for a response, give warnings or just display simple messages.

Figure 7.3. An Ewl Dialog

Example 7.6. EWL Dialog code

```
    Ewl_Widget *dialog = NULL;
    Ewl_Widget *o = NULL;

    o = ewl_text_new("a dialog eh");
    ewl_object_set_alignment(EWL_OBJECT(o),
    EWL_FLAG_ALIGN_CENTER);
```

```
    ewl_widget_show(o);

    dialog = ewl_dialog_new(EWL_POSITION_BOTTOM);
    ewl_dialog_set_has_separator(EWL_DIALOG(dialog), 0);
    ewl_dialog_add_widget(EWL_DIALOG(dialog), o);
    ewl_object_set_alignment(EWL_OBJECT(dialog), EWL_FLAG_ALIGN_CENTER);
    ewl_widget_show(dialog);

    o = ewl_dialog_set_button(EWL_STOCK_OK, EWL_RESPONSE_OK);
    ewl_container_append_child(EWL_CONTAINER(dialog), o);
    ewl_callback_append(o, EWL_CALLBACK_CLICKED, dialog_clicked_cb, dialog);
    ewl_widget_show(o);

    o = ewl_dialog_set_button(EWL_STOCK_CANCEL, EWL_RESPONSE_CANCEL);
    ewl_container_append_child(EWL_CONTAINER(dialog), o);
    ewl_callback_append(o, EWL_CALLBACK_CLICKED, dialog_clicked_cb, dialog);
    ewl_widget_show(o);
```

This example will create an `Ewl_Dialog` with two buttons an OK button and a Cancel button. The dialog itself is created with the call to `ewl_dialog_new()` passing the position of the buttons relative to the window itself. The possible values are:

- EWL_POSITION_TOP
- EWL_POSITION_BOTTOM
- EWL_POSITION_LEFT
- EWL_POSITION_RIGHT

A `Ewl_Dialog` can optionally have a horizontal line drawn to seperate the two sections of the dialog. The line is controlled with the `ewl_dialog_set_has_separator()` where 0 means do not draw separator and 1 means to draw the separator. There is a corresponding `ewl_dialog_get_has_separator()` returning 1 if there is a separator and 0 otherwise.

The content of the main display area of the box is controlled through the function `ewl_dialog_add_widget()`. In this instance we add a `Ewl_Text` object into the dialog.

Once the dialog is initialized we need to create any desired buttons. The buttons are created by calling `ewl_dialog_set_button()` this will create a button. The parameters are the label of the button and the response code to return from the button. There are several pre-defined labels, including:

- EWL_STOCK_OK
- EWL_STOCK_APPLY
- EWL_STOCK_CANCEL
- EWL_STOCK_OPEN
- EWL_STOCK_SAVE
- EWL_STOCK_PAUSE
- EWL_STOCK_PLAY
- EWL_STOCK_STOP

The pre-defined response codes are:

- EWL_RESPONSE_OPEN
- EWL_RESPONSE_SAVE
- EWL_RESPONSE_OK
- EWL_RESPONSE_CANCEL
- EWL_RESPONSE_APPLY
- EWL_RESPONSE_PLAY
- EWL_RESPONSE_PAUSE
- EWL_RESPONSE_STOP

Once the buttons are created they need to be added to the dialog and have a callback append for there EWL_CALLBACK_CLICKED state.

Example 7.7. EWL Dialog callback

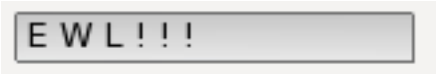
```
void dialog_clicked_cb(Ewl_Widget *w, void *event, void *data) {
    int d = EWL_BUTTON_STOCK(w)->response_id;

    if (d == EWL_RESPONSE_OK)
        printf("OK\n");
    else if (d == EWL_RESPONSE_CANCEL)
        printf("CANCEL\n");

    ewl_widget_destroy(EWL_WIDGET(data));
}
```

The response code of the button that was clicked is available from the Ewl_Button_Stock widget itself through its response_id parameter. Using this value we can determine which of the buttons was clicked. We also passed the Ewl_Dialog itself through the data parameter so that we could destroy the dialog when we were finished.

ewl_entry

The EWL entry box is available when you need to retrieve text input from the user. The box works on single lines, and the callback is triggered when the user presses the 'Enter' key.

Figure 7.4. An EWL entry box



Example 7.8. Creating an EWL entry box

```
   Ewl_Widget *entry = ewl_entry_new();
   ewl_object_request_size(EWL_OBJECT(entry), 100, 15);
   ewl_object_set_padding(EWL_OBJECT(entry), 1, 1, 1, 1);
   ewl_callback_append(entry, EWL_CALLBACK_VALUE_CHANGED, entry_cb, NULL);
   ewl_widget_show(entry);
```

The Ewl_Entry is a fairly simple object to work with, about the only required setup is to create the new object and attach a callback for EWL_CALLBACK_VALUE_CHANGED events. This example takes the extra steps of setting the size with ewl_object_request_size() and adding a little bit of padding to the widget with ewl_object_set_padding().

Example 7.9. Ewl_Entry value changed callback

```
void entry_cb(Ewl_Widget *w, void *event, void *data) {
    char *s = ewl_entry_get_text(EWL_ENTRY(w));
    printf("%s\n", s);

    ewl_entry_set_text(EWL_ENTRY(w), "New Text");
}
```

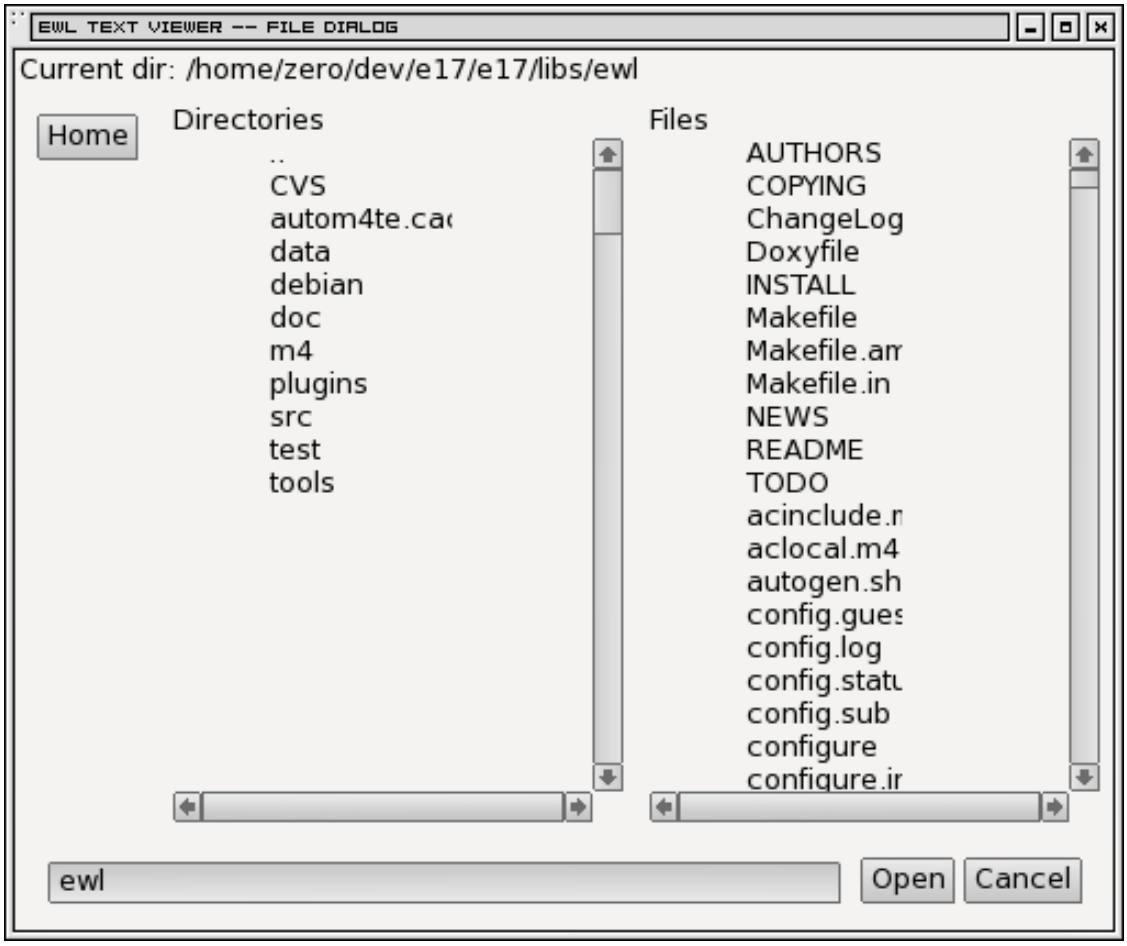
This callback grabs the current value of the entry widget with the call to `ewl_entry_get_text()` and then resets the text to the value of 'New Text' by calling `ewl_entry_set_text()`.

The `Ewl_Entry` object allows you to set whether or not the text is editable with a call to `void ewl_entry_set_editable(Ewl_Entry *, unsigned int edit)` where `edit` is 0 for uneditable and editable otherwise.

ewl_filedialog

It is often desired to allow the user to open and save files. This can be easily accomplished through the use of the `Ewl_Filedialog`.

Figure 7.5. An EWL file dialog



This file dialog has been embedded into its own window, but it could have been placed in another window in the same fashion.

Example 7.10. Creating an EWL filedialog

```
Ewl_Widget *filedialog = ewl_filedialog_new(EWL_FILEDIALOG_TYPE_OPEN);
ewl_callback_append(filedialog, EWL_CALLBACK_VALUE_CHANGED, open_file_cb, NULL)
ewl_widget_show(filedialog);
```

When the file dialog is created you specify a type either `EWL_FILDIALOG_TYPE_OPEN` or `EWL_FILEDIALOG_TYPE_SAVE` depending on the type of file dialog desired. The callback `EWL_CALLBACK_VALUE_CHANGED` will be executed when the user clicks the 'Open' button in the dialog.

It is also possible to pack other widgets into the filedialog itself. This is done through the normal `ewl_container_append_child()`. So, if you wanted for example, to add a 'Home' button, you could create the button and pack it into the file dialog where it will appear down the left side.

You can change the directory that is currently being viewed in the file dialog by executing `void ewl_filedialog_set_directory(Ewl_Filedialog *, char *path)` where `path` is the full path to the desired directory.

Example 7.11. Ewl_Filedialog open callback

```
void open_file_cb(Ewl_Widget *w, void *event, void *data) {
    char *filename = (char *)event;
    printf("selected file %s\n", filename);
}
```

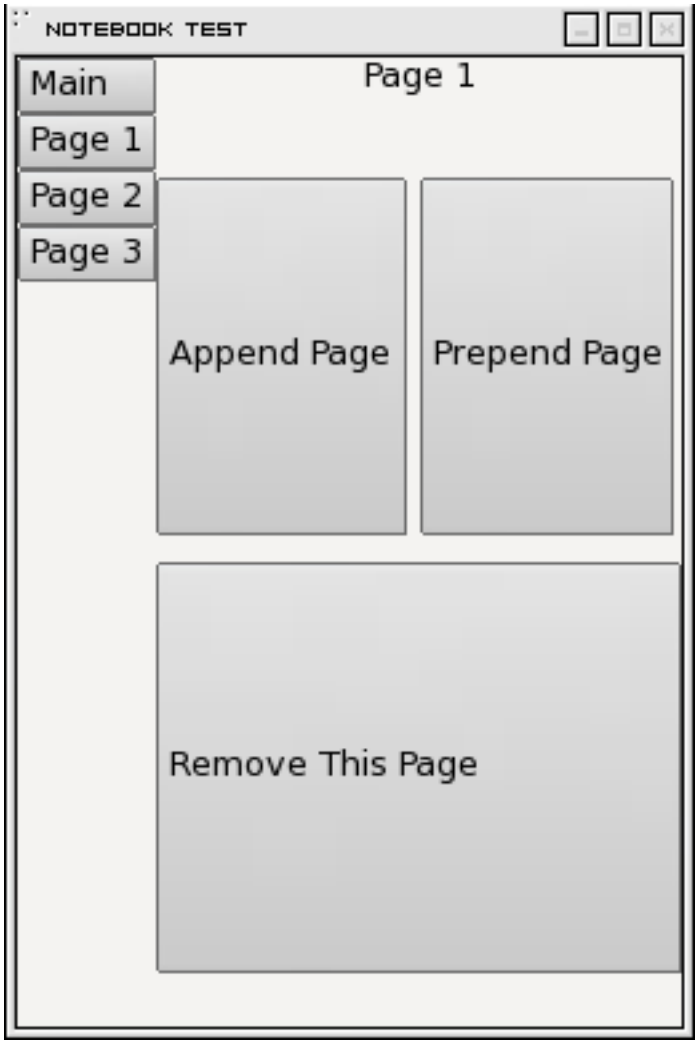
The file that has been selected is passed to the callback as the `event` parameter. If you wish to remove the filedialog you can do something similar to `ewl_widget_hide(fd_win)` where `fd_win` is the window object holding the file dialog.

ewl_image

ewl_menu

ewl_notebook

Figure 7.6. An EWL Notebook

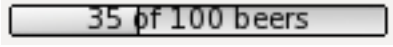


ewl_password

Figure 7.7. An EWL password dialog

ewl_progressbar

Figure 7.8. An EWL progress bar



ewl_radiobutton

ewl_scrollpane

ewl_seeker

ewl_spinner

Figure 7.9. An EWL spinner

ewl_table

ewl_text

The `Ewl_Text` widget provides for a multi-line text layout widget. It can be utillized whenever the display of text is required in an application. It works well with the `Ewl_Scrollpane` to provide a scrollable text area.

Example 7.12. Ewl_Text code

```
Ewl_Widget *text = ewl_text_new("text");
ewl_widget_show(text);
```

Creating the basic `Ewl_Text` object is pretty simple, the object will be setup to diplay the parameter to `ewl_text_new()`.

Once the text object is created you can change the text, retrieve the current text contents or get the text length with:

- `ewl_text_text_set(Ewl_Text *, char *)`
- `ewl_text_text_prepend(Ewl_Text *, char *)`
- `ewl_text_text_append(Ewl_Text *, char *)`
- `ewl_text_text_insert(Ewl_Text *, char *, int index)`
- `char *ewl_text_text_get(Ewl_Text *)`
- `int ewl_text_length_get(Ewl_Text *)`

The `Ewl_Text` widget allows you to preform styling changes to the text in the widget. Different portions of the text can be different colours, fonts or styles. The styling that is applied to a widget is based on what is setup when the text is added to the widget. So, if you want your text to be red, you need to set the colour of the `Ewl_Text` object *before* adding the text.

The colour of the text can be manipulated with the `ewl_text_color_set(Ewl_Text *, int r, int g, int b, int a` call while the current colour information can be retrieved with the `ewl_text_color_get(Ewl_Text *, int *r, int *g, int *b, int *a`.

The font settings of the text can be manipulated with the `ewl_text_font_set(Ewl_Text *, char *font, int size)` call. With the calls to get the current font name as size defined as: `char *ewl_text_font_get(Ewl_Text *)` and `int ewl_text_font_size_get(Ewl_Text *)`.

To retrieve or set the alignment of the text widget there are the two functions `ewl_text_align_set(Ewl_Text *, unsigned int align)` and `unsigned int ewl_text_align_get(Ewl_Text *)`. Where the align parameter is one of the EWL alignment flags:

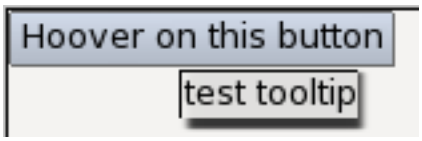
- EWL_FLAG_ALIGN_CENTER
- EWL_FLAG_ALIGN_LEFT
- EWL_FLAG_ALIGN_RIGHT
- EWL_FLAG_ALIGN_TOP
- EWL_FLAG_ALIGN_BOTTOM

It is also possible to set the style of the text. This can include things such as bolding the text or setting soft shadows. The styles that are available are shipped through the Etox library and currently include:

- bold
- outline
- plain
- raised
- shadow
- soft_shadow

ewl_tooltip

Figure 7.10. An EWL tooltip



ewl_tree

ewl_media

The Ewl_Media widget allows for the embedding of video objects into your application. This is done by wrapping around the Emotion library.

Figure 7.11. An EWL media object

Example 7.13. Ewl_Media code

```
Ewl_Media *m = ewl_media_new(file);
ewl_callback_append(m, EWL_CALLBACK_REALIZE, video_realize_cb, NULL);
ewl_callback_append(m, EWL_CALLBACK_VALUE_CHANGED, video_change_cb, NULL);
ewl_widget_show(m);
```

Creating the basic video object is no simpler then creating the object and showning it (assuming you've appending it to whatever container it is being placed into). We hook the two callbacks EWL_CALLBACK_REALIZE and EWL_CALLBACK_VALUE_CHANGED. We hook in the realize callback so we can determine the length of the video to be displayed if desired. This is only available after the video has been realized, and will return 0 until it has been realized. The value change callback will be called whenever emotion advances the video. This can be used to setup a timer, or a seek bar and

have it auto advance for the video.

Example 7.14. Ewl_Media callbacks

```
void video_realize_cb(Ewl_Widget *w, void *event, void *data) {
    double len = ewl_media_length_get(EWL_MEDIA(video));
}

void video_change_cb(Ewl_Widget *w, void *event, void *data) {
    char buf[512];
    int h, m;
    double s;

    ewl_media_position_time_get(EWL_MEDIA(video), &h, &m, &s);
    snprintf(buf, sizeof(buf), "%02i:%02i:%02.0f", h, m, s);
}
```

The video that is being displayed can be changed by calling `ewl_media_media_set(Ewl_Media *, char *)` or if you just wish to know what is currently playing you can call `char *ewl_media_media_get(Ewl_Media *)`. The length of the current video can be retrieved by calling `int ewl_media_length_get(Ewl_Media *)`. The length can also be retrieved as a time value by calling `ewl_media_length_time_get(Ewl_Media *, int h, int m, double s)`.

You can start the video playing by passing 1 to `ewl_media_play_set(Ewl_Media *, int)` or stop the video by passing 0 to the same function.

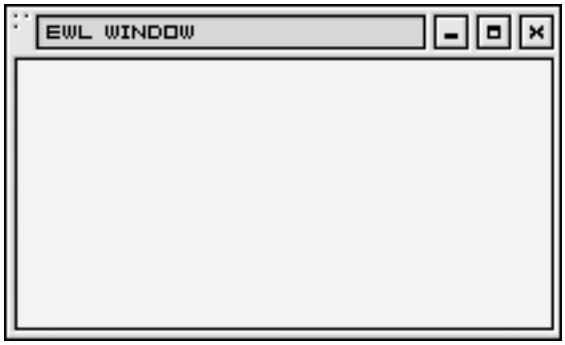
To determine if the video codec allows for seeking in the video you can call `int ewl_media_seekable_get(Ewl_Media *)` which will return 1 if the video is seekable, 0 otherwise. `double ewl_media_position_get(Ewl_Media *)` is used to determine the current position in the video, while `ewl_media_position_set(Ewl_Media *, double position)` can be used to set the position in the video. This value can also be retrieved as a hours, minutes and seconds by calling `ewl_media_position_time_get(Ewl_Media *, int h, int m, double s)`.

If you wish to change the audio settings of the video there are several functions available. These including the ability to get/set the current mute settings: `int ewl_media_audio_mute_get(Ewl_Media *)` and `ewl_media_audio_mute_set(Ewl_Media *, int)`. You can also get/set the volume of the video through the calls: `int ewl_media_audio_volume_get(Ewl_Media *)` and `ewl_media_audio_volume_set(Ewl_Media *, int)`.

ewl_window

An ewl_window will be used by every EWL application. This is the window that will display all of the other desired EWL widgets.

Figure 7.12. An EWL Window



Example 7.15. Creating a Window

```
    Ewl_Widget *window = ewl_window_new();
    ewl_window_set_title(EWL_WINDOW(window), "foo window");
    ewl_window_set_class(EWL_WINDOW(window), "foo_class");
    ewl_window_set_name(EWL_WINDOW(window), "foo_name");
    ewl_object_request_size(EWL_OBJECT(window), 300, 400);
    ewl_callback_append(window, EWL_CALLBACK_DELETE_WINDOW, win_del_cb, NULL);
    ewl_widget_show(window);
```

Setting up the basic window is pretty simple. We take the extra steps of calling: `ewl_window_set_title()`, `ewl_window_set_name()` and `ewl_window_set_class()` to fill in the information the window manager uses.

Since the window is a `Ewl_Object` like any other, we use the `ewl_object_request_size()` to request the starting size of our window. We could have also called `ewl_object_set_minimum_size()` and `ewl_object_set_maximum_size()` to constrain the minimum/maximum sizes of our window.

The main callback used by a Ewl_Window is the `EWL_CALLBACK_DELETE_WINDOW`. This will be called when, for whatever reason, the window is being destroyed by the window manager. It should be used to cleanup any resources that the application has used before exiting the application.

Example 7.16. Ewl Window destroy callback

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

Some of the other operations involving the Ewl_Window object are:

- `char *ewl_window_get_title(Ewl_Window *)`
- `char *ewl_window_get_name(Ewl_Window *)`
- `char *ewl_window_get_class(Ewl_Window *)`

- `void ewl_window_set_borderless(Ewl_Window *)`
- `void ewl_window_move(Ewl_Window *, int x, int y)`
- `void ewl_window_get_position(Ewl_Window *, int *x, int *y)`

The first three calls are pretty self explanatory. The `ewl_window_set_borderless()` can be used to tell the window manager not to display any decoration around the window, this includes the border and the title bar. The function `ewl_window_move()` is used to position the window to a specific place on the desktop, indexed from the top left corner. The opposite to this is `ewl_window_get_position()` which will return the position of the window on the desktop.

Chapter 8. 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].

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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] website, all the information on accessing CVS and the mailing lists can be found there.

Thank you.

Appendix A. EWL Media Player Example