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First programs in GTK+

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In this part of the GTK+ programming tutorial, we create our first programs in GTK+. We center a window on the screen, show an icon in the titlebar, display a small tooltip, and create a mnemonic for a button widget.

Simple example

Our first example shows a basic window.

simple.c

```
#include <gtk/gtk.h>

int main(int argc, char *argv[]) {

  GtkWidget *window;

  gtk_init(&argc, &argv);

  window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
  gtk_widget_show(window);

   _signal_connect(window, "destroy",
      G_CALLBACK(gtk_main_quit), NULL);
}
```

This example shows a basic window on the screen.

```
GtkWidget *window;
```

`GtkWidget` is the base class that all widgets in GTK+ derive from. It manages the widget lifecycle, states, and style.

```
gtk_init(&argc, &argv);
```

The `gtk_init` function initializes GTK+ and parses some standard command line options. This function must be called before using any other GTK+ functions.

```
window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
```

The `gtk_window_new` function creates a new `GtkWindow`, which is a toplevel window that can contain other widgets. The window type is `GTK_WINDOW_TOPLEVEL`; toplevel windows have a titlebar and a border. They are managed by the window manager.

```
gtk_widget_show(window);
```

The `get_widget_show` flags a widget to be displayed. Any widget that is not shown will not appear on the screen.

```
g_signal_connect(window, "destroy",
    G_CALLBACK(gtk_main_quit), NULL);
```

terminate the application by connecting the `destroy` signal to the built-in `gtk_main_quit` function, which terminates the application.

```
gtk_main();
```

This code enters the GTK+ main loop. From this point, the application sits and waits for events to happen.

```
$ gcc -o simple simple.c `pkg-config --libs --cflags gtk+-2.0`
```

This is how we compile the example.

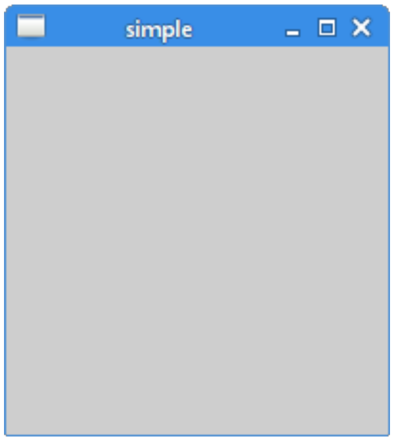


Figure: Simple

Centering the window

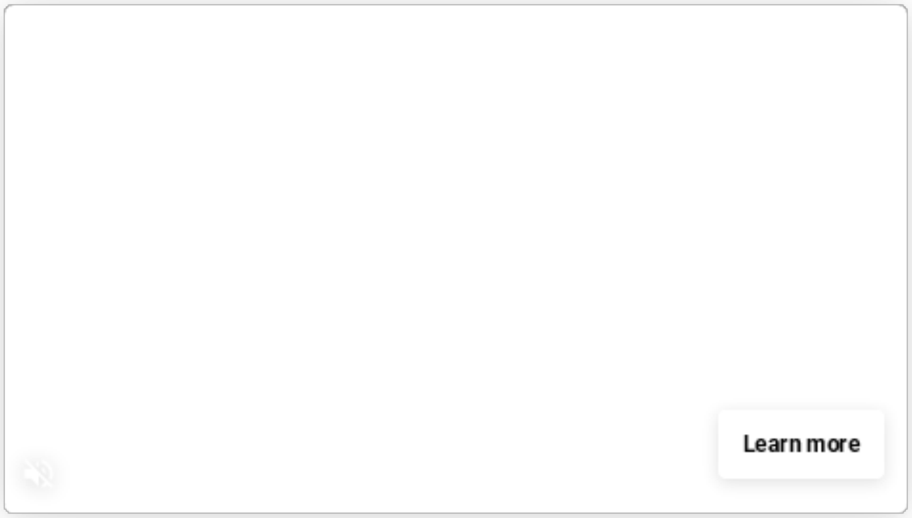
If we do not position the window ourselves, the window manager will position it for us. In the next example, we will center the window.

center.c

```
#include <gtk/gtk.h>

int main(int argc, char *argv[]) {

  GtkWidget *window;

  gtk_init(&argc, &argv);

 indow = gtk_window_new(GTK_WINDOW_TOPLEVEL);
```

```
    g_signal_connect(G_OBJECT(window), "destroy",
        G_CALLBACK(gtk_main_quit), NULL);

    gtk_main();

    return 0;
  }
```

In the example, we center the window, set a title, and size the window.



```
gtk_window_set_title(GTK_WINDOW(window), "Center");
```

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The `gtk_window_set_title` function sets a window title. If we do not set a title ourselves, the GTK+ will use a name of a source file as a title.

manager.

```
gtk_window_set_position(GTK_WINDOW(window), GTK_WIN_POS_CENTER);
```

Passing the `GTK_WIN_POS_CENTER` constant to the `gtk_window_set_position` function centers the program on the screen.

The application icon

In the next example, we show the application icon. Most window managers display the icon in the left corner of the titlebar and also on the taskbar.

icon.c

```
#include <gtk/gtk.h>

GdkPixbuf *create_pixbuf(const gchar * filename) {

   GdkPixbuf *pixbuf;
   GError *error = NULL;
   pixbuf = gdk_pixbuf_new_from_file(filename, &error);

   if (!pixbuf) {

      fprintf(stderr, "%s\n", error->message);
      g_error_free(error);
   }

   return pixbuf;
}

int main(int argc, char *argv[]) {

  GtkWidget *window;
  GdkPixbuf *icon;

  gtk_init(&argc, &argv);

  window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
  gtk_window_set_title(GTK_WINDOW(window), "Icon");
  gtk_window_set_default_size(GTK_WINDOW(window), 230, 150);
  gtk_window_set_position(GTK_WINDOW(window), GTK_WIN_POS_CENTER);

  icon = create_pixbuf("web.png");
```

```
      G_CALLBACK(gtk_main_quit), NULL);

  g_object_unref(icon);

  gtk_main();

  return 0;
}
```

The code example shows an application icon.

```
pixbuf = gdk_pixbuf_new_from_file(filename, &error);
```

The `gdk_pixbuf_new_from_file` function creates a new pixbuf by loading an image from a file. The file format is detected automatically. If NULL is returned, then an error will be set.

```
if (!pixbuf) {

    fprintf(stderr, "%s\n", error->message);
    g_error_free(error);
}
```

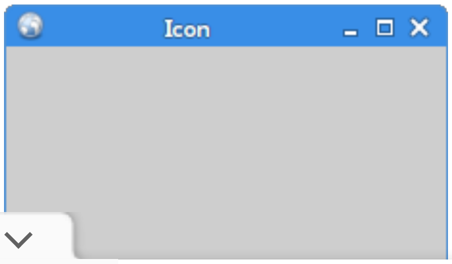
An error message is printed if the icon could not be loaded.

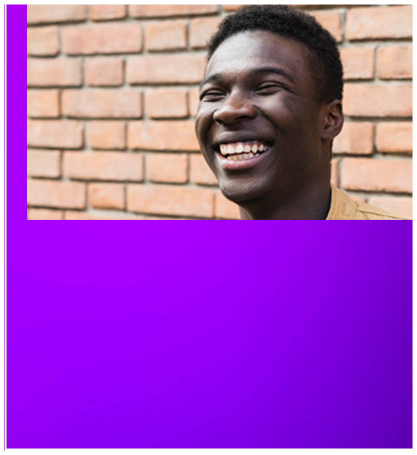
```
icon = create_pixbuf("web.png");
gtk_window_set_icon(GTK_WINDOW(window), icon);
```

The `gtk_window_set_icon` displays the icon for the window. The `create_pixbuf` creates a `GdkPixbuf` from a PNG file.

```
g_object_unref(icon);
```

The `g_object_unref` decreases the reference count of the pixbuf object. When its reference count drops to 0, the object is finalized (i.e. its memory is freed).





Tooltip

A tooltip is a small rectangular window, which gives a brief information about an object. It is usually a GUI component; it is part of the help system of the application.

tooltip.c

```
#include <gtk/gtk.h>

int main(int argc, char *argv[]) {

  GtkWidget *window;
  GtkWidget *button;
  GtkWidget *halign;

  gtk_init(&argc, &argv);

  window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
  gtk_window_set_title(GTK_WINDOW(window), "Tooltip");
  gtk_window_set_default_size(GTK_WINDOW(window), 300, 200);
  gtk_container_set_border_width(GTK_CONTAINER(window), 15);

  button = gtk_button_new_with_label("Button");
  gtk_widget_set_tooltip_text(button, "Button widget");

  halign = gtk_alignment_new(0, 0, 0, 0);
  gtk_container_add(GTK_CONTAINER(halign), button);
  gtk_container_add(GTK_CONTAINER(window), halign);

  gtk_widget_show_all(window);

   signal_connect(G_OBJECT(window), "destroy",
}
```

The example shows a basic tooltip on a button widget.

```
gtk_container_set_border_width(GTK_CONTAINER(window), 15);
```

The `gtk_container_set_border_width` sets some border space around the edges of the window.

```
gtk_widget_set_tooltip_text(button, "Button widget");
```

The `gtk_widget_set_tooltip_text` sets a basic tooltip for the given widget.

```
halign = gtk_alignment_new(0, 0, 0, 0);
gtk_container_add(GTK_CONTAINER(halign), button);
```

The `GtkAlignment` is a basic container which can be used to align its child to the sides of the window. In our case, the button is placed to the upper-left corner of the window. The first parameters of the function are the xalign and yalign. A value of 0 for xalign indicates left alignment; a value of 0 for yalign indicates top alignment. The third and fourth parameters are scaling values. Passing 0 to both parameters indicates that the widget does not expand in both directions.

```
gtk_container_add(GTK_CONTAINER(window), halign);
```

The `GtkAlignment` is set to be the main container of the window.

```
gtk_widget_show_all(window);
```

When we are dealing with multiple widgets, it is easier to call `gtk_widget_show_all` on the container than individually showing all widgets. In our case, both the window and the button are shown in one shot.

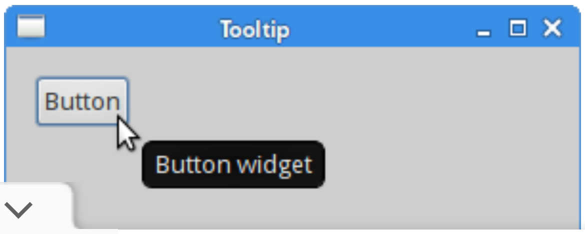


Figure: Tooltip

Mnemonic

Mnemonics are shortcut keys that activate a widget that supports mnemonics. They can be used with labels, buttons, or menu items. The mnemonic is created by adding the _ character to the widget's label. It causes the next character to be the mnemonic. The character is combined with the mouseless modifier, usually `Alt`. The chosen character is underlined, but it may be emphasized in a platform specific manner. On some platforms, the character is only underlined after pressing the mouseless modifier.

mnemonic.c

```
#include <gtk/gtk.h>

void print_msg(GtkWidget *widget, gpointer window) {

  g_printf("Button clicked\n");
}

int main(int argc, char *argv[]) {

  GtkWidget *window;
  GtkWidget *button;
  GtkWidget *halign;

  gtk_init(&argc, &argv);

  window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
  gtk_window_set_title(GTK_WINDOW(window), "Mnemonic");
  gtk_window_set_default_size(GTK_WINDOW(window), 300, 200);
  gtk_container_set_border_width(GTK_CONTAINER(window), 15);

  button = gtk_button_new_with_mnemonic("_Button");

  g_signal_connect(button, "clicked",
      G_CALLBACK(print_msg), NULL);

  halign = gtk_alignment_new(0, 0, 0, 0);
  gtk_container_add(GTK_CONTAINER(halign), button);
  gtk_container_add(GTK_CONTAINER(window), halign);

   k_widget_show_all(window);
```

```
    return 0;
}
```

We set a mnemonic for a button widget. It can be activated with the `Alt+B` keyboard shortcut.

```
button = gtk_button_new_with_mnemonic("_Button");
```

The `gtk_button_new_with_mnemonic` function creates a new `GtkButton` containing a label. If characters in label are preceded by an underscore, they are underlined.

```
g_signal_connect(button, "clicked",
    G_CALLBACK(print_msg), NULL);
```

When we fire the button, a message is printed to the console. With the `g_signal_connect` function, we connect a `clicked` signal to the `print_msg` function.

At this moment, there are three ways to activate the button: a left mouse button click, the `Alt+B` shortcut, and the `Space` key (provided the button has the focus).

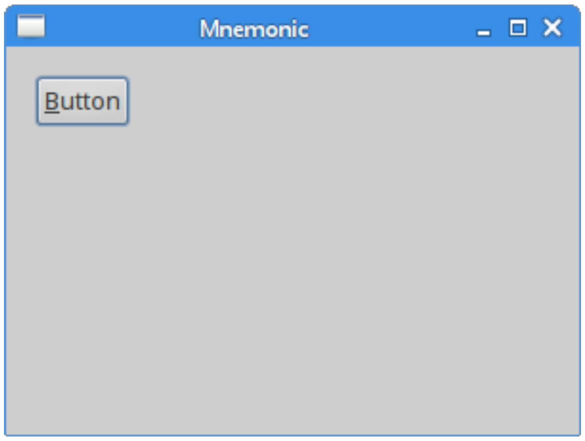


Figure: Mnemonic

In this chapter we have created some simple GTK+ programs.

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