res_name and res_class here must be complete resource specifications (minus the application name) and should not contain wildcard of any kind. The resource will be converted according to the type and result stored in type. *nbytes* is used only if the resource type is FL_STRING. The function returns the string representation of the resource value. If type is passed a value FL_NONE, the resource is not converted and the pointer val is not referenced.

There is also a routine that allows the application program to set resources programmatically

```
void fl_set_resource(const char *string, const char *value)
```

where string and value are a resource-value pair. The string can be a fully qualified resource name (minus the application name) or a resource class.

Routines fl_set_resource and fl_get_resource can be used to store and retrieve arbitrary strings and values and may be useful to pass data around.

C.2 Going Further

It is possible to implement your own form/object specific resources management system using the services mentioned above. For example, to implement a user-configurable form size, code similar to the following can be used, assuming the form is named “myform"

```
struct fsize { int width, height; } myformsize;

FL_resource res[] =
{
   {"myform.width", "XForm.width", FL_INT, &(myform.width),   "150"},
   {"myform.height","XForm.height", FL_INT, &(myform.height), "150"},
};

fl_initialize(&argc, argv, app_class, 0, 0);
fl_get_app_resources(res,2);

/* create the forms */
 myform = fl_bgn_form (myformsize.width, myformsize.height,.....);
```

Or (more realistically) you create the form first using fdesign and then scale it before it is shown:

```
fl_initialize(&argc, argv, app_class, 0, 0);
fl_get_app_resources(res,2);
/*create_all_forms here */
fl_set_form_size(myform, mysformsize.width, myformsize.height);
fl_show_form(myform, ...);
```

Eventually form geometry and other things might be done via **XForms** internal routines, it is recommended that you name your form to be the form title with all spaces removed and first letter lower-cased, i.e., if a form is shown with a label Foo Bar, the name of the form should be fooBar.

Appendix D

Dirty Tricks

This chapter describes some of the routines that may be used in special situations where more power or flexibility from **Forms Library** is needed. These routines are classified as “dirty tricks" either because they can easily mess up the normal operation of **Forms Library** or they depend on internal information that might change in the future, or they rely too much on the underlying window systems. Thus whenever possible, try *not* to use these routines.

D.1 Interaction

D.1.1 Form Event

It is possible to by-pass the form event processing entirely by setting a “raw callback” that sits between the event reading and dispatching stage, thus a sneak preview can be implemented and optionally consume the event before the internal form processing machinery gets to it.

Use the following routines to register such a preemptive processing routine

```
typedef int (*FL_RAW_CALLBACK)(FL_FORM *, void *xevent);

FL_RAW_CALL_BACK fl_register_raw_callback(FL_FORM *form,
                        unsigned long mask,
                        FL_RAW_CALLBACK callback);
```

where `mask` is the event mask you are interested in (same as XEvent mask). The function returns the old handler for the event.

Currently only handlers for the following events are supported

- `KeyPressMask` and `KeyReleaseMask`
- `ButtonPressMask` and `ButtonReleaseMask`
- `EnterWindowMask` and `LeaveWindowMask`

- `ButtonMotionMask` and `PointerMotionMask`
- `FL_ALL_EVENT` (see below)

Further there is only one handler for each event pair, (e.g., `ButtonPress` and `ButtonRelease`), thus you can't have two separate handlers for each pair although it is okay to register a handler only for one of them (almost always a mistake) if you know what you're doing. If you register a single handler for more than one pair of events, e.g., setting `mask` to `KeyPressMask|ButtonPressMask`, the returned old handler is random.

A special constant, `FL_ALL_EVENT`, is defined so that the handler registered will received *all* events that are selected. To select events, use `fl_addto_selected_xevent()`.

Once an event handler is registered and the event is detected, then instead of doing the default processing by the dispatcher, the registered handler is invoked. The handler must return `FL_PREEMPT` if the event is gobbled up (consumed) and 0 otherwise so that the internal process can continue. See `minput2.c` for an example.

D.1.2 Object Events

Just as you can by-pass the internal event processing for a particular form, you can also do so for an object. Unlike in raw callbacks, you can not select individual events.

The mechanism provided is via the registration of a pre-handler for an object. The pre-handler will be called before the built-in object handler. By electing to handle some of the events, a pre-handler can, in effect, replace part of the built-in handler.

Chapter 29.1 has already discussed the API in detail, here we just repeat the discussion for completeness as any use of preemptive handler is considered "dirty tricks".

To register a pre-handler, use the following routine

```
typedef int (*FL_HANDLEPTR)(FL_OBJECT *ob, int event,
                            FL_Coord mx, FL_Coord my,
                            int key, void *raw_event);

void fl_set_object_prehandler(FL_OBJECT *, FL_HANDLEPTR prehandler);
```

Where `event` is the generic event in the **Forms Library**, that is, `FL_DRAW`, `FL_ENTER` etc. Parameter `mx, my` are the mouse position and `key` is the key pressed. The last parameter `raw_event` is the (cast) XEvent that caused the invocation of the pre-handler.

Notice that the pre-handler has the same function prototype as the built-in handler. Actually they are called with the same exact parameters by the event dispatcher. The prehandler should return 0 if the processing by the built-in handler should continue. A return value of `FL_PREEMPT` will prevent the dispatcher from calling the built-in handler.

See demo program `preemptive.c` for an example.

Similar mechanism exists for registering a post-handler, i.e., a handler invoked after the built-in handler finishes. Whenever possible a post-handler should be used instead of a pre-handler.

D.2 Other

As stated earlier, `fl_set_defaults()` can be used to modify **Forms Library**'s default prior to calling `fl_initialize()`. Actually this routine can also be used after `fl_initialize()` to override the values set on the command line or application databases. However, overriding users' preference should be done with discretion. Further, setting `privateColormap` after `fl_initialize()` has no effect.

Appendix E

Trouble Shooting

This appendix deals with a number of (common) problems encountered by people using the **Forms Library**. Ways of avoiding them are presented.

`fl_show_form() only draws the form partially` This only happens if immediately following `fl_show_form()`, the application program blocks the execution (e.g., waiting for a socket connection, starting a new process via `fork()` etc.). To fix this problem, you can flush the X buffer manually using `XFlush(fl_get_display())` before blocking occurs or use an idle callback to check the status of the blocking device or let the main loop handle it for you via `fl_add_io_callback()`.

`I updated the value of a slider/counter/label, but it does not change` This only happens if the update is followed by a blockage of execution or a long task without involving the main loop of **Forms Library**. You can force a screen update using `XSync(fl_get_display(),0)`.

Reporting Bugs

When you (think you) encountered a bug in the **XForms** please report it by sending a mail message to `zhao@[bloch|bragg].phys.uwm.edu`. In this mail please indicate the version of the library, the type of machine and OS version you are running this on. Some sample code that exhibits the erratic behavior would help greatly. The name of the window manager, and an output of `xdpyinfo` or any other relevant information (demo program similar to your code works/fails etc) would also help. **Forms Library** version can be obtained by holding the <Meta> key and pressing the middle mouse button somewhere in one of the forms, or by running `fdesign` with `-flversion` flag. Give a short description of the problem and if possible. Don't expect an immediate answer but we will do our best.

Appendix F

List of the demo programs

The demo programs included in the distribution are not only sample programs that show the usage and appearance of various objects, they also serve as testing programs. Majority of these demo programs are run for every public release of the **Forms Library** to ensure the quality of the release, including the build and packaging. Thus whenever you think you've found a bug in the library through your code, please check if a demo program of similar functionality shows the same problem or not and include this piece of information in your bug report. This will give us a starting point in identifying and ultimately, fixing or reaching a resolution about the problem.

It can't be over-emphasized the importance of including relevant information (platform/OS version, library version, any output from the compiler/library etc) in a bug report. Sending a terse "xxx feature doesn't work" is a waste of time (yours and ours).

`xyplotactive.c` An active xyplot.

`browserop.c` Browser class routines (add line, delete line etc.)

`browserall.c` All browser types.

`buttonall.c` All button classes with different border widths.

`chartall.c` Shows all available chart types.

`sliderall.c` Shows all slider types.

`demo33.c` Bitmap class.

`boxtype.c` Shows all boxtypes.

`butttypes.c` Show all button types.

`borderwidth.c` Shows the effect of border width.

`demo09.c` Use of simple callback.

`choice.c` Choice class.

`counter.c` A counter.

`cursor.c` Cursor support demo.

`objinactive.c` Activation/Deactivation of objects.

`dirlist.c` `fl_get_dirlist()` tester.

`fdial.c` A fill dial.

`folder.c` Tabbed folder class demo.

`fonts.c` Fonts demo.

`freedraw.c` An example of free Object.

`free1.c` Shows the use of a free object.

`fbrowse.c` Shows the use of file selector.

`gl.c` A OpenGL/Mesa canvas demo.

`goodies.c` Shows the pre-built goodies in the library.

`group.c` Shows the usage of multiple overlapping groups.

`iconify.c` Icons for the form.

`inputall.c` All input types.

`minput2.c` Input field interaction. Raw callback.

`lalign.c` Label alignment demo.

`ldial.c` A line dial.

`longlabel.c` How to put multiple lines in a label.

`menu.c` A menu.

`minput.c` Multi-line input field.

`objreturn.c` Interaction styles of objects.

`objpos.c` Changing object position on the fly.

`positioner.c` A normal positioner.

`positionerXOR.c` A positioner that moves in XOR mode.

`popup.c` Use of popup menus. Better API than `pup.c`.

`preemptive.c` Shows the use of pre-emptive handlers.

`pup.c` Shows the use of popup menus.

`pushbutton.c` Shows several push buttons.

`minput2.c` Shows the raw (pre-emptive) callback.

`rescale.c` Resize a form programmatically or interactively.

`scrollbar.c` Scrollbar demo.

`demo06.c` Basic input field.

`demo05.c` Your basic slider.

`sldsize.c` Shows how to change the slider size.

`chartstrip.c` A strip chart of some sort.

`symbols.c` Shows most of the available symbols.

`timerprec.c` A timer accuracy test.

`touchbutton.c` Touch button type.

`xyplotall.c` All xyplot types.

`xyplotover.c` Show the use of xyplot overlay and plot key. Also tests `fl_object_ps_dump()`.

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