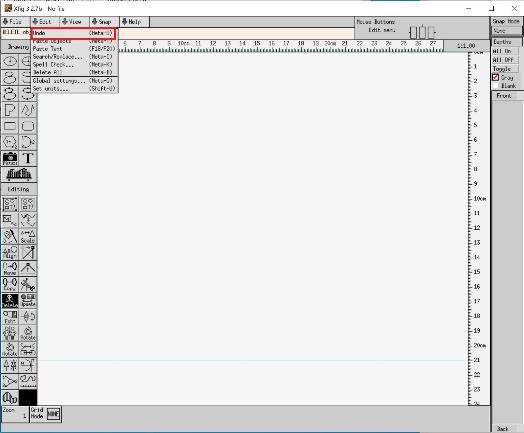
**Software Change Request**

| **Software** | **Baseline Version** | **Feature Name** | **Difficulty** |
| --- | --- | --- | --- |
| Xfig | 3.2.8a | Shortcut Button for Undo | Easy (Est. 3 files; 15 LOC) |



***Current Behavior:***

Currently the Undo edit tool allows a user to undo the last operation such as object creation, deletion, or modification. As shown in Figure 1, the Undo edit tool is accessed through the menu (Menu --> Edit --> Undo). However, Xfig users always prefer doing actions through the shortcut buttons on the Editing Mode Panel shown at the left hand side of Xfig, since it is directly visible and quick with one rather than two clicks.

*Figure 1: the undo in the menu of Xfig*

***Expected Behavior:***

Create a shortcut button for Undo on the Editing Mode Panel at the left hand side of Xfig. The behavior should be the same as the default Undo: First click will undo the last operation, and one more clicking will redo it.

***Solution Hints for Instructor:***

Buttons are created in the w\_modepanel.c by adding an entry into the **mode\_switches** array. This entry is a mode\_sw\_info struct, which as the format:

icon\_struct \*icon; //pointer to the icon of the button  
int mode; // mode xfig enters, such as creating a box or moving an object  
void (\*setmode\_func) (); // the function that executes when the button is pressed  
int objmask; //objects that will be affected  
unsigned long indmask; // mask to display indicators  
char modemsg[MAX\_MODEMSG\_LEN]; // message for function  
Boolean popup; // if something will popup  
Widget widget; // widget to open  
Pixmap pixmap, reversePM; // pixmaps forXtVaCreateManagedWidget()

All buttons use the same values for **popup**, **widget**, and the **pixmap**s, with the rest of the values being self-explanatory. **setmode\_func** will be a pointer to the undo function, so u\_undo.h will need to be included. The other main change is in w\_icons.c and w\_icons.h.

All of xfig’s button icons are stored in w\_icons.c, with each button having a normal and small icon. These icons are stored in a bitmap format, which can easily be obtained from an image manipulation program. The undo icon struct, as well as the length and width of both icons, must be set here. In w\_icons.h, the icon must be defined as an external variable.

**w\_modepanel.c:**

… **includes**

#include "u\_markers.h"  
#include "u\_search.h"  
+ #include “u\_undo.h”  
#include "w\_drawprim.h"  
#include "w\_indpanel.h”

.. end of **mode\_sw\_info mode\_switches[]**

{&areameas\_ic, F\_AREAMEAS, areameas\_selected, M\_AREAMEAS\_OBJECT, I\_MIN2,  
"Measure AREA of polygons, arcs and ellipses (Ctrl-m)",  
False, NULL, (Pixmap)0, (Pixmap)0},  
+ {&undo\_ic, F\_NULL, undo, M\_ALL, I\_NONE,  
+ "Undo last change (Meta-U)",  
+ False, NULL, (Pixmap)0, (Pixmap)0},

**w\_icons.c:**

… “**icons for mode panel” section**

#define areameas\_width\_small 22  
#define areameas\_height\_small 22  
static unsigned char areameas\_bits\_small[] = {  
0x00,0x00,0xc0,0x00,0x00,0xc0,0x00,0x00,0xc0,0x80,0x01,0xc0,0xc0,0x03,0xc0,  
0x60,0x05,0xc0,0x50,0x0d,0xc0,0x58,0x15,0xc0,0x54,0x15,0xc0,0x56,0x35,0xc0,  
0x56,0x35,0xcc,0x56,0xf5,0xd7,0x56,0x55,0xd5,0x56,0x55,0xd5,0xdc,0x57,0xd5,  
0x78,0x5c,0xcd,0x18,0x58,0xc7,0x00,0xf8,0xc1,0x00,0x20,0xc0,0x00,0x00,0xc0,  
0x00,0x00,0xc0,0x00,0x00,0xc0};

+#define undo\_width\_small 22  
+#define undo\_height\_small 22  
+static unsigned char undo\_bits\_small[] = { // example undo icon  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x30, 0x00, 0x00, 0x38, 0x00, 0x00, 0x1c, 0x00, 0x00,  
+ 0xfe, 0x7f, 0x00, 0xfe, 0xff, 0x00, 0x1c, 0xf8, 0x01, 0x38, 0xc0, 0x03,  
+ 0x30, 0x80, 0x03, 0x00, 0x80, 0x03, 0x00, 0xc0, 0x03, 0x00, 0xf0, 0x01,  
+ 0x00, 0x7c, 0x00, 0x00, 0x3c, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };

… “**NORMAL SIZE ICONS” section**

#define lenmeas\_width\_big 36  
#define lenmeas\_height\_big 32  
static unsigned char lenmeas\_bits\_big[] = {  
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,  
0x00,0x00,0x00,0x00,0x1e,0x00,0x00,0x00,0x80,0x13,0x00,0x40,  
0x00,0x70,0x10,0x80,0xc1,0x00,0x18,0x10,0xe0,0x83,0x01,0x08,  
0x10,0x30,0x06,0x01,0x0c,0x10,0x10,0x0c,0x01,0x04,0x18,0x18,  
0x08,0x01,0x04,0x08,0x08,0x0c,0x01,0x04,0x04,0x08,0x04,0x01,  
0x00,0x03,0x0c,0x84,0x01,0xc0,0x00,0x06,0xdc,0x00,0x60,0x00,  
0x03,0x70,0x00,0x60,0xc0,0x00,0x00,0x00,0xc0,0x3f,0x00,0x00,  
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,  
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,  
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x08,0x21,0x84,0x10,0x02,  
0x08,0x21,0x84,0x10,0x02,0x08,0x21,0x84,0x10,0x02,0xf8,0xff,  
0xff,0xff,0x03,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,  
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,  
0x00,0x00,0x00,0x00};

+ #define undo\_width\_big 36  
+ #define undo\_height\_big 32  
+ static unsigned char undo\_bits\_big[] = { // example undo icon  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x70, 0x00, 0x00, 0x00, 0x00, 0x3c, 0x00,  
+ 0x00, 0x00, 0x00, 0x1e, 0x00, 0x00, 0x00, 0x00, 0x0f, 0x00, 0x00, 0x00,  
+ 0x80, 0xff, 0xff, 0x00, 0x00, 0xc0, 0xff, 0xff, 0x07, 0x00, 0x80, 0xff,  
+ 0xff, 0x0f, 0x00, 0x00, 0x0f, 0xfc, 0x1f, 0x00, 0x00, 0x1e, 0x80, 0x1f,  
+ 0x00, 0x00, 0x3c, 0x00, 0x3e, 0x00, 0x00, 0x70, 0x00, 0x3e, 0x00, 0x00,  
+ 0x00, 0x00, 0x3e, 0x00, 0x00, 0x00, 0x00, 0x1f, 0x00, 0x00, 0x00, 0x80,  
+ 0x0f, 0x00, 0x00, 0x00, 0xe0, 0x07, 0x00, 0x00, 0x00, 0xf8, 0x03, 0x00,  
+ 0x00, 0x00, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x3c, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,  
+ 0x00, 0x00, 0x00, 0x00 };

… **defining structs section**

icon\_struct areameas\_ic;  
+ icon\_struct undo\_ic;

… **populate\_icons\_big**

icon\_struct lenmeas\_ic\_ = { lenmeas\_width\_big, lenmeas\_height\_big, (char\*)lenmeas\_bits\_big };  
 icon\_struct areameas\_ic\_ = { areameas\_width\_big, areameas\_height\_big, (char\*)areameas\_bits\_big };  
+ icon\_struct undo\_ic\_ = { undo\_width\_big, undo\_height\_big, (char\*)undo\_bits\_big };  
 regpoly\_ic = regpoly\_ic\_;  
 addpt\_ic = addpt\_ic\_;

… **populate\_icons\_big (near bottom)**

anglemeas\_ic = anglemeas\_ic\_;  
 lenmeas\_ic = lenmeas\_ic\_;  
 areameas\_ic = areameas\_ic\_;  
+ undo\_ic = undo\_ic\_;  
}

… **populate\_icons\_small**

icon\_struct lenmeas\_ic\_ = { lenmeas\_width\_small, lenmeas\_height\_small, (char\*)lenmeas\_bits\_small };  
 icon\_struct areameas\_ic\_ = { areameas\_width\_small, areameas\_height\_small, (char\*)areameas\_bits\_small };  
+ icon\_struct undo\_ic\_ = { undo\_width\_small, undo\_height\_small, (char\*)undo\_bits\_small };  
 regpoly\_ic = regpoly\_ic\_;  
 addpt\_ic = addpt\_ic\_;

..**populate\_icons\_small**

lenmeas\_ic = lenmeas\_ic\_;  
 areameas\_ic = areameas\_ic\_;  
+ undo\_ic = undo\_ic\_;  
}

**w\_icons.h:**

extern icon\_struct areameas\_ic;  
+ extern icon\_struct undo\_ic;  
  
/\* misc icons \*/  
  
extern icon\_struct kbd\_ic;