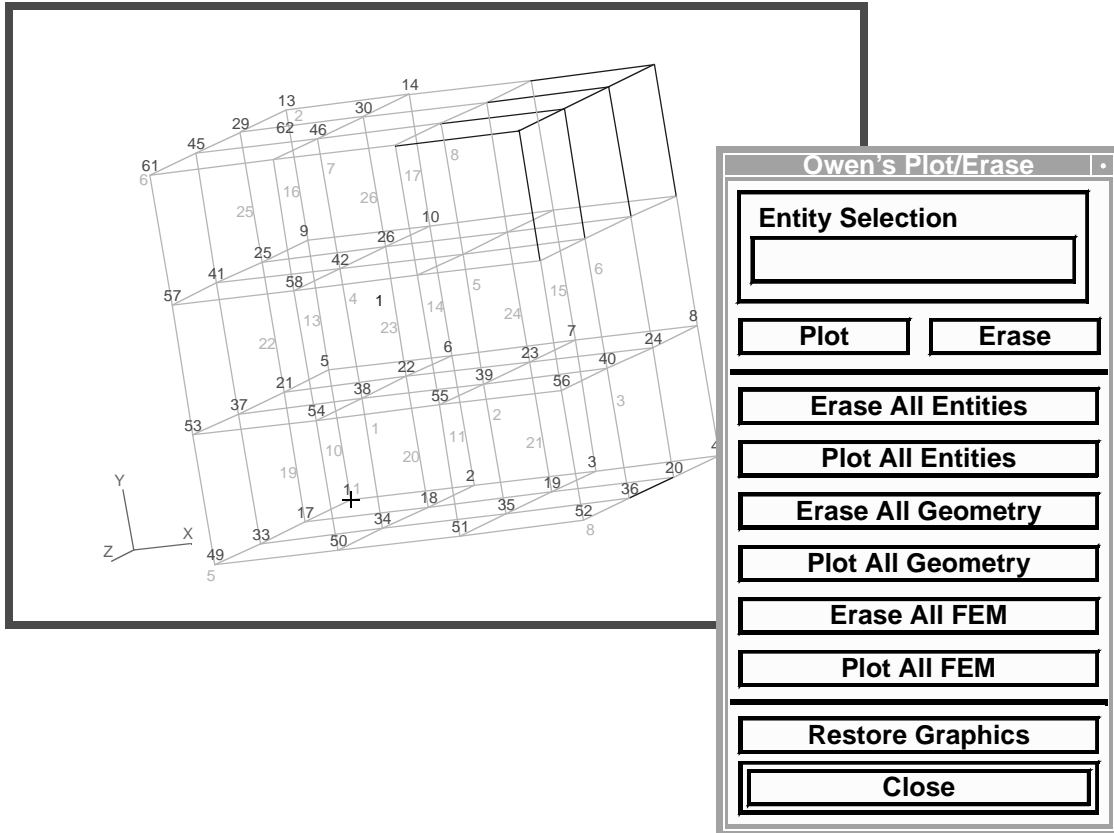


## EXERCISE 8

# *User Defined Data Tables*



### Objective:

- Write a new Plot/Erase function that utilizes the User Defined Data Tables.



## Exercise Description:

The *Display/Plot/Erase* function in MSC/PATRAN does not retain the desired images in between opening and closing a database. In this exercise, you will create a new *Plot/Erase* function that utilizes the User Defined Data Tables to store information about the last image displayed during that session. The image can be restored when the database is reopened. Also create a couple of function callbacks to simulate the *Plot/Erase* functionality.

## Exercise Procedure:

1. In the `ex8` directory, enter the `vi` editor and edit the PCL function in a file called `exercise_08.template`. Subsitute the appropriate PCL syntax or create new function for the lines which contain:

```
*****##*****
```

There are quick reference pages for `vi` and UNIX in the appendix of this workbook for your reference.

After filling in the blanks, save the function and name the file `plot.pcl`.

2. Compile the function. Remember to type at the shell prompt:

```
/usr/lib/cpp -l/patran/patran3/customization plot.pcl plot_erase.cpp
```

Refer to the previous exercises for the machine specific commands.

Start MSC/PATRAN by typing `p3` in your `xterm` window.

Enter the command `!!input plot_erase.cpp` into the MSC/PATRAN command window.

All the error messages and diagnostics will be written to the MSC/PATRAN command window.

3. Run the session file, `play_test.ses` to create a new database. When done, test the function by hitting the **Restore Graphics** button. Refresh the display.

Click on **File** in the Main Window. Select **Play Session File...** in the pull-down menu.

**File/Session/Play...**

Play from file:

**play\_test.ses**

**Apply**

---

**Restore Graphics**

**Exercise Template:**

```

#include "appforms.p"
#define OI_PLOT_ERASE_TYPE 3
#define MAX_STR_LENGTH 1024

CLASS oi_display

/* Classwide Variables */
CLASSWISE WIDGET form_id, selfrm_01, selddb_01, button_01, button_02
CLASSWISE WIDGET sep_01, button_03, button_04, button_08, button_05
CLASSWISE WIDGET button_07, button_06, sep_02, button_09

FUNCTION init()
  REAL yloc_main
  REAL yloc_selfrm_01=0.

  form_id=ui_form_create(                                     @
  /* callback */      "",                                     @
  /* x */             FORM_X_LOC_SML_CEN,                   @
  /* y */             FORM_Y_LOC,                           @
  /* position */     "UL",                                   @
  /* width */        FORM_WID_SML,                          @
  /* height */       FORM_HGT_TALL,                          @
  /* label */        "Owen's Plot/Erase",                   @
  /* unused */       "")

  yloc_main = FORM_T_MARGIN

  selfrm_01=ui_selectframe_create(                           @
  /* parent */       form_id,                               @
  /* callback */     "",                                     @
  /* x */            FORM_L_MARGIN,                         @
  /* y */            yloc_main,                             @
  /* width */        SFRAME_WID_SINGLE,                     @
  /* height */       1.0,                                    @
  /* label */        "",                                     @
  /* recycle */      FALSE)

  yloc_selfrm_01 = SFRAME_T_MARGIN

  selddb_01=ui_selectdatabox_create(                          @
  /* parent */       selfrm_01,                              @
  /* callback */     "",                                     @
  /* x */            FORM_L_MARGIN,                         @
  /* y */            yloc_selfrm_01,                       @
  /* label_length */ 0.0,                                    @
  /* box_length */   SDBOX_WID_SINGLE,                      @
  /* label */        "Entity Selection",@
  /* value */        "",                                     @
  /* label_above */  TRUE,                                   @
  /* datatype */     "ANY",                                  @
  /* prompt */       "Choose Entities")

  yloc_selfrm_01 += SDBOX_HGT_LABOVE + @
                  INTER_WIDGET_SPACE

  ui_wid_set(selfrm_01,"HEIGHT",yloc_selfrm_01)

  yloc_main += SFRAME_2EDGE + @

```

```

INTER_WIDGET_SPACE + @
yloc_selfrm_01

button_01=ui_button_create(                                     @
/* parent */                                                 form_id, @
/* callback */                                               "plot_cb", @
/* x */                                                       BUTTON_HALF_X_LOC1, @
/* y */                                                       yloc_main, @
/* width */                                                  BUTTON_WID_HALF, @
/* height */                                                 BUTTON_DEFAULT_HGT, @
/* label */                                                  "Plot", @
/* TRUE */                                                   TRUE, @
/* highlight */                                              FALSE)

button_02=ui_button_create(                                     @
/* parent */                                                 form_id, @
/* callback */                                               "erase_cb", @
/* x */                                                       BUTTON_HALF_X_LOC2, @
/* y */                                                       yloc_main, @
/* width */                                                  BUTTON_WID_HALF, @
/* height */                                                 BUTTON_DEFAULT_HGT, @
/* label */                                                  "Erase", @
/* TRUE */                                                   TRUE, @
/* highlight */                                              TRUE)

yloc_main += BUTTON_DEFAULT_HGT + @
             HIGHLITE_1EDGE + @
             INTER_WIDGET_SPACE

sep_01=ui_separator_create(                                     @
/* parent */                                                 form_id, @
/* name */                                                  "\", @
/* x */                                                      0.0, @
/* y */                                                       yloc_main, @
/* length */                                                 FORM_WID_SML, @
/* horizontal */                                             TRUE)

yloc_main += 5*PIXEL_HGT - @
             0.5*INTER_WIDGET_SPACE+ @
             INTER_WIDGET_SPACE

button_03=ui_button_create(                                     @
/* parent */                                                 form_id, @
/* callback */                                               "erase_all", @
/* x */                                                       BUTTON_FULL_X_LOC1, @
/* y */                                                       yloc_main, @
/* width */                                                  BUTTON_WID_FULL, @
/* height */                                                 BUTTON_DEFAULT_HGT, @
/* label */                                                  "Erase All Entities", @
/* TRUE */                                                   TRUE, @
/* highlight */                                              FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
             INTER_WIDGET_SPACE

button_04=ui_button_create(                                     @
/* parent */                                                 form_id, @
/* callback */                                               "plot_all", @
/* x */                                                       BUTTON_FULL_X_LOC1, @
/* y */                                                       yloc_main, @
/* width */                                                  BUTTON_WID_FULL, @
/* height */                                                 BUTTON_DEFAULT_HGT, @
/* label */                                                  "Plot All Entities", @
/* TRUE */                                                   TRUE, @

```

```

/* highlight */                FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
                INTER_WIDGET_SPACE

button_08=ui_button_create(                                @
/* parent */                form_id,                        @
/* callback */                "erase_all_geo",              @
/* x */                BUTTON_FULL_X_LOC1,                  @
/* y */                yloc_main,                            @
/* width */                BUTTON_WID_FULL,                  @
/* height */                BUTTON_DEFAULT_HGT,              @
/* label */                "Erase All Geometry",            @
/* TRUE */                TRUE,                               @
/* highlight */                FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
                INTER_WIDGET_SPACE

button_05=ui_button_create(                                @
/* parent */                form_id,                        @
/* callback */                "plot_all_geo",              @
/* x */                BUTTON_FULL_X_LOC1,                  @
/* y */                yloc_main,                            @
/* width */                BUTTON_WID_FULL,                  @
/* height */                BUTTON_DEFAULT_HGT,              @
/* label */                "Plot All Geometry",            @
/* TRUE */                TRUE,                               @
/* highlight */                FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
                INTER_WIDGET_SPACE

button_07=ui_button_create(                                @
/* parent */                form_id,                        @
/* callback */                "erase_all_fem",              @
/* x */                BUTTON_FULL_X_LOC1,                  @
/* y */                yloc_main,                            @
/* width */                BUTTON_WID_FULL,                  @
/* height */                BUTTON_DEFAULT_HGT,              @
/* label */                "Erase All FEM",                @
/* TRUE */                TRUE,                               @
/* highlight */                FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
                INTER_WIDGET_SPACE

button_06=ui_button_create(                                @
/* parent */                form_id,                        @
/* callback */                "plot_all_fem",              @
/* x */                BUTTON_FULL_X_LOC1,                  @
/* y */                yloc_main,                            @
/* width */                BUTTON_WID_FULL,                  @
/* height */                BUTTON_DEFAULT_HGT,              @
/* label */                "Plot All FEM",                @
/* TRUE */                TRUE,                               @
/* highlight */                FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
                INTER_WIDGET_SPACE

```

```

sep_02=ui_separator_create(                                     @
/* parent */          form_id,                               @
/* name */           "",                                     @
/* x */              0.0,                                   @
/* y */              yloc_main,                             @
/* length */         FORM_WID_SML,                         @
/* horizontal */     TRUE)

yloc_main += 5*PIXEL_HGT          - @
            0.5*INTER_WIDGET_SPACE + @
            INTER_WIDGET_SPACE

button_09=ui_button_create(                                     @
/* parent */          form_id,                               @
/* callback */        "reset_pe",                           @
/* x */              BUTTON_FULL_X_LOCL,                   @
/* y */              yloc_main,                             @
/* width */           BUTTON_WID_FULL,                     @
/* height */          BUTTON_DEFAULT_HGT,                  @
/* label */           "Restore Graphics",                  @
/* TRUE */            TRUE,                                 @
/* highlight */       FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
            INTER_WIDGET_SPACE

button_09=ui_button_create(                                     @
/* parent */          form_id,                               @
/* callback */        "cancel",                             @
/* x */              BUTTON_FULL_X_LOCL,                   @
/* y */              yloc_main,                             @
/* width */           BUTTON_WID_FULL,                     @
/* height */          BUTTON_DEFAULT_HGT,                  @
/* label */           "Close",                             @
/* TRUE */            TRUE,                                 @
/* highlight */       FALSE)

yloc_main += BUTTON_DEFAULT_HGT + @
            INTER_WIDGET_SPACE

ui_wid_set(form_id,"HEIGHT",yloc_main)

END FUNCTION /* init */

FUNCTION display()
    ui_form_display("oi_display")
END FUNCTION /* display */

FUNCTION plot_cb()
/*
* This is a callback for the button named button_01
*/
    STRING picklist[*****1*****]

    ui_wid_get_vstring(*****2*****)
>    oi_display.add_data_to_table(*****3*****)

END FUNCTION /* plot_cb */

FUNCTION erase_cb()
/*

```

```

* This is a callback for the button to erase selected entities
*/
    STRING picklist[MAX_STR_LENGTH]

    ui_wid_get_vstring( seldbox_01, "VALUE", picklist)

> oi_display.add_data_to_table(picklist, FALSE)

END FUNCTION /* erase_cb */

FUNCTION erase_all()
/*
* This is a callback for the button to erase all entities
*/
    INTEGER status

    oi_display.clean_table()
> status = oi_display.add_data_to_table("ALL ENT", FALSE)
    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        RETURN
    END IF

END FUNCTION /* erase_all */

FUNCTION plot_all()
/*
* This is a callback for the button named button_04
*/
    INTEGER status

    oi_display.clean_table()

> status = oi_display.add_data_to_table( ***** 4 ***** )
    IF ( status != 0 ) THEN
        msg_to_form( ***** 5 ***** )
        ***** 6 *****
    END IF

END FUNCTION /* plot_all */

FUNCTION erase_all_geo()
/*
* This is a callback for the button to erase all geometry
*/
> oi_display.add_data_to_table("ALL GEO", FALSE)

END FUNCTION /* erase_all_geo */

FUNCTION plot_all_geo()
/*
* This is a callback for the button to plot all geometry
*/
> oi_display.add_data_to_table("ALL GEO", TRUE)

END FUNCTION /* plot_all_geo */

```

---

```

FUNCTION erase_all_fem()
/*
 * This is a callback for the button to erase all finite elements
 */
> oi_display.add_data_to_table("ALL FEM", FALSE)

END FUNCTION /* erase_all_fem */

FUNCTION plot_all_fem()
/*
 * This is a callback for the button to plot all finite elements
 */
> oi_display.add_data_to_table("ALL FEM", TRUE)

END FUNCTION /* plot_all_fem */
FUNCTION cancel()
/*
 * This is a callback for the button to close the form
 */

    ui_form_hide("oi_display")

END FUNCTION /* cancel */

FUNCTION add_data_to_table(pick_list, plot_these)

/*
 * The purpose of this function is to add the information
 * to the user defined data tables.
 */
    STRING s_arr[MAX_STR_LENGTH](1), PICK_LIST[]
    LOGICAL l_arr(1), PLOT_THESE
    INTEGER i_arr(1), id, status, label = 0, max_len
    REAL    r_arr(1)

    IF ( pick_list == "" ) THEN RETURN 0

    max_len = str_length(pick_list)
    l_arr(1) = plot_these
    s_arr(1) = pick_list

/*
 * Create the data tables in the database using the User Defined Data Tables
 */
    status = db_create_client_data(***** 7 *****)
        /* id */
        /* client_label */
        /* client_type */
        /* num_logicals */
        /* num_integers */
        /* num_reals */
        /* num_strings */
        /* max_str_len */
        /* log_array */
        /* int_array */
        /* real_array */
        /* str_array */

    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        dump status
    END IF

```

```

status = oi_display.plot_erase(pick_list, plot_these)
IF ( status != 0 ) THEN
    msg_to_form(status, 2, 0, 0, 0., "")
    RETURN
END IF

ui_writec("Entered %d: Plot (%s) => %s\n", id, str_from_logical(l_arr(1)),@
s_arr(1) )

RETURN 0

END FUNCTION /* add_data_to_table */
FUNCTION get_data_from_table(label, str_val, log_val)

    STRING s_arr[MAX_STR_LENGTH](1), str_val[]
    LOGICAL l_arr(1), log_val
    INTEGER i_arr(1), id, status, label
    REAL    r_arr(1)

/*
* Get the id number from the data tables given the label number
*/
status = db_get_client_id_by_label(***** 8 *****)
IF ( status != 0 ) THEN
    msg_to_form(status, 2, 0, 0, 0., "")
END IF
/*
* Get all the data for that id number
*/
status = db_get_all_client_data(***** 9 *****)
/*    id          */
/* num_logicals */
/* num_integers */
/* num_reals     */
/* num_strings  */
/* max_num_char */
/* log_array    */
/* int_array    */
/* real_array   */
/* str_array    */

IF ( status != 0 ) THEN
    msg_to_form(status, 2, 0, 0, 0., "")
dump s_arr
dump l_arr
dump status
END IF

ui_writec("Got %d: Plot (%s) => %s\n", id, str_from_logical(l_arr(1)),@
s_arr(1) )

str_val= s_arr(1)
log_val = l_arr(1)

RETURN 0

END FUNCTION /* get_data_from_table */

FUNCTION plot_erase(picklist, plotem)

```

```

STRING picklist[]
LOGICAL plotem

SWITCH ( picklist )

    CASE ("ALL ENT")
>     gm_visibility_all( plotem )
    CASE ("ALL GEO")
>     gm_visibility_widget( " point 1:# surface 1:# solid 1:# ", plotem )
    CASE ("ALL FEM")
>     gm_visibility_widget( " node 1:# elem 1:# mpc 1:# ", plotem )
    DEFAULT
>     gm_visibility_widget( picklist, plotem )
END SWITCH

RETURN 0

END FUNCTION /* plot_erase */

FUNCTION reset_pe()

    INTEGER i, status, max_entry, labels(VIRTUAL)
    STRING what[MAX_STR_LENGTH]
    LOGICAL plotem

    gm_visibility_all( TRUE )

/*
 * Count the number of entries of type OI_PLOT_ERASE_TYPE
 */
    status = db_count_client_labels_by_type(***** 10 *****)
    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        RETURN
    END IF

    status = sys_allocate_array(labels, 1, max_entry)

/*
 * Get the label numbers
 */
    status = db_get_client_labels_by_type(***** 11 *****)
    FOR ( i = 1 to max_entry )
        status = oi_display.get_data_from_table(labels(i), what, plotem)
        IF ( status != 0 ) THEN continue

        oi_display.plot_erase(what, plotem)
    END FOR

    RETURN 0

END FUNCTION /* reset_pe */

FUNCTION clean_table()

    INTEGER status, labels(VIRTUAL), i, max_entry, id

    status = db_count_client_labels_by_type(OI_PLOT_ERASE_TYPE, max_entry)
    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        dump status
    END IF

```

```

status = sys_allocate_array(labels, 1, max_entry)
IF ( status != 0 ) THEN
    msg_to_form(status, 2, 0, 0, 0., "")
    dump status
END IF

status = db_get_client_labels_by_type(OI_PLOT_ERASE_TYPE, labels)
IF ( status != 0 ) THEN
    msg_to_form(status, 2, 0, 0, 0., "")
    dump status
END IF

FOR ( i = 1 to max_entry )
    status = db_get_client_id_by_label(labels(i), id)
    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        dump status
    END IF

    status = db_delete_client_data(id)
    IF ( status != 0 ) THEN
        msg_to_form(status, 2, 0, 0, 0., "")
        dump status
    END IF
END FOR

END FUNCTION /* clean_table */

END CLASS /* oi_display */

```

```

*1 MAX_STR_LENGTH
*2 seldbox_01, "VALUE", picklist
*3 picklist, TRUE
*4 "ALL ENT", TRUE
*5 status, 2, 0, 0, 0., ""
*6 RETURN
*7 id, label, OI_PLOT_ERASE_TYPE, @
*8 label, id
*9 id, 0, 0, 1, MAX_STR_LENGTH, l_arr, l_arr, s_arr
*10 OI_PLOT_ERASE_TYPE, max_entry
*11 OI_PLOT_ERASE_TYPE, labels

```

