

Intuition and Workbench

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/* Optimzefresh.c - Execute me to compile me with SAS/C 5.10a
LC -offstmcu -v -y -j73 optimzefresh.c
LINK FROM LIB:c.o.optimzefresh.o TO optimzefresh LIBRARY LIB:LC.lib/LIB:Amiga.lib
quit */

/* This program demonstrates optimal window refreshing using a scrolling text
 * display as a sample.
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 * All Rights Reserved
 */

#include <exec/types.h>
#include <exec/libraries.h>
#include <exec/memory.h>
#include <utility/hooks.h>
#include <utility/tagitem.h>
#include <graphics/gfxmacros.h>
#include <intuition/intuition.h>
#include <intuition/screens.h>
#include <intuition/gadgetclass.h>
#include <dos.h>

#include <clib/exec_protos.h>
#include <clib/intuition_protos.h>
#include <clib/graphics_protos.h>
#include <clib/layers_protos.h>
#include <clib/alib_protos.h>
#include <clib/dos_protos.h>

/*****

/* There is one line structure for every line of text in our fictional
 * document.
 */
struct Line
{
    struct MinNode In_Link; /* to link the lines together */
    STRPTR In_Text; /* pointer to the text for this line */
    ULONG In_TextLen; /* the length of the text for this line */
};

/*****

/* system libraries */
struct Library *IntuitionBase;
struct Library *GfxBase;
struct Library *LayersBase;

/* global display handles */
struct Screen *screen;
struct Window *window;
struct Gadget *scroller;
struct Hook *refreshhook;

struct RastPort *raster;
struct RastPort *clear;

/* our document along with associated view information */
ULONG numLines;
ULONG topline;
ULONG oldTopline;
ULONG linesVisible;
ULONG columnVisible;
ULONG fontHeight;
ULONG forwWidth;
ULONG viewHeight;
ULONG viewWidth;
ULONG usefullHeight;
ULONG usefullWidth;

/* a state flag indicating whether the main application is busy */
BOOL taskBusy;

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Optimized Window Refreshing

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/*****
VOID InitDocument(VOID);
VOID FreeDocument(VOID);
VOID EventLoop(VOID);
VOID __asm BackFillHook(register __a2 struct RastPort *rp,
                        register __a1 struct BackFillMsg *bIm);
/*****

/* This is where it all begins.
 */
ULONG main(void)
{
    /* open the system libraries we need.
     */
    IntuitionBase = OpenLibrary("intuition.library", 37);
    GfxBase = OpenLibrary("graphics.library", 37);
    LayersBase = OpenLibrary("layers.library", 37);
    if (IntuitionBase && GfxBase && LayersBase)
    {
        /* get a pointer to the default public screen */
        if (screen = LockSubScreen(NULL))
        {
            /* allocate and initialize a scroller as a BOOPSI object */
            if (scroller = NewObject(NULL, "propclass",
                GA_Right, -13,
                GA_Top, 1+screen->WBotTop+screen->Font->ta_ysize+1,
                GA_Width, 10,
                GA_Height, -12-(screen->WBotTop+screen->Font->ta_ysize+1),
                GA_Relief, TRUE,
                GA_ReliefStyle, TRUE,
                GA_Immediate, TRUE,
                GA_FollowMouse, TRUE,
                GA_RightBorder, TRUE,
                PGA_Borderless, TRUE,
                PGA_Freedom, FREEVERT,
                PGA_Total, 1,
                PGA_Visible, 1,
                PGA_Top, 0,
                PGA_NewLook, TRUE,
                TAG_DONE))
            {
                /* initialize data used by the backfill hook */
                refreshhook.h_Entry = ((ULONG (*)( )) BackFillHook); /* point the */
                taskBusy = TRUE; /* hook to our routine. */

                /* open the window */
                if (window = OpenWindowTags(NULL,
                    WA_Left, 0,
                    WA_Top, 0,
                    WA_PubScreen, screen,
                    WA_AutoLoadJust, TRUE,
                    WA_CloseGadget, TRUE,
                    WA_DepthGadget, TRUE,
                    WA_DragBar, TRUE,
                    WA_SizeGadget, TRUE,
                    WA_SizeRight, TRUE,
                    WA_Title, "Optimized Refresh Sample",
                    WA_SimpleRefresh, TRUE,
                    WA_Activate, TRUE,
                    WA_Gadgets, TRUE,
                    WA_MinWidth, 32,
                    WA_MinHeight, 10+12+(screen->Font->ta_ysize+1),
                    WA_MaxWidth, -1,
                    WA_MaxHeight, -1,
                    IDCMP_CLOSEWINDOW | IDCMP_NEWSIZE
                    | IDCMP_REFRESHWINDOW | IDCMP_GADGETUP
                    | IDCMP_GADGETDOWN | IDCMP_MOUSEMOVE
                    | IDCMP_VANILLAKEY,
                    krefreshhook,
                    WA_BackFill,
                    TAG_DONE))
                {
                    /* initialize our document structure */
                    InitDocument();
                }
            }
        }
    }
}

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        /* process user events in the window */
        EventLoop();

        /* free our document structure */
        FreeDocument();

        /* close up shop */
        CloseWindow(window);
    }
    /* free the scroller BOOPSI object */
    DisposeObject(scroller);
}
/* unlock the default public screen */
UnlockPubScreen(NULL,screen);
}

/* close the libraries we opened */
CloseLibrary(LayersBase);
CloseLibrary(GfxBase);
CloseLibrary(IntuitionBase);

/* tell the shell everything is all right */
return(0);
}

/*****

/* This function initializes our document. That means allocating 100
 * Line structures and linking them together in an Exec list. The lines
 * are filled with a pattern of text so we have something to display
 * in our window
 */
VOID InitDocument(VOID)
{
    struct Line *line;
    UWORD i,j;

    NewList((struct List *)&document);
    numLines = 0;
    i = 100;
    while (i--)
    {
        if (line = AllocVec(sizeof(struct Line)+91,MEMF_CLEAR|MEMF_PUBLIC))
        {
            line->ln_Text = (STRPTR)((ULONG)line + sizeof(struct Line));
            line->ln_TextLen = 40;
            AddTail((struct List *)&document,(struct Node *)line);
            numLines++;

            j = 0;
            while (j < 90)
            {
                line->ln_Text[j] = (numLines % 96) + 32;
                j++;
            }
        }
    }
}

/*****

/* This function frees all the memory allocated by InitDocument() */
VOID FreeDocument(VOID)
{
    struct Line *line;

    while (line = (struct Line *)RemHead((struct List *)&document))
        FreeVec(line);
}

/*****

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/* This is the message packet passed by layers.library to a backfill hook.
 * It contains a pointer to the layer that has been damaged, a Rectangle
 * structure that defines the bounds of the damage. No rendering can occur
 * outside of these coordinates.
 *
 * The backfill hook is also passed a RastPort in which the rendering
 * should be performed.
 */
struct BackFillMsg
{
    struct Layer *bf_Layer;
    struct Rectangle bf_Bounds;
    LONG bf_OffsetX;
    LONG bf_OffsetY;
};

VOID __asm BackFillHook(register __a2 struct RastPort *rp,
                       register __a1 struct BackFillMsg *bfm)
{
    struct RastPort crp;

    crp = *rp; /* copy the rastport */
    crp.Layer = NULL; /* eliminate bogus clipping from our copy */

    if (taskBusy)
    {
        SetWrMsk(&crp,0xff); /* if the main task is busy, clear all planes */
    }
    else
    {
        SetWrMsk(&crp,0xfe); /* otherwise, clear all planes except plane 0 */
    }

    SetAPen(&crp,0); /* set the pen to color 0 */
    SetDrMd(&crp,JAM2); /* set the rendering mode we need */
    RectFill(&crp,bfm->bf_Bounds.MinX, /* clear the whole area */
            bfm->bf_Bounds.MinY,
            bfm->bf_Bounds.MaxX,
            bfm->bf_Bounds.MaxY);
}

/*****

/* Adjust the scroller object to reflect the current window size and
 * scroll offset within our document
 */
VOID SetScroller(struct Window *window, struct Gadget *scroller,
                ULONG linesVisible, ULONG numLines, ULONG topLines)
{
    SetGadgetAttrs(scroller>window,NULL,PGA_Visible, linesVisible,
                  PGA_Total, numLines,
                  PGA_Top, topLine,
                  TAG_DONE);
}

/*****

/* Render a single line of text at a given position */
VOID RenderLine(UWORD x, UWORD y, UWORD w, STRPTR text, ULONG len)
{
    Move(&render,x,y); /* move the cursor to the position */

    if (len > columnsVisible) /* is line is longer than allowed? */
        len = columnsVisible; /* yes, so reduce its length */

    Text(&render,text,len); /* write to the window */

    if (len < columnsVisible)
        RectFill(&clear,render.cp_x,y-render.TxBaseline,
                x+w-1,y-render.TxBaseline+fontHeight-1);
}

/*****

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/* Whenever the application is busy, this function is called. It will
 * change the behavior of the backfill hook in order to improve the
 * appearance of the display until the application completes its lengthy
 * task.
 *
 * You could also set a busy pointer in the document window in this routine
 * to tell the user you are not listening to him for awhile.
 */
VOID BusyState(BOOL makeBusy)
{
    taskBusy = makeBusy;

    if (LAYERREFRESH & window->WLayer->Flags)
    {
        BeginRefresh(window);
        RefreshView(TRUE);
        EndRefresh(window, TRUE);
    }
}

/*****

/* This routine is a typical event processor. It looks and acts on all events
 * arriving at the window's port.
 */
VOID EventLoop(VOID)
{
    struct IntuiMessage *intuiMsg;
    ULONG                class;

    topLine    = 0;
    oldTopLine = 0;

    /* initialize rendering attributes we are going to use */
    render = *window->RPort;
    SetDrMd(&render, JAM2);
    SetWrMsk(&render, 1); /* we only want to render in the first plane */
    SetAPen(&render, 1);

    /* initialize clearing attributes we are going to use */
    clear = *window->RPort;
    SetDrMd(&clear, JAM2);
    SetWrMsk(&clear, 1); /* we only want to clear the first plane */
    SetAPen(&clear, 0);

    /* render the initial display */
    RefreshView(TRUE);

    /* set the initial scroller position and size */
    SetScroller(window, scroller, linesVisible, numLines, topLine);

    /* we aren't busy, so register that fact */
    BusyState(FALSE);

    while (TRUE)
    {
        /* if the LAYERREFRESH flag is set in the window's layer, it
         * means the layer has some damage we should repair.
         */
        if (LAYERREFRESH & window->WLayer->Flags)
        {
            /* enter optimized repair state */
            BeginRefresh(window);

            /* redraw the whole display through the optimized repair
             * region
             */
            RefreshView(TRUE);

            /* tell the system we are done repairing the window
             */
            EndRefresh(window, TRUE);
        }
    }
}

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/* nothing left to do but wait for user input */
WaitPort(window->UserPort);
intuiMsg = (struct IntuiMessage *)GetMsg(window->UserPort);
class    = intuiMsg->Class;
ReplyMsg(intuiMsg);

/* we got a message, so act on it */
switch (class)
{
    /* user clicked on the close gadget, exit the program */
    case IDCMP_CLOSEWINDOW : return;

    /* user sized the window. We need to redraw the whole
     * display in order to eliminate any garbage. Start by
     * calling BeginRefresh() and EndRefresh() to eliminate
     * the window's damage regions then completely redraw
     * the window contents.
     */
    case IDCMP_NEWSIZE      : BeginRefresh(window);
                            EndRefresh(window, TRUE);
                            RefreshView(TRUE);
                            SetScroller(window,
                                        scroller,
                                        linesVisible,
                                        numLines,
                                        topLine);

                            break;

    /* Intuition is telling us damage occurred to our layer.
     * Don't bother doing anything, the check at the top of the
     * loop will catch this fact and refresh the display
     */
    /* Even though we don't do anything with these events, we
     * still need them to be sent to us so we will wake up and
     * look at the LAYERREFRESH bit.
     */
    case IDCMP_REFRESHWINDOW: break;

    /* user is playing with the scroller. Get the scroller's current
     * top line and synchronize the display to match it
     */
    case IDCMP_GADGETUP      :
    case IDCMP_GADGETDOWN   :
    case IDCMP_MOUSEMOVE    : GetAttr(PGA_Top, scroller, &topLine);
                            RefreshView(FALSE);
                            break;

    /* whenever a key is hit, we fake becoming busy for 4
     * seconds. During that time, try to size and depth arrange
     * the window to see what happens to its contents
     */
    case IDCMP_VANILLAKEY   : BusyState(TRUE);
                            Delay(200);
                            BusyState(FALSE);
                            break;
}
}
}

```

