GUI PROGRAM :

```
#include <windows.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>

void passOne();
void passTwo();
void displayPassOne(HWND hwnd);
void displayPassTwo(HWND hwnd);
void displayObjectCode(HWND hwnd);
LRESULT CALLBACK WindowProcedure(HWND, UINT, WPARAM, LPARAM);
void AddControls(HWND);

HWND hOutputBox;
char outputBuffer[4096];

int WINAPI WinMain(HINSTANCE hInst, HINSTANCE hPrevInst, LPSTR args, int nCmdShow)
{
    WNDCLASSW wc = {0};
    wc.hbrBackground = (HBRUSH)COLOR_WINDOW;
    wc.hCursor = LoadCursor(NULL, IDC_ARROW);
    wc.hInstance = hInst;
    wc.lpszClassName = L"myWindowClass";
    wc.lpfnWndProc = WindowProcedure;
    if (!RegisterClassW(&wc)) return -1;
```

```
    CreateWindowW(L"myWindowClass", L"SIC Assembler", WS_OVERLAPPEDWINDOW |
WS_VISIBLE, 100, 100, 800, 600, NULL, NULL, NULL, NULL);

    MSG msg = {0};
    while (GetMessage(&msg, NULL, NULL, NULL))
    {
        TranslateMessage(&msg);
        DispatchMessage(&msg);
    }
    return 0;
}

LRESULT CALLBACK WindowProcedure(HWND hwnd, UINT msg, WPARAM wp, LPARAM lp)
{
    switch (msg)
    {
    case WM_COMMAND:
        if (wp == 1) passOne();
        else if (wp == 2) passTwo();
        else if (wp == 3) displayPassOne(hwnd);
        else if (wp == 4) displayPassTwo(hwnd);
        else if (wp == 5) displayObjectCode(hwnd);
        break;
    case WM_CREATE:
        AddControls(hwnd);
        break;
    case WM_DESTROY:
        PostQuitMessage(0);
        break;
    default:
        return DefWindowProcW(hwnd, msg, wp, lp);
```

```
    }
    return 0;
}
void AddControls(HWND hwnd)
{
    CreateWindowW(L"Button", L"Run Pass 1", WS_VISIBLE | WS_CHILD, 50, 50, 150, 50, hwnd, (HMENU)1, NULL, NULL);
    CreateWindowW(L"Button", L"Run Pass 2", WS_VISIBLE | WS_CHILD, 220, 50, 150, 50, hwnd, (HMENU)2, NULL, NULL);
    CreateWindowW(L"Button", L"Display Pass 1", WS_VISIBLE | WS_CHILD, 50, 120, 150, 50, hwnd, (HMENU)3, NULL, NULL);
    CreateWindowW(L"Button", L"passtwo address", WS_VISIBLE | WS_CHILD, 220, 120, 150, 50, hwnd, (HMENU)4, NULL, NULL);
    CreateWindowW(L"Button", L"Display Pass 2 object code", WS_VISIBLE | WS_CHILD, 390, 50, 200, 50, hwnd, (HMENU)5, NULL, NULL);
    hOutputBox = CreateWindowW(L"Edit", L"", WS_VISIBLE | WS_CHILD | WS_BORDER | ES_MULTILINE | ES_AUTOVSCROLL | ES_READONLY, 50, 190, 700, 300, hwnd, NULL, NULL, NULL);
}
void passOne()
{
    FILE *inputFile = fopen("input.txt", "r"), *symtabFile = fopen("symtab.txt", "w"), *intermediateFile = fopen("intermediate.txt", "w");
    if (!inputFile || !symtabFile || !intermediateFile)
    {
        MessageBox(NULL, "Error opening files", "Error", MB_OK | MB_ICONERROR);
        return;
    }
    int locctr, start;
    char label[10], opcode[10], operand[10];
    fscanf(inputFile, "%s %s %s", label, opcode, operand);
    locctr = (strcmp(opcode, "START") == 0) ? strtol(operand, NULL, 16) : 0;
```

```
    start = locctr;
    while (strcmp(opcode, "END") != 0)
    {
        locctr += 3;
        if (strcmp(label, "") != 0) fprintf(symtabFile, "%s %X\n", label, locctr);
        fprintf(intermediateFile, "%04X\t%s\t%s\t%s\n", locctr, label, opcode, operand);
        fscanf(inputFile, "%s %s %s", label, opcode, operand);
    }

    fclose(inputFile);
    fclose(symtabFile);
    fclose(intermediateFile);
    MessageBox(NULL, "Pass 1 completed", "Information", MB_OK | MB_ICONINFORMATION);
}
void passTwo()
{
    FILE *intermediateFile = fopen("intermediate.txt", "r"), *symtabFile = fopen("symtab.txt", "r"),
*objFile = fopen("objcode.txt", "w");
    if (!intermediateFile || !symtabFile || !objFile)
    {
        MessageBox(NULL, "Error opening files", "Error", MB_OK | MB_ICONERROR);
        return;
    }

    int address, symbolAddress, startAddress = 0, programLength = 0;
    char label[10], opcode[10], operand[10];

    fscanf(intermediateFile, "%X %s %s %s", &startAddress, label, opcode, operand);
    address = startAddress;
    programLength += 3;
```

```
fprintf(objFile, "H^%06X^%06X\n", startAddress, programLength);

do
{
   if (strcmp(opcode, "BYTE") == 0)
   {
      fprintf(objFile, "T^%06X^%02X^%s\n", address, strlen(operand) - 3, operand + 2);
      address += 3;
   }
   else if (strcmp(opcode, "WORD") == 0)
   {
      fprintf(objFile, "T^%06X^03^%06X\n", address, atoi(operand));
      address += 3;
   }
   else
   {
      rewind(symtabFile);
      while (fscanf(symtabFile, "%s %X", label, &symbolAddress) != EOF)
      {
         if (strcmp(operand, label) == 0)
         {
            fprintf(objFile, "T^%06X^03^%06X\n", address, symbolAddress);
            address += 3;
            break;
         }
      }
   }
}
while (fscanf(intermediateFile, "%X %s %s %s", &address, label, opcode, operand) != EOF);

fprintf(objFile, "E^%06X\n", startAddress);
```

```
    fclose(intermediateFile);
    fclose(symtabFile);
    fclose(objFile);
    MessageBox(NULL, "Pass 2 completed", "Information", MB_OK | MB_ICONINFORMATION);
}

void displayObjectCode(HWND hwnd)
{
    FILE *intermediateFile, *objFile;
    strcpy(outputBuffer, "Pass 2: Input and Object Code:\r\n");
    strcat(outputBuffer, "------------------------------------------------------------\r\n");
    strcat(outputBuffer, "Input (Address   Label   Opcode   Operand)     Object Code\r\n");
    strcat(outputBuffer, "------------------------------------------------------------\r\n");

    intermediateFile = fopen("intermediate.txt", "r");
    objFile = fopen("objcode.txt", "r");

    if (intermediateFile && objFile)
    {
        char interAddress[10], label[10], opcode[10], operand[10];
        char objLine[100], objCode[20];

        while (fscanf(intermediateFile, "%s %s %s %s", interAddress, label, opcode, operand) != EOF)
        {


            if (strcmp(opcode, "RESW") == 0 || strcmp(opcode, "BYTE") == 0 || strcmp(opcode, "RESB")
== 0)
            {
```

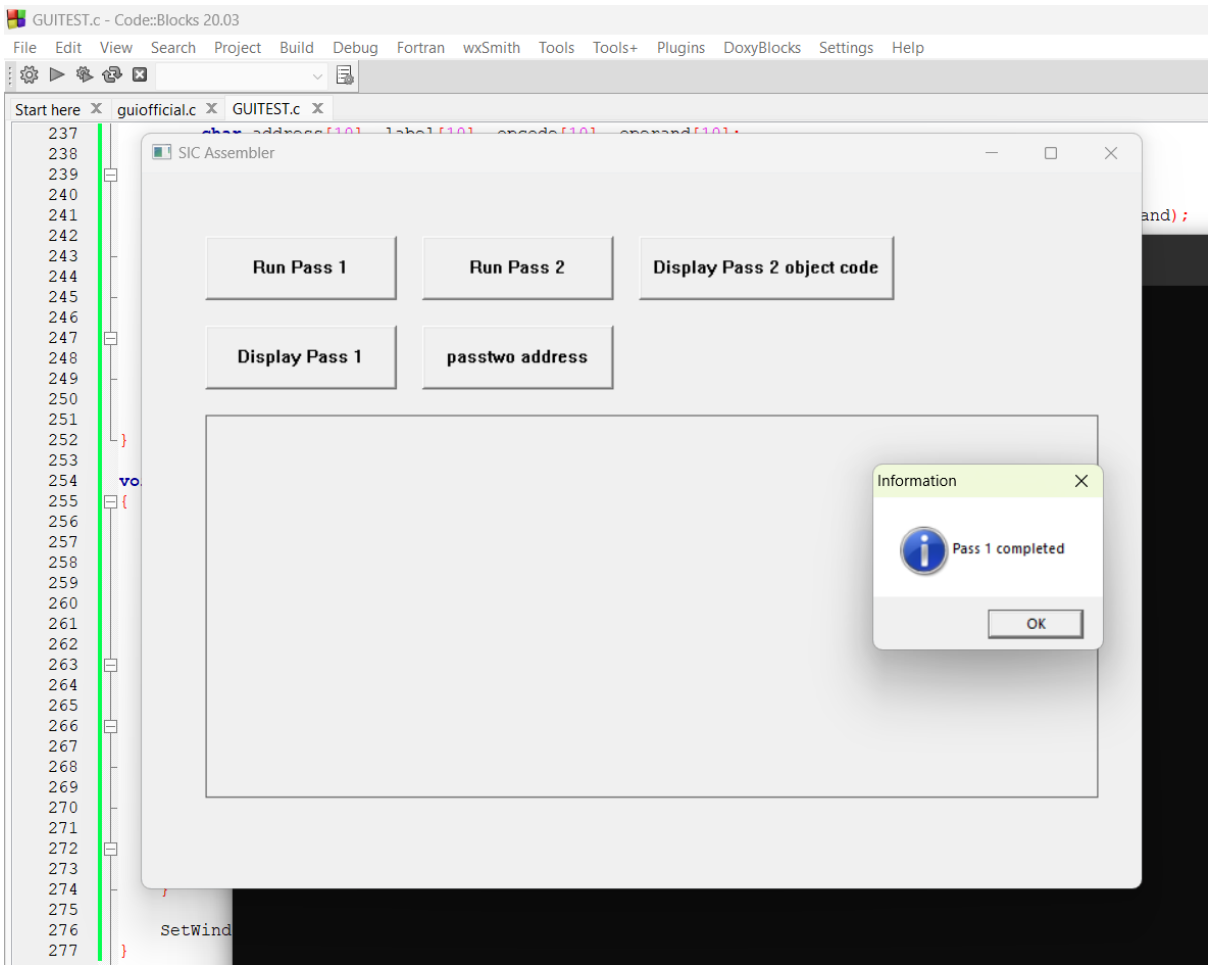
```
    char line[200];
    snprintf(line, sizeof(line), "%-10s %-8s %-8s %-10s      %s\r\n",
            interAddress, label, opcode, operand, "No Obj Code");
    strcat(outputBuffer, line);
}

else if (fgets(objLine, sizeof(objLine), objFile))
{
    if (sscanf(objLine, "T^%*6s^%*2s^%s", objCode) == 1)
    {

        char line[200];
        snprintf(line, sizeof(line), "%-10s %-8s %-8s %-10s      %s\r\n",
                interAddress, label, opcode, operand, objCode);
        strcat(outputBuffer, line);
    }
    else
    {

        char line[200];
        snprintf(line, sizeof(line), "%-10s %-8s %-8s %-10s      %s\r\n",
                interAddress, label, opcode, operand, "Invalid Obj Code");
        strcat(outputBuffer, line);
    }
}
else
{

    char line[200];
    snprintf(line, sizeof(line), "%-10s %-8s %-8s %-10s      %s\r\n",
            interAddress, label, opcode, operand, "No Obj Code");
```

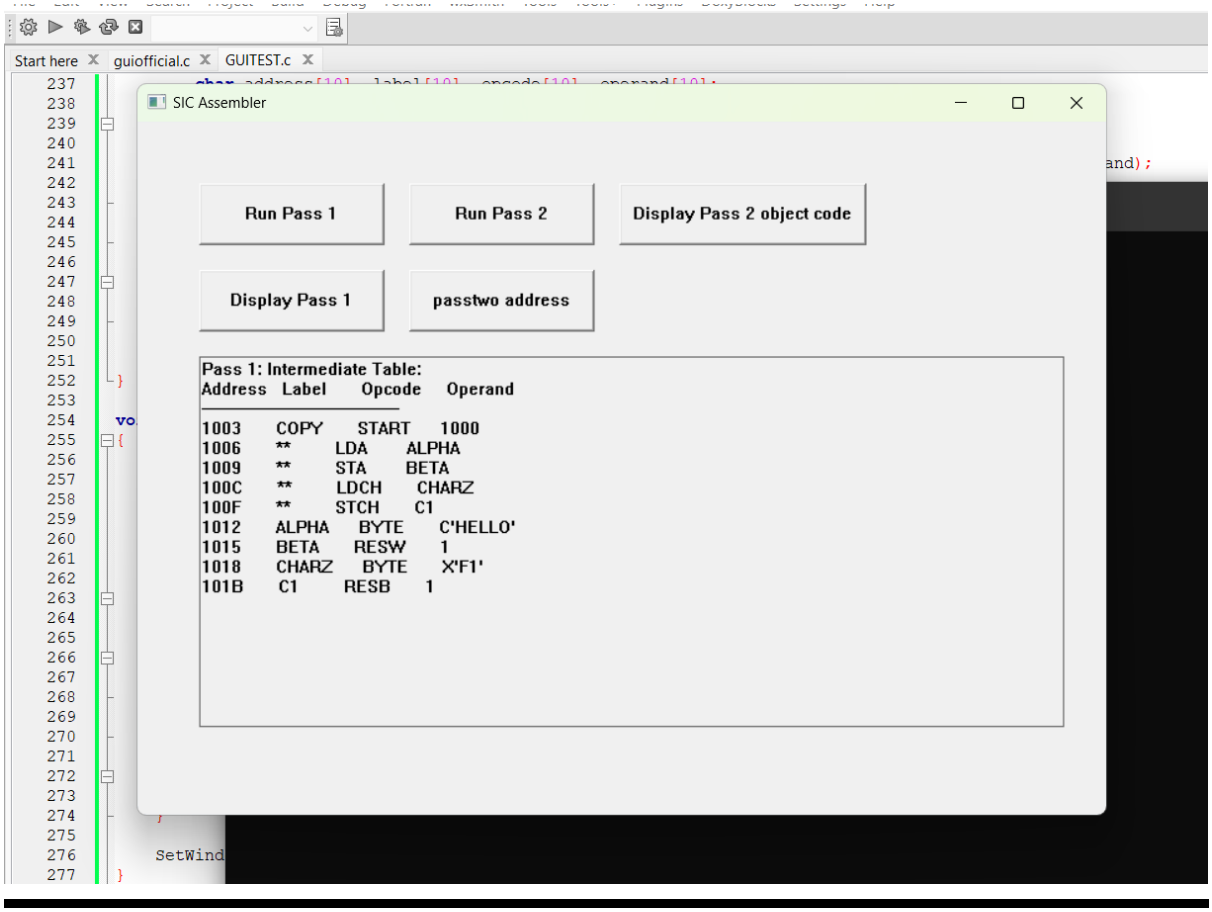
```
            strcat(outputBuffer, line);
        }
    }

    fclose(intermediateFile);
    fclose(objFile);
  }
  else
  {
    if (!intermediateFile)
    {
      strcat(outputBuffer, "Error: intermediate.txt not found.\r\n");
    }
    if (!objFile)
    {
      strcat(outputBuffer, "Error: objcode.txt not found.\r\n");
    }
  }

  SetWindowText(hOutputBox, outputBuffer);
}

void displayPassOne(HWND hwnd)
{
  FILE *file;
  strcpy(outputBuffer, "Pass 1: Intermediate Table:\r\n");
  strcat(outputBuffer, "Address   Label      Opcode     Operand\r\n");
  strcat(outputBuffer, "-----------------------------------\r\n");

  file = fopen("intermediate.txt", "r");
  if (file)
```

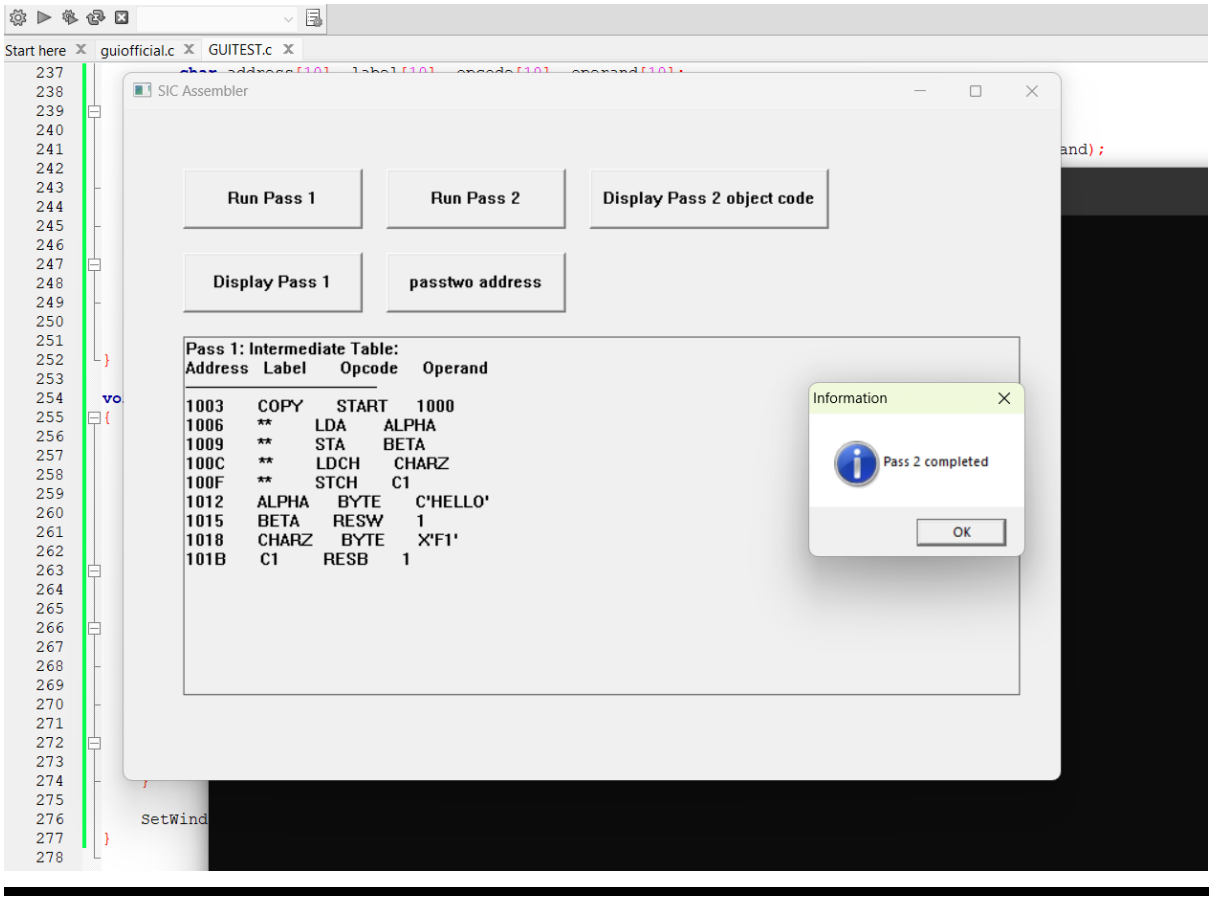
```
    {
        char address[10], label[10], opcode[10], operand[10];
        while (fscanf(file, "%s %s %s %s", address, label, opcode, operand) != EOF)
        {
            char line[100];
            snprintf(line, sizeof(line), "%-10s %-10s %-10s %-10s\r\n", address, label, opcode, operand);
            strcat(outputBuffer, line);
        }
        fclose(file);
    }
    else
    {
        strcat(outputBuffer, "Error: intermediate.txt not found.\r\n");
    }

    SetWindowText(hOutputBox, outputBuffer);
}

void displayPassTwo(HWND hwnd)
{
    FILE *file;
    strcpy(outputBuffer, "Pass 2: Object Code:\r\n");
    strcat(outputBuffer, "Object Code\r\n");
    strcat(outputBuffer, "-------------------------\r\n");

    file = fopen("objcode.txt", "r");
    if (file)
    {
        char line[100];
        while (fgets(line, sizeof(line), file))
        {
```

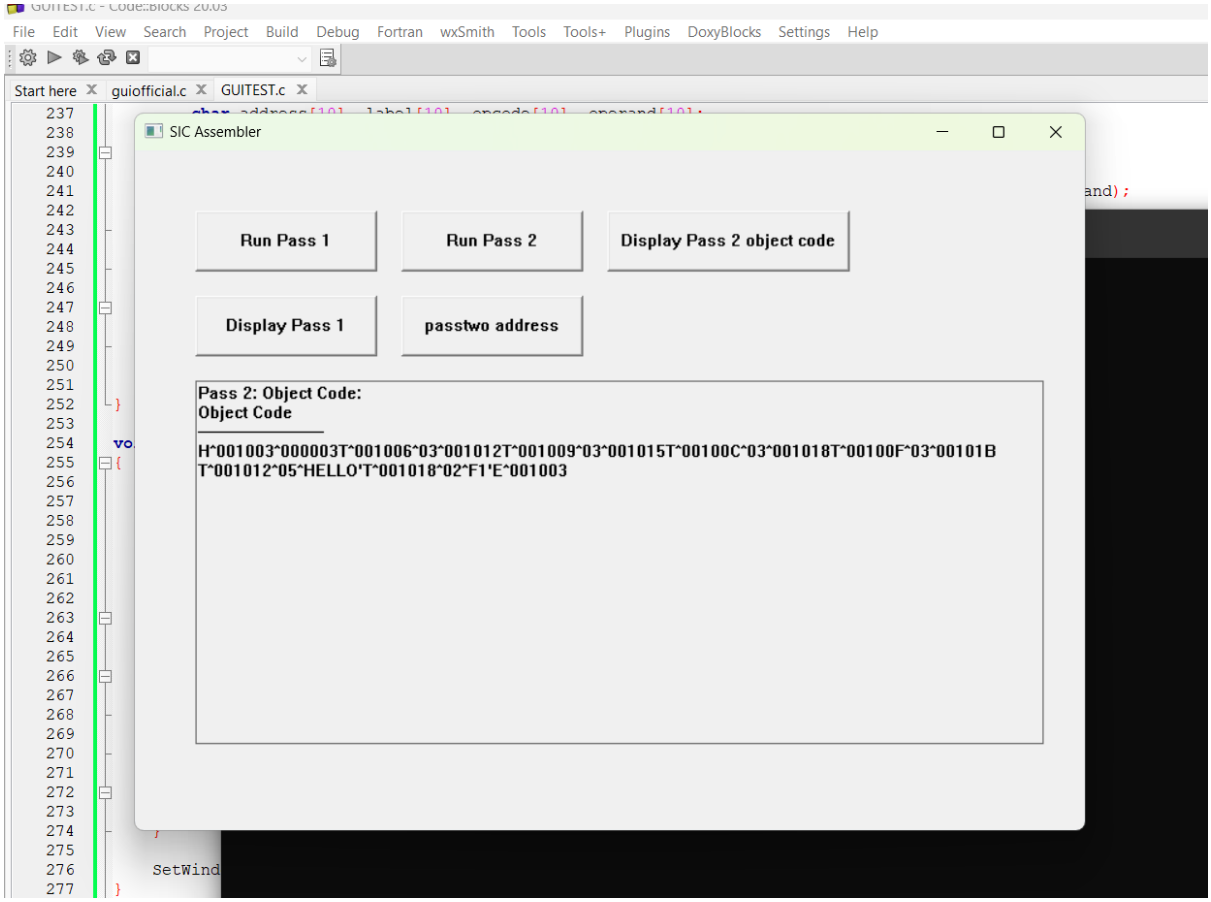
```
            strcat(outputBuffer, line);
        }
        fclose(file);
    }
    else
    {
        strcat(outputBuffer, "Error: objcode.txt not found.\r\n");
    }

    SetWindowText(hOutputBox, outputBuffer);
}
```

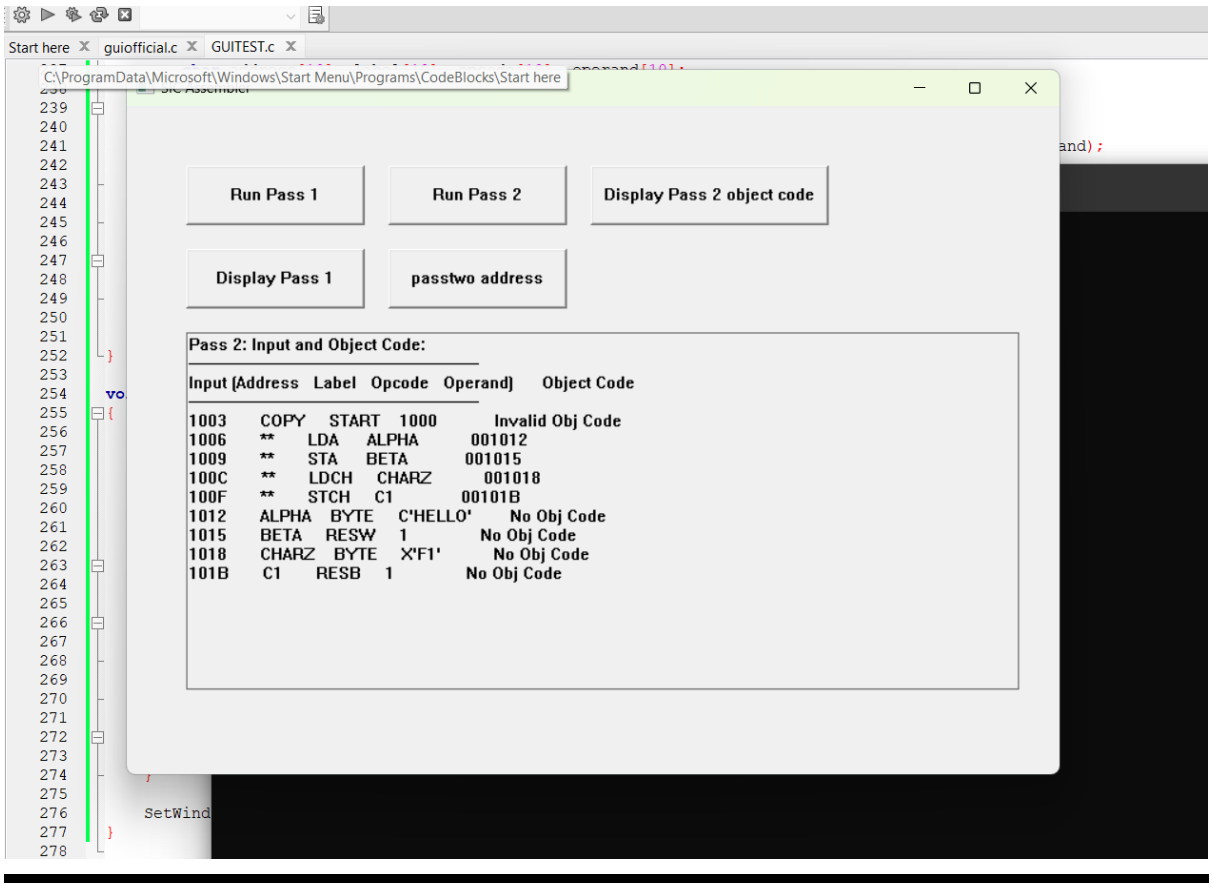
OUTPUT:




Start here
guiofficial.c
GUITEST.c
SIC Assembler
Run Pass 1
Run Pass 2
Display Pass 2 object code
Display Pass 1
passtwo address
Pass 1: Intermediate Table:
Address Label Opcode Operand
1003 COPY START 1000
1006 ** LDA ALPHA
1009 ** STA BETA
100C ** LDCH CHARZ
100F ** STCH C1
1012 ALPHA BYTE C'HELLO'
1015 BETA RESW 1
1018 CHARZ BYTE X'F1'
101B C1 RESB 1


Start here
guiofficial.c
GUITEST.c
SIC Assembler
Run Pass 1
Run Pass 2
Display Pass 2 object code
Display Pass 1
passtwo address
Pass 1: Intermediate Table:
Address Label Opcode Operand
1003 COPY START 1000
1006 ** LDA ALPHA
1009 ** STA BETA
100C ** LDCH CHARZ
100F ** STCH C1
1012 ALPHA BYTE C'HELLO'
1015 BETA RESW 1
1018 CHARZ BYTE X'F1'
101B C1 RESB 1
Information
Pass 2 completed
OK


File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
guiofficial.c
GUITEST.c
SIC Assembler
Run Pass 1
Run Pass 2
Display Pass 2 object code
Display Pass 1
passtwo address
Pass 2: Object Code:
Object Code
H^001003^000003T^001006^03^001012T^001009^03^001015T^00100C^03^001018T^00100F^03^00101B
T^001012^05^HELLO'T^001018^02^F1'E^001003


Start here
guiofficial.c
GUITEST.c
C:\ProgramData\Microsoft\Windows\Start Menu\Programs\CodeBlocks\Start here
Run Pass 1
Run Pass 2
Display Pass 2 object code
Display Pass 1
passtwo address
Pass 2: Input and Object Code:
Input (Address Label Opcode Operand) Object Code
1003 COPY START 1000 Invalid Obj Code
1006 ** LDA ALPHA 001012
1009 ** STA BETA 001015
100C ** LDCH CHARZ 001018
100F ** STCH C1 00101B
1012 ALPHA BYTE C'HELLO' No Obj Code
1015 BETA RESW 1 No Obj Code
1018 CHARZ BYTE X'F1' No Obj Code
101B C1 RESB 1 No Obj Code

GITHUB LINK:

https://github.com/AleenaVarghese04/GUI-SIC-ASSEMBLER/blob/main/README.md?plain=1

ALEENA VARGHESE

CSEA 25

****