LAB 1.C----------

Objective:

The objective of this lab is to copy the given instructions that will give the result by storing a phrase “Welcome to CSCI 320!!!” in a memory location, the goal of the assignment is to better understand and interact with the SBC680000 board to store data into memory and execute the program

Procedure:

First we assigned some values (A-Z, a-z, and 0-9) to some memory location using code or the easy68k instruction set. Instructions are given such that the address 2200 would contain “Welcome to CSCI 320!!!” when program is executed.

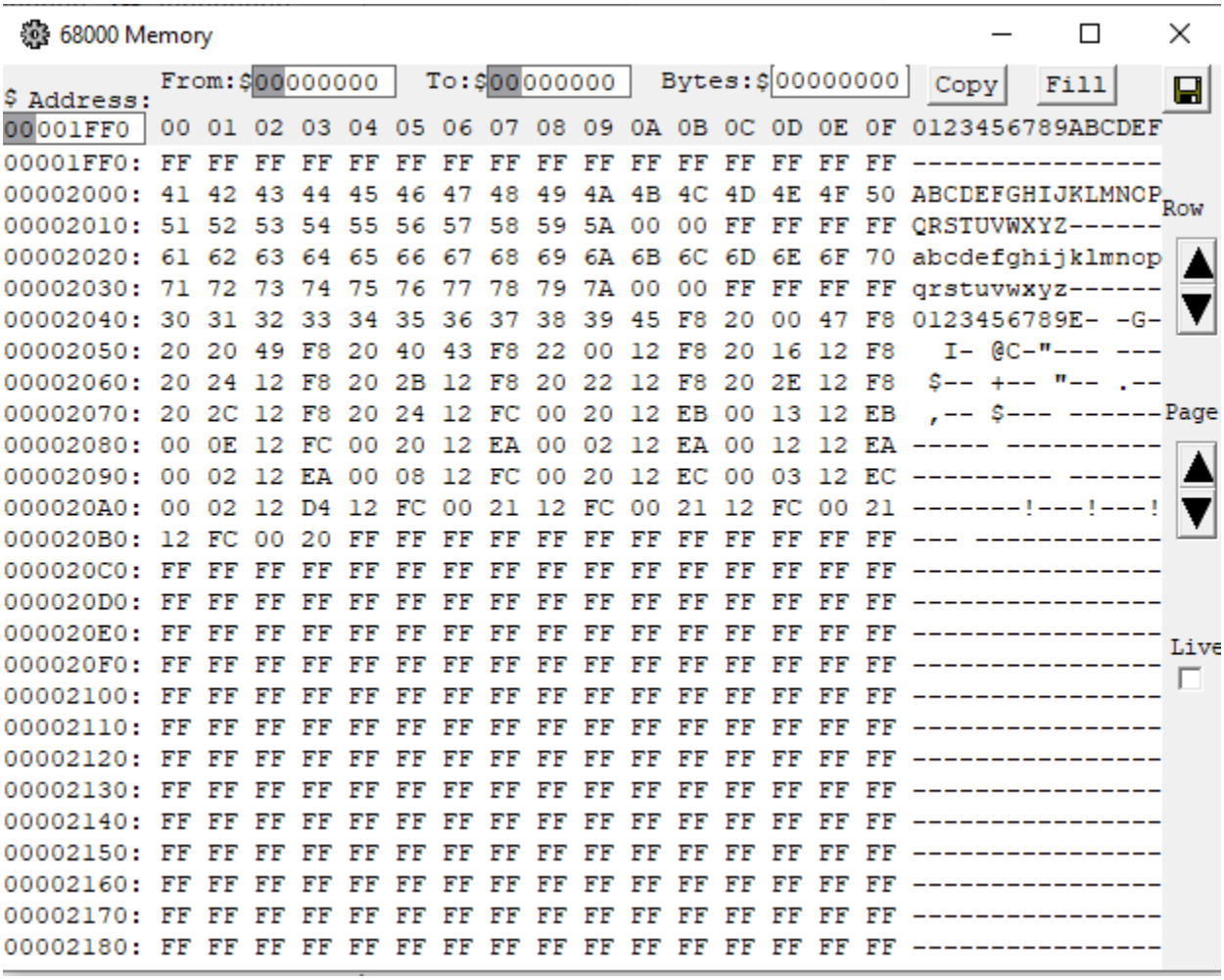
Program Description:

This program stores uppercase letters starting from $00002000 memory location, lowercase from $00002020, and numbers from $00002040. The code is used to display “Welcome to CSCI 320!!!”

Source File:

```
*-----------------------------------------------------------
* Title      : Lab 1.C
* Written by : Dalton Wright
* Date       : 01/21/2021
* Description: This program prints "Welcome to CSCI320".
*-----------------------------------------------------------

   ORG    $2000
    DC.L 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
    ORG    $2020
    DC.L 'abcdefghijklmnopqrstuvwxyz'
    ORG    $2040
    DC.W '0123456789'

START:
    LEA.L  $002000,A2
    LEA.L  $002020,A3
    LEA.L  $002040,A4
    LEA.L  $002200,A1

    MOVE.B $002016,(A1)+
    MOVE.B $002024,(A1)+
    MOVE.B $00202B,(A1)+
    MOVE.B $002022,(A1)+
    MOVE.B $00202E,(A1)+
    MOVE.B $00202C,(A1)+
    MOVE.B $002024,(A1)+
    MOVE.B #32,(A1)+
    MOVE.B 19(A3) ,(A1)+
    MOVE.B 14(A3) ,(A1)+
    MOVE.B #32,(A1)+
    MOVE.B 2(A2) ,(A1)+
    MOVE.B 18(A2) ,(A1)+
    MOVE.B 2(A2) ,(A1)+
    MOVE.B 8(A2) ,(A1)+
    MOVE.B #32,(A1)+
    MOVE.B 3(A4) ,(A1)+
    MOVE.B 2(A4) ,(A1)+
    MOVE.B (A4) ,(A1)+
    MOVE.B #33,(A1)+
    MOVE.B #33,(A1)+
    MOVE.B #33,(A1)+
    MOVE.B #32,(A1)+

    SIMHALT             ; halt simulator

    END    START        ; last line of source
```

Memory before execution:



Memory after execution:

```
68000 Memory
$ Address:  From:$00000000   To:$00000000   Bytes:$00000000   Copy   Fill
00002090  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF
00002090: 00 02 12 EA 00 08 12 FC 00 20 12 EC 00 03 12 EC --------- ------
000020A0: 00 02 12 D4 12 FC 00 21 12 FC 00 21 12 FC 00 21 -------!---!---!
000020B0: 12 FC 00 20 FF FF FF FF FF FF FF FF FF FF FF FF --- ------------
000020C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000020D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000020E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000020F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002100: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002110: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002120: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002130: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002140: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002150: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002160: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002170: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002180: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002190: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000021F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

Lab 1.C Log-Trace:

EASy68K execution log file: 1/21/2021 2:46:41 PM

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------

D0=00000000 D4=00000000 A0=00000000 A4=00000000 T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000204A Code=45F8 2000 Line= 15 LEA.L $002000,A2

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------

D0=00000000 D4=00000000 A0=00000000 A4=00000000 T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000204E Code=47F8 2020 Line= 16 LEA.L $002020,A3

```
00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002052  Code=49F8 2040            Line=   17      LEA.L   $002040,A4

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002056  Code=43F8 2200            Line=   18      LEA.L   $002200,A1

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002200 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000205A  Code=12F8 2016            Line=   20      MOVE.B  $002016,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002201 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000205E  Code=12F8 2024            Line=   21      MOVE.B  $002024,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
```

```
D1=00000000 D5=00000000 A1=00002202 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002062  Code=12F8 202B            Line=   22      MOVE.B  $00202B,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002203 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002066  Code=12F8 2022            Line=   23      MOVE.B  $002022,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002204 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
```

```
PC=0000206A  Code=12F8 202E            Line=   24      MOVE.B  $00202E,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002205 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000206E  Code=12F8 202C            Line=   25      MOVE.B  $00202C,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002206 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002072  Code=12F8 2024            Line=   26      MOVE.B  $002024,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
```

```
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002207 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002076  Code=12FC 0020            Line=   27      MOVE.B  #32,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002208 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000207A  Code=12EB 0013            Line=   28      MOVE.B  19(A3) ,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002209 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000207E  Code=12EB 000E            Line=   29      MOVE.B  14(A3) ,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000220A A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002082  Code=12FC 0020            Line=   30      MOVE.B  #32,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000220B A5=00000000 SR=0010000000000000
```

```
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002086  Code=12EA 0002            Line=   31      MOVE.B  2(A2) ,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000220C A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=0000208A  Code=12EA 0012            Line=   32      MOVE.B  18(A2) ,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000220D A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=0000208E  Code=12EA 0002            Line=   33      MOVE.B  2(A2) ,(A1)+
```

```
00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000220E A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002092  Code=12EA 0008            Line=   34      MOVE.B  8(A2) ,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000220F A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002096  Code=12FC 0020            Line=   35      MOVE.B  #32,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
```

```
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002210 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000209A  Code=12EC 0003            Line=   36      MOVE.B  3(A4) ,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002211 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000209E  Code=12EC 0002            Line=   37      MOVE.B  2(A4) ,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002212 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020A2  Code=12D4                Line=   38      MOVE.B  (A4) ,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002213 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020A4  Code=12FC 0021           Line=   39      MOVE.B  #33,(A1)+

00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI
00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002214 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
```

```
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020A8  Code=12FC 0021            Line=   40      MOVE.B  #33,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002215 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020AC  Code=12FC 0021            Line=   41      MOVE.B  #33,(A1)+


00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002216 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020B0  Code=12FC 0020            Line=   42      MOVE.B  #32,(A1)+
```

```
00002200: 57 65 6C 63 6F 6D 65 20 74 6F 20 43 53 43 49 20 Welcome to CSCI

00002210: 33 32 30 21 21 21 20 FF FF FF FF FF FF FF FF FF 320!!! ---------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002217 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020B4  Code=FFFF FFFF            Line=   45      SIMHALT            ; halt simulator
```

LAB 1.O----------

Objective:

The objective of this lab is to copy the given instructions from Lab 1.C and manipulate using address register direct, address register indirect, post-increment, pre-decrement, and displacement in order to store your name starting at memory location $2100, and also store a SSN at memory location $2160, the goal of the assignment is to better understand and interact with the SBC680000 board to store data into memory and execute the program while getting a expected output using a variety of address register commands.

Procedure:

First we assigned some values (A-Z, a-z, and 0-9) to some memory location using code or the easy68k instruction set. Instructions are given such that the address $2100 would contain your name and address $2160 would contain a social security number when the program is executed.

Program Description:

This program stores uppercase letters starting from $00002000 memory location, lowercase from $00002020, and numbers from $00002040. The code is used to display your name and a social security number in two separate locations. The program is to use multiple different addressing modes.

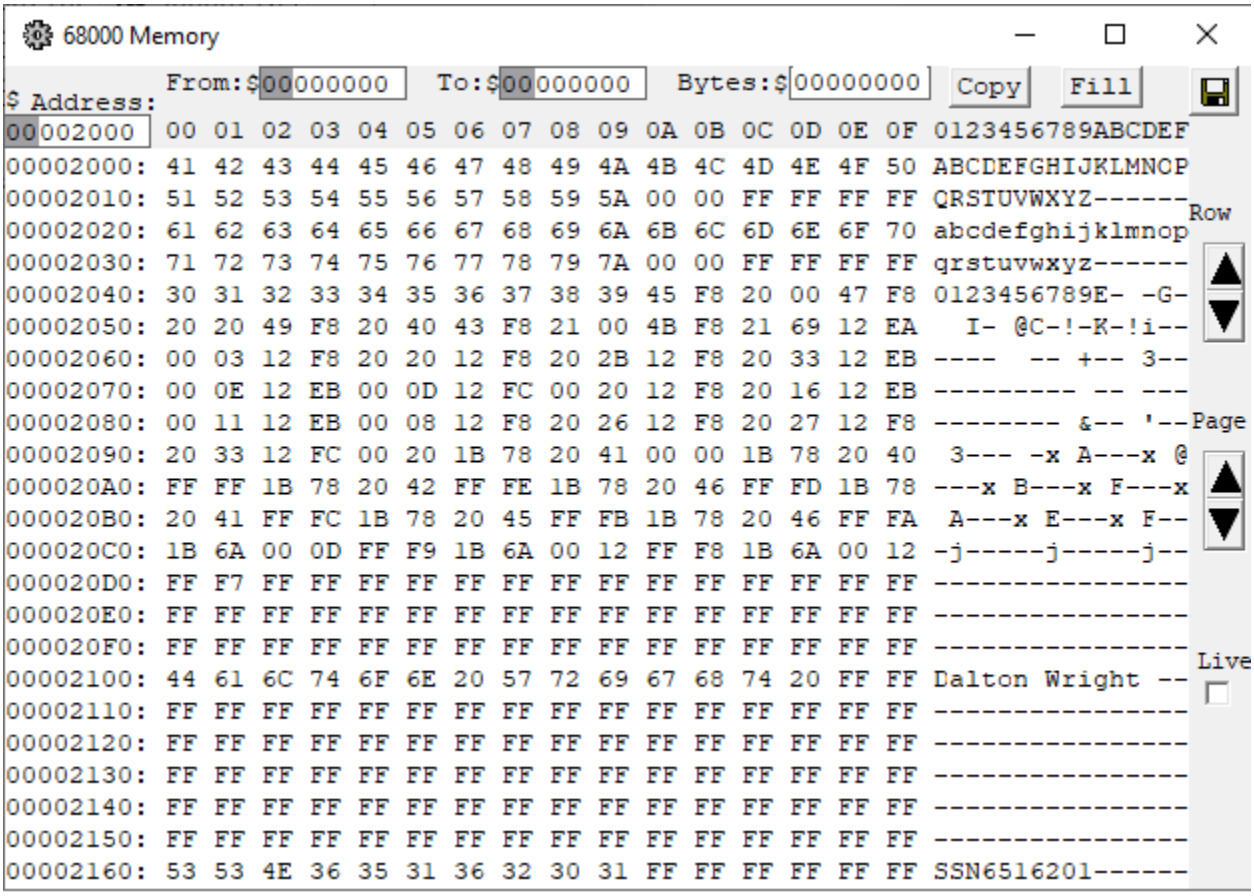
Source File:

```
*-----------------------------------------------------------
* Title      : Lab 1.0
* Written by : Dalton Wright
* Date       : 01/29/2021
* Description: This program stores my name at location $2100, and
*              stores a SSN at location $2160.
*-----------------------------------------------------------
    ORG    $2000
    DC.L 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
    ORG    $2020
    DC.L 'abcdefghijklmnopqrstuvwxyz'
    ORG    $2040
    DC.W '0123456789'

START:                  ; first instruction of program
    LEA.L   $00002000,A2
    LEA.L   $00002020,A3
    LEA.L   $00002040,A4
    LEA.L   $00002100,A1
    LEA.L   $00002169,A5

    MOVE.B  3(A2),(A1)+         *D
    MOVE.B  $00002020,(A1)+     *a
    MOVE.B  $0000202B,(A1)+     *l
    MOVE.B  $00002033,(A1)+     *t
    MOVE.B  14(A3),(A1)+        *o
    MOVE.B  13(A3),(A1)+        *n

    MOVE.B  #32,(A1)+

    MOVE.B  $00002016,(A1)+     *W
    MOVE.B  17(A3),(A1)+        *r
    MOVE.B  8(A3),(A1)+         *i
    MOVE.B  $00002026,(A1)+     *g
    MOVE.B  $00002027,(A1)+     *h
    MOVE.B  $00002033,(A1)+     *t

    MOVE.B  #32,(A1)+

    MOVE.B  $00002041,-0(A5)    *S
    MOVE.B  $00002040,-1(A5)    *S
    MOVE.B  $00002042,-2(A5)    *N
    MOVE.B  $00002046,-3(A5)    *6
    MOVE.B  $00002041,-4(A5)    *5
    MOVE.B  $00002045,-5(A5)    *1
    MOVE.B  $00002046,-6(A5)    *6
    MOVE.B  13(A2),-7(A5)       *2
    MOVE.B  18(A2),-8(A5)       *0
    MOVE.B  18(A2),-9(A5)       *1

* Put program code here
    SIMHALT             ; halt simulator
* Put variables and constants here

    END    START        ; last line of source
```

Memory before execution:

```
68000 Memory
$ Address:  From:$00000000  To:$00000000  Bytes:$00000000  Copy  Fill
00002000  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF
00002000: 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 ABCDEFGHIJKLMNOP
00002010: 51 52 53 54 55 56 57 58 59 5A 00 00 FF FF FF FF QRSTUVWXYZ------
00002020: 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E 6F 70 abcdefghijklmnop
00002030: 71 72 73 74 75 76 77 78 79 7A 00 00 FF FF FF FF qrstuvwxyz------
00002040: 30 31 32 33 34 35 36 37 38 39 45 F8 20 00 47 F8 0123456789E- -G-
00002050: 20 20 49 F8 20 40 43 F8 21 00 4B F8 21 69 12 EA   I- @C-!-K-!i--
00002060: 00 03 12 F8 20 20 12 F8 20 2B 12 F8 20 33 12 EB ----  -- +-- 3--
00002070: 00 0E 12 EB 00 0D 12 FC 00 20 12 F8 20 16 12 EB --------- -- ---
00002080: 00 11 12 EB 00 08 12 F8 20 26 12 F8 20 27 12 F8 -------- &-- '--
00002090: 20 33 12 FC 00 20 1B 78 20 41 00 00 1B 78 20 40  3--- -x A---x @
000020A0: FF FF 1B 78 20 42 FF FE 1B 78 20 46 FF FD 1B 78 ---x B---x F---x
000020B0: 20 41 FF FC 1B 78 20 45 FF FB 1B 78 20 46 FF FA  A---x E---x F--
000020C0: 1B 6A 00 0D FF F9 1B 6A 00 12 FF F8 1B 6A 00 12 -j-----j-----j--
000020D0: FF F7 FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000020E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000020F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002100: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002110: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002120: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002130: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002140: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002150: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002160: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
Row
Page
Live
```

Memory after execution:



Lab 1.O Log-Trace:

EASy68K execution log file: 1/29/2021 5:38:53 PM

```
00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000204A  Code=45F8 2000            Line=   16      LEA.L   $00002000,A2

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000204E  Code=47F8 2020            Line=   17      LEA.L   $00002020,A3
```

```
00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002052  Code=49F8 2040            Line=   18      LEA.L   $00002040,A4

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002056  Code=43F8 2100            Line=   19      LEA.L   $00002100,A1

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000205A  Code=4BF8 2169            Line=   20      LEA.L   $00002169,A5

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002100 A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000205E  Code=12EA 0003            Line=   22      MOVE.B  3(A2),(A1)+        *D

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002101 A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002062  Code=12F8 2020            Line=   23      MOVE.B  $00002020,(A1)+     *a


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002102 A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002066  Code=12F8 202B            Line=   24      MOVE.B  $0000202B,(A1)+     *l


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002103 A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
```

```
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=0000206A  Code=12F8 2033            Line=   25      MOVE.B  $00002033,(A1)+     *t


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002104 A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=0000206E  Code=12EB 000E            Line=   26      MOVE.B  14(A3),(A1)+       *o


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00002105 A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=00002072  Code=12EB 000D            Line=   27      MOVE.B  13(A3),(A1)+       *n
```

```
00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002106 A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002076  Code=12FC 0020            Line=   29      MOVE.B  #32,(A1)+

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002107 A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000207A  Code=12F8 2016            Line=   31      MOVE.B  $00002016,(A1)+     *W

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002108 A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000207E  Code=12EB 0011            Line=   32      MOVE.B  17(A3),(A1)+       *r

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002109 A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002082  Code=12EB 0008            Line=   33      MOVE.B  8(A3),(A1)+        *i

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
```

```
D1=00000000 D5=00000000 A1=0000210A A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002086  Code=12F8 2026            Line=   34      MOVE.B  $00002026,(A1)+     *g

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210B A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000208A  Code=12F8 2027            Line=   35      MOVE.B  $00002027,(A1)+     *h

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210C A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
```

```
PC=0000208E  Code=12F8 2033          Line=   36     MOVE.B  $00002033,(A1)+    *t

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210D A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002092  Code=12FC 0020          Line=   38     MOVE.B  #32,(A1)+

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=00002096  Code=1B78 2041 0000       Line=   41     MOVE.B  $00002041,-0(A5)    *S

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=0000209C  Code=1B78 2040 FFFF        Line=   42      MOVE.B  $00002040,-1(A5)    *S

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020A2  Code=1B78 2042 FFFE        Line=   43      MOVE.B  $00002042,-2(A5)    *N

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020A8  Code=1B78 2046 FFFD        Line=   44      MOVE.B  $00002046,-3(A5)    *6

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020AE  Code=1B78 2041 FFFC        Line=   45      MOVE.B  $00002041,-4(A5)    *5

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
```

```
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020B4  Code=1B78 2045 FFFB        Line=   46      MOVE.B  $00002045,-5(A5)    *1


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020BA  Code=1B78 2046 FFFA        Line=   47      MOVE.B  $00002046,-6(A5)    *6


00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020C0  Code=1B6A 000D FFF9        Line=   48      MOVE.B  13(A2),-7(A5)       *2
```

```
00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020C6  Code=1B6A 0012 FFF8        Line=   49      MOVE.B  18(A2),-8(A5)       *0

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000
D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000
PC=000020CC  Code=1B6A 0012 FFF7        Line=   50      MOVE.B  18(A2),-9(A5)       *1

00002200: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00002210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

```
00002220: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------

00002230: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------


D0=00000000 D4=00000000 A0=00000000 A4=00002040    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=0000210E A5=00002169 SR=0010000000000000

D2=00000000 D6=00000000 A2=00002000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00002020 A7=01000000 SS=01000000

PC=000020D2  Code=FFFF FFFF            Line=   54      SIMHALT            ; halt simulator
```

LAB 2.C----------

Objective:

The objective of this lab is to study step by step the processing of the data registers and address registers with different memory partitions and using a variety of different addressing modes like pre-decrement and post-increment.

Procedure:

First we assigned we load up our effective addresses and assign specified values for specific address registers, then move memory locations to different data registers. Once the memory setup is complete we load our memory addresses locations and assign them the specified values or contents given in the lab and load our contents into data register.

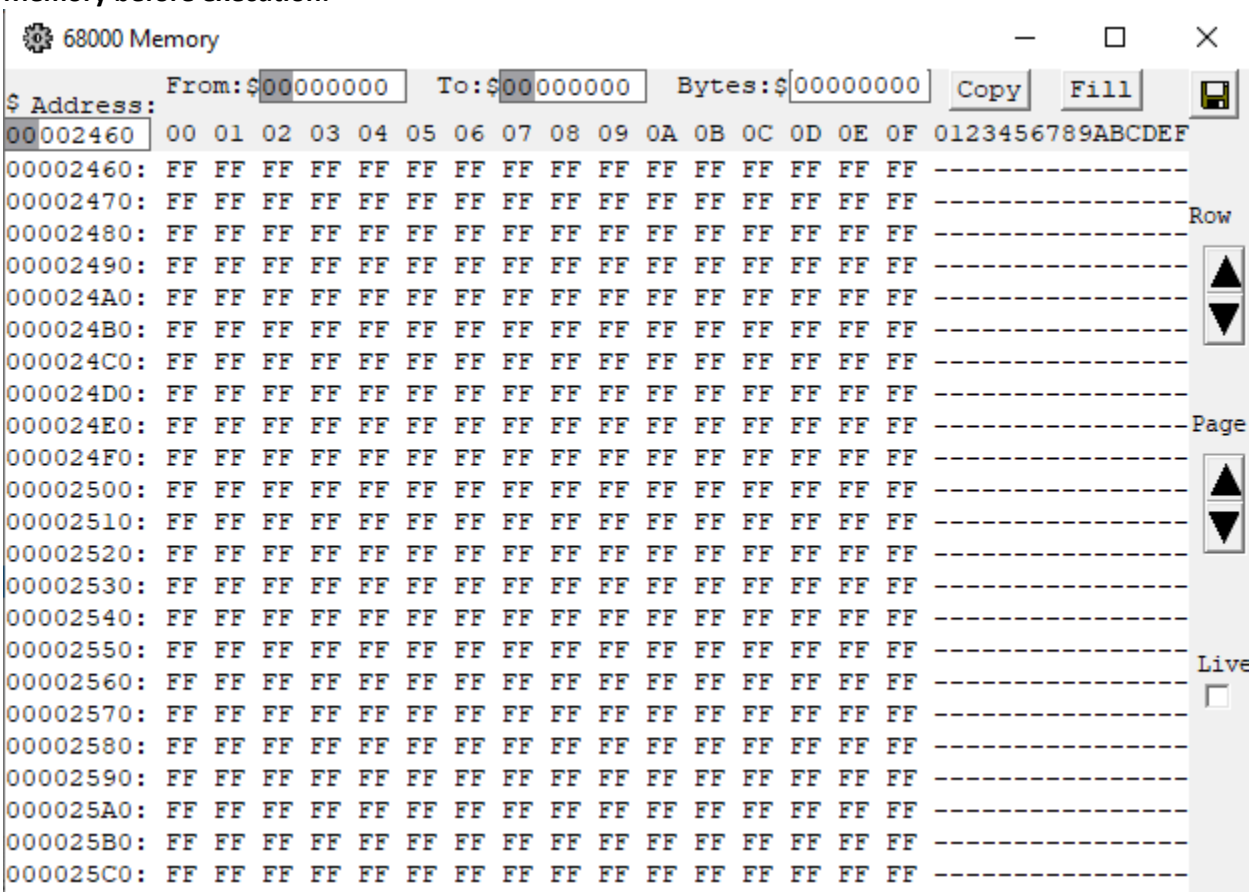
Program Description:

This program simulates an experiment that helps to understand memory partitions and using different addressing modes and allows step by step tracing for each instruction with what is happening inside the memory locations and the registers themselves. The program uses locations $2518-$2556.

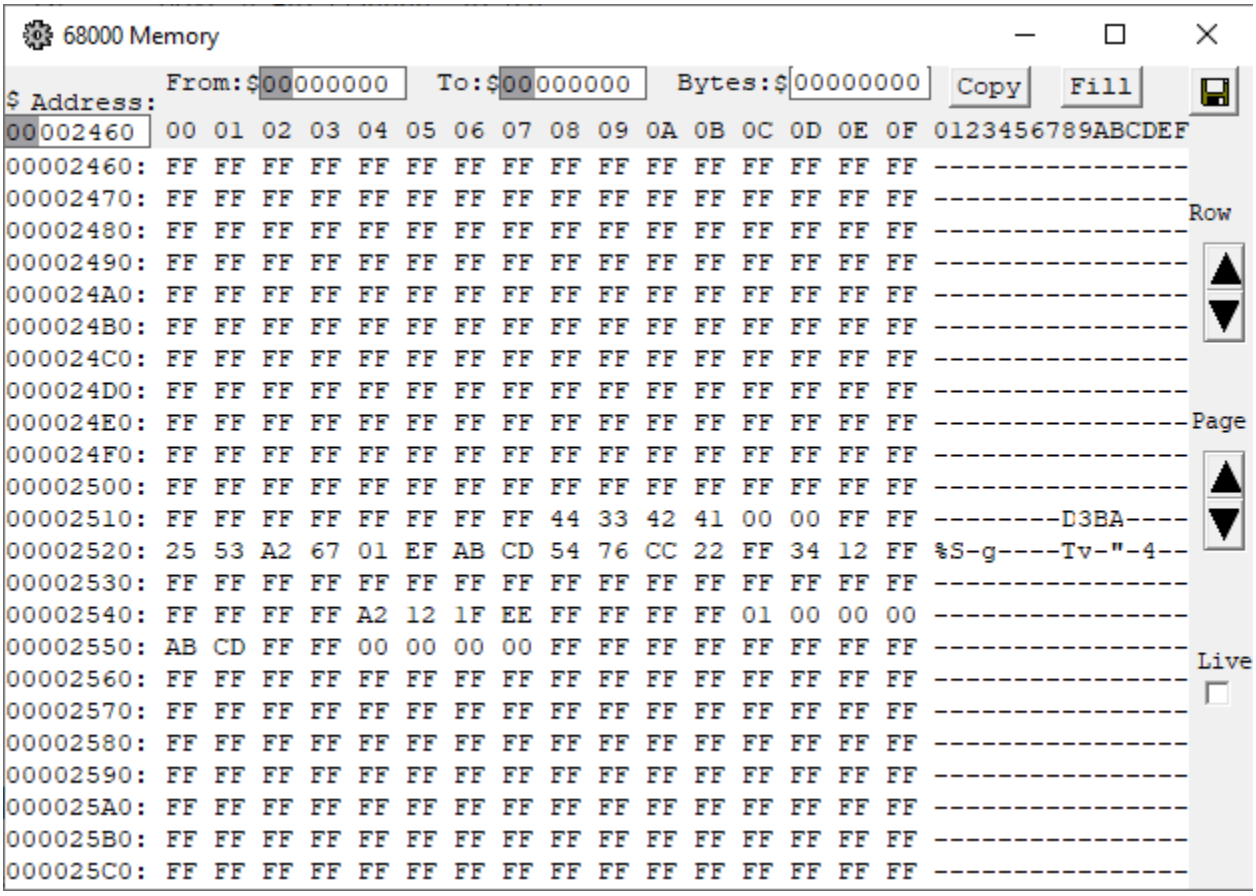
Source File:

```
*-----------------------------------------------------------
* Title      : Lab 2.C
* Written by : Dalton Wright
* Date       : 01/06/2021
* Description: This program loads info into memory locations and
*              address/data registers using addressing modes.
*-----------------------------------------------------------
    ORG    $2000
    DC.L 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
    ORG    $2020
    DC.L 'abcdefghijklmnopqrstuvwxyz'
    ORG    $2040
    DC.W '0123456789'
START:

    LEA.L $002468FA,A3
    LEA.L $00002544,A4
    LEA.L $00002518,A6

    MOVE.L #$00000000,D3
    MOVE.L #$FFFFFFFF,D5
    MOVE.L #$00000000,D6

    MOVE.L #$44334241, $2518
    MOVE.L #$00000000, $251C
    MOVE.L #$25530000, $2520
    MOVE.L #$01EFABCD, $2524
    MOVE.L #$5476CC22, $2528
    MOVE.L #$FF3412FF, $252C

    MOVE.L #$A2671FEE, $2544
    MOVE.L #$FFFFFFFF, $2548
    MOVE.L #$01000000, $254C
    MOVE.L #$ABCDFFFF, $2550
    MOVE.L #$00000000, $2554

    MOVE.B  3(A6),D3
    MOVE.W  4(A4),6(A6)
    MOVE.L  (A6)+,D5
    MOVE.W  (A4)+,$002522
    MOVE.B  $00252E,-(A4)
    LEA.L   $00252A,A3
    MOVE.W  (A3),D6

* Put program code here

    SIMHALT             ; halt simulator

* Put variables and constants here

    END    START        ; last line of source
```

Memory before execution:



Memory after execution:



Lab 2.C Log-Trace:

EASy68K execution log file: 2/6/2021 6:34:46 PM

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000204A  Code=47F9 002468FA         Line=   16      LEA.L $002468FA,A3


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002050  Code=49F8 2544             Line=   17      LEA.L $00002544,A4


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002054  Code=4DF8 2518             Line=   18      LEA.L $00002518,A6


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002058  Code=7600                  Line=   20      MOVE.L #$00000000,D3


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000205A  Code=7AFF                  Line=   21      MOVE.L #$FFFFFFFF,D5


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
```

```
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000205C  Code=7C00                Line=   22      MOVE.L #$00000000,D6


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000205E  Code=21FC 44334241 2518     Line=   24      MOVE.L #$44334241, $2518


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002066  Code=21FC 00000000 251C     Line=   25      MOVE.L #$00000000, $251C


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000206E  Code=21FC 25530000 2520     Line=   26      MOVE.L #$25530000, $2520


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002076  Code=21FC 01EFABCD 2524     Line=   27      MOVE.L #$01EFABCD, $2524


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000207E  Code=21FC 5476CC22 2528     Line=   28      MOVE.L #$5476CC22, $2528


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
```

```
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002086  Code=21FC FF3412FF 252C     Line=   29      MOVE.L #$FF3412FF, $252C


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000208E  Code=21FC A2671FEE 2544     Line=   31      MOVE.L #$A2671FEE, $2544


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=00002096  Code=21FC FFFFFFFF 2548     Line=   32      MOVE.L #$FFFFFFFF, $2548


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=0000209E  Code=21FC 01000000 254C     Line=   33      MOVE.L #$01000000, $254C


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020A6  Code=21FC ABCDFFFF 2550     Line=   34      MOVE.L #$ABCDFFFF, $2550


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020AE  Code=21FC 00000000 2554     Line=   35      MOVE.L #$00000000, $2554


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
```

```
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000000 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020B6  Code=162E 0003            Line=   37      MOVE.B  3(A6),D3


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000041 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020BA  Code=3D6C 0004 0006        Line=   38      MOVE.W  4(A4),6(A6)


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=FFFFFFFF A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00002518 US=00FF0000
D3=00000041 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020C0  Code=2A1E                 Line=   39      MOVE.L  (A6)+,D5


D0=00000000 D4=00000000 A0=00000000 A4=00002544    T_S__INT___XNZVC
D1=00000000 D5=44334241 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=0000251C US=00FF0000
D3=00000041 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020C2  Code=31DC 2522            Line=   40      MOVE.W  (A4)+,$002522


D0=00000000 D4=00000000 A0=00000000 A4=00002546    T_S__INT___XNZVC
D1=00000000 D5=44334241 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=0000251C US=00FF0000
D3=00000041 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020C6  Code=1938 252E            Line=   41      MOVE.B  $00252E,-(A4)


D0=00000000 D4=00000000 A0=00000000 A4=00002545    T_S__INT___XNZVC
D1=00000000 D5=44334241 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=0000251C US=00FF0000
D3=00000041 D7=00000000 A3=002468FA A7=01000000 SS=01000000
PC=000020CA  Code=47F8 252A            Line=   42      LEA.L   $00252A,A3


D0=00000000 D4=00000000 A0=00000000 A4=00002545    T_S__INT___XNZVC
```

```
D1=00000000 D5=44334241 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=0000251C US=00FF0000
D3=00000041 D7=00000000 A3=0000252A A7=01000000 SS=01000000
PC=000020CE  Code=3C13                Line=   43      MOVE.W  (A3),D6


D0=00000000 D4=00000000 A0=00000000 A4=00002545    T_S__INT___XNZVC
D1=00000000 D5=44334241 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=0000CC22 A2=00000000 A6=0000251C US=00FF0000
D3=00000041 D7=00000000 A3=0000252A A7=01000000 SS=01000000
PC=000020D0  Code=FFFF FFFF           Line=   47      SIMHALT           ; halt simulator
```

LAB 2.O----------
Objective:

The objective of this lab is to store a user defined vector “A-J” at location $004AC4 and using relative addressing modes reverse the vector beginning at location $004ACE.

Procedure:

First we loaded our effective address $00000000 into address register A0, then LEA our wanted start position of our created vector with program counter into A0. Then moving copies of the locations into our data registers we can reverse the vector so the vector reads “J-A”.

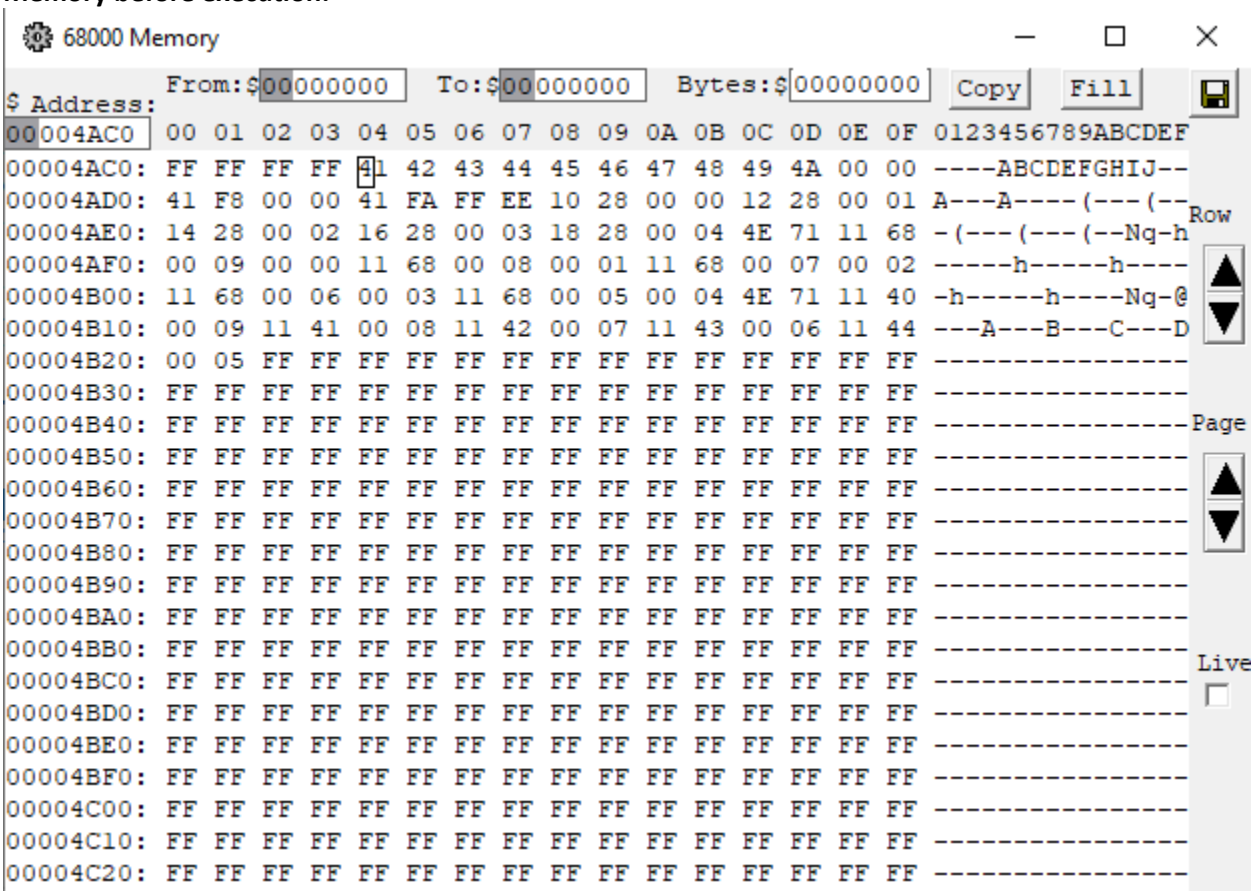
Program Description:

This program simulates an experiment that helps to understand how to manipulate the locations of a stored vector and using data registers to reverse the vector.

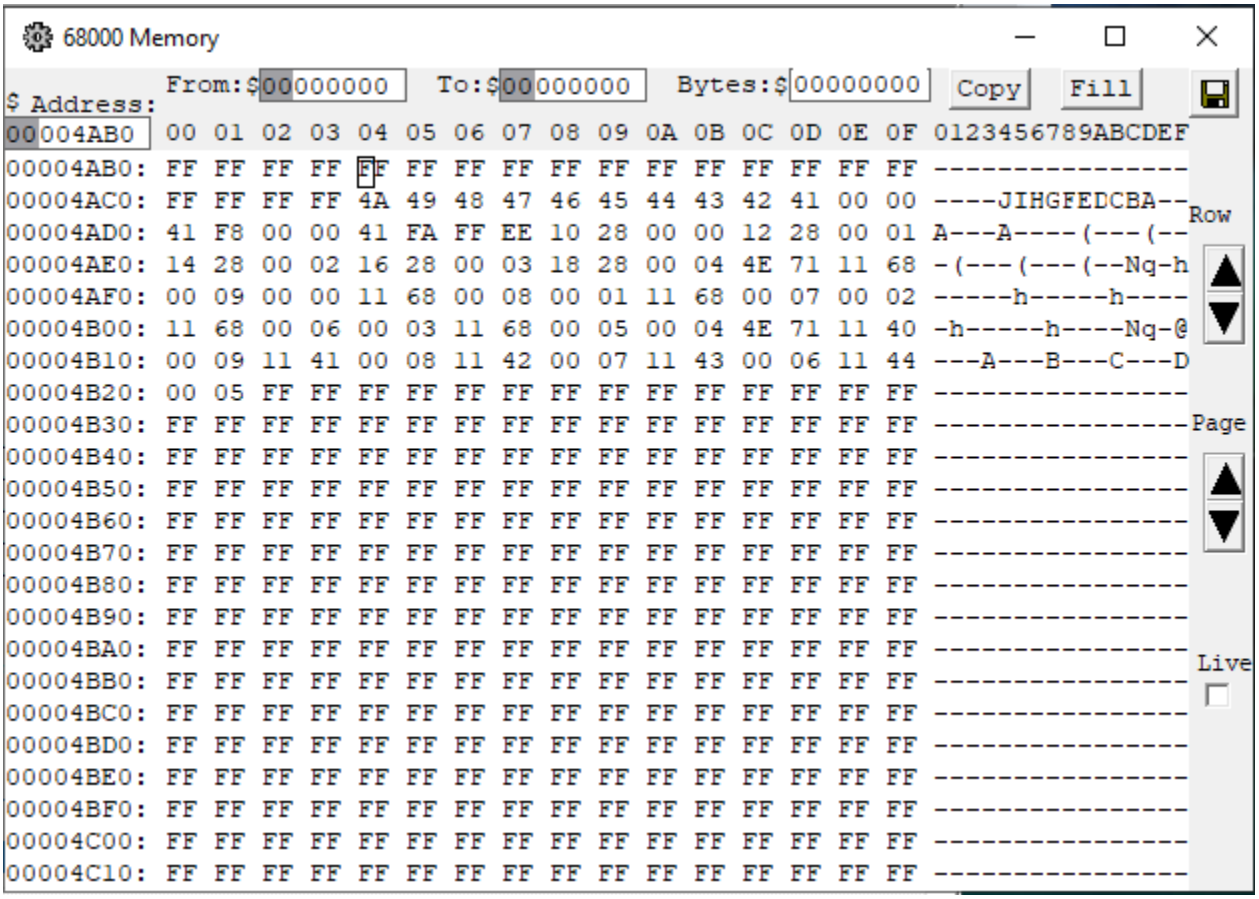
Source File:

```
*-----------------------------------------------------------
* Title      : Lab 2.0
* Written by : Dalton Wright
* Date       : 02/19/2021
* Description: This program reverses vector.
*-----------------------------------------------------------
    ORG    $4AC4
    DC.L   'ABCDEFGHIJ'

START:                  ; first instruction of program
    LEA.L   $00000000,A0
    LEA.L   $004AC4(PC),A0
    MOVE.B  0(A0),D0
    MOVE.B  1(A0),D1
    MOVE.B  2(A0),D2
    MOVE.B  3(A0),D3
    MOVE.B  4(A0),D4
    NOP
    MOVE.B  9(A0),0(A0)
    MOVE.B  8(A0),1(A0)
    MOVE.B  7(A0),2(A0)
    MOVE.B  6(A0),3(A0)
    MOVE.B  5(A0),4(A0)

    NOP
    MOVE.B  D0,9(A0)
    MOVE.B  D1,8(A0)
    MOVE.B  D2,7(A0)
    MOVE.B  D3,6(A0)
    MOVE.B  D4,5(A0)


* Put program code here

    SIMHALT             ; halt simulator

* Put variables and constants here

    END    START        ; last line of source
```

Memory before execution:



Memory after execution:



Lab 2.O Log-Trace:

EASy68K execution log file: 2/19/2021 2:36:07 PM

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AD0  Code=41F8 0000            Line=   11      LEA.L   $00000000,A0

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AD4  Code=41FA FFEE            Line=   12      LEA.L   $004AC4(PC),A0

D0=00000000 D4=00000000 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AD8  Code=1028 0000            Line=   13      MOVE.B  0(A0),D0

D0=00000041 D4=00000000 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
```

```
PC=00004ADC  Code=1228 0001          Line=   14     MOVE.B  1(A0),D1

D0=00000041 D4=00000000 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AE0  Code=1428 0002          Line=   15     MOVE.B  2(A0),D2

D0=00000041 D4=00000000 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AE4  Code=1628 0003          Line=   16     MOVE.B  3(A0),D3

D0=00000041 D4=00000000 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AE8  Code=1828 0004          Line=   17     MOVE.B  4(A0),D4

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AEC  Code=4E71               Line=   18     NOP
```

```
D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AEE  Code=1168 0009 0000        Line=   19      MOVE.B  9(A0),0(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AF4  Code=1168 0008 0001        Line=   20      MOVE.B  8(A0),1(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004AFA  Code=1168 0007 0002        Line=   21      MOVE.B  7(A0),2(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B00  Code=1168 0006 0003        Line=   22      MOVE.B  6(A0),3(A0)
```

```
D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B06  Code=1168 0005 0004        Line=   23      MOVE.B  5(A0),4(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B0C  Code=4E71                  Line=   25      NOP

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B0E  Code=1140 0009             Line=   26      MOVE.B  D0,9(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B12  Code=1141 0008             Line=   27      MOVE.B  D1,8(A0)
```

```
D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B16  Code=1142 0007            Line=   28      MOVE.B  D2,7(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B1A  Code=1143 0006            Line=   29      MOVE.B  D3,6(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B1E  Code=1144 0005            Line=   30      MOVE.B  D4,5(A0)

D0=00000041 D4=00000045 A0=00004AC4 A4=00000000    T_S__INT___XNZVC
D1=00000042 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000043 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000044 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00004B22  Code=FFFF FFFF            Line=   35      SIMHALT           ; halt simulator
```

LAB 3.C----------
Objective:

The objective of this lab is to study memory partitions and addressing modes.

Procedure:

First we loaded our effective address $00002100 into A1, after initializing all of the required address and data registers, then we setup our memory partitions from $00002100-$0000211C, then perform the labs instruction set.

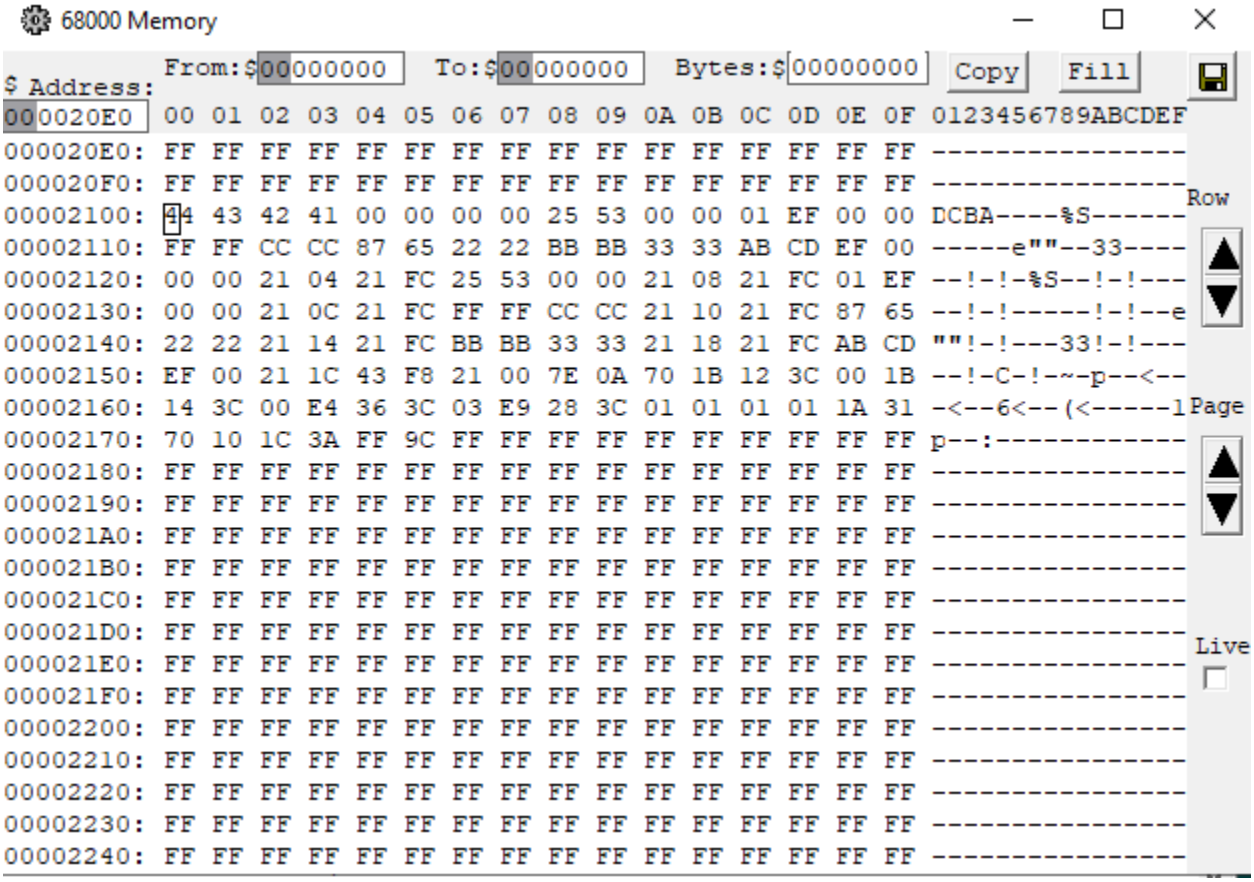
Program Description:

This program simulates an experiment that helps to understand how to manipulate the initializations of the registers and memory partitions.

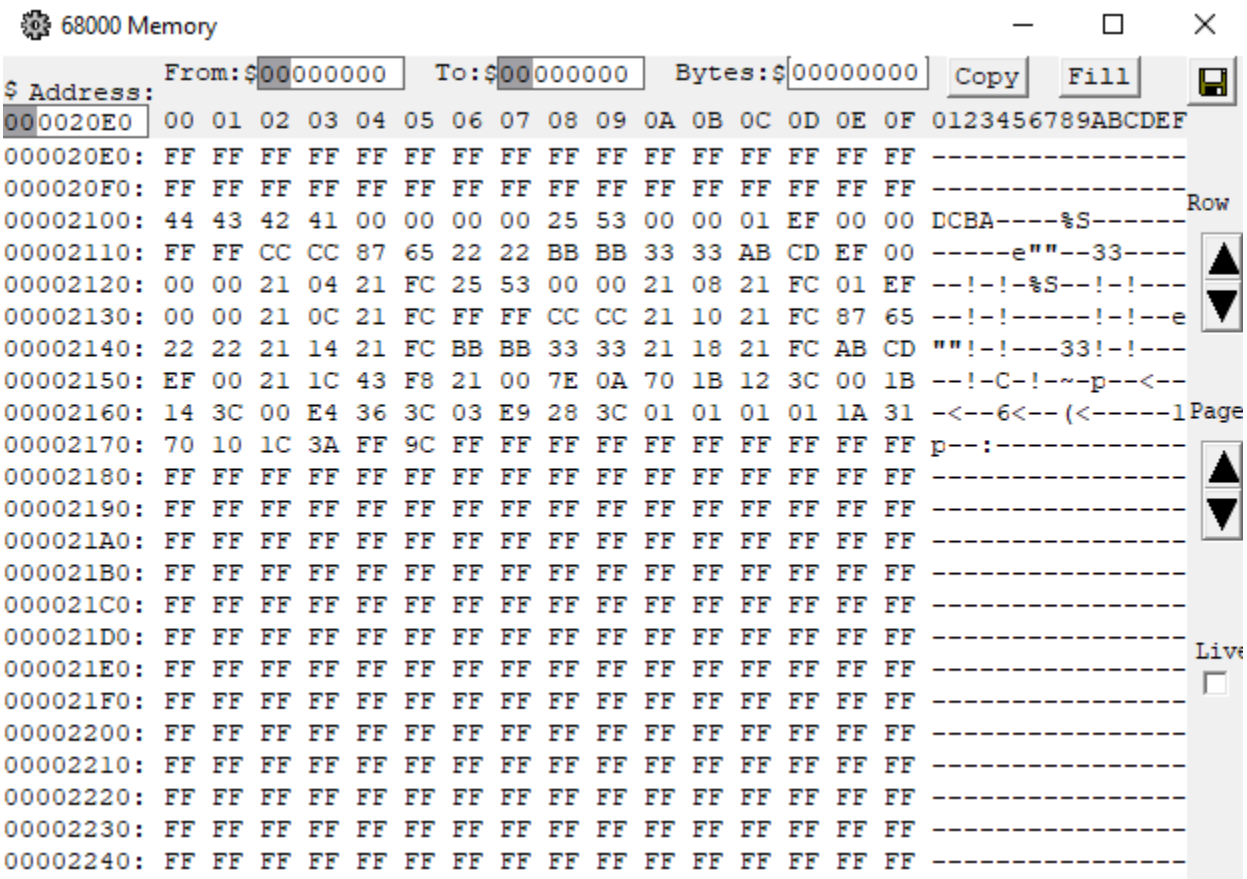
Source File:

```
*-----------------------------------------------------------
* Title      : Lab 3.C
* Written by : Dalton Wright
* Date       : 02/26/2021
* Description: More addressing modes, use of memory partitions.
*-----------------------------------------------------------
    ORG    $2100
START:

    LEA.L $00000000,A1

    MOVE.L #$00000000,D0
    MOVE.L #$00000000,D1
    MOVE.L #$00000000,D2
    MOVE.L #$00000000,D3
    MOVE.L #$00000000,D4
    MOVE.L #$00000000,D5
    MOVE.L #$00000000,D6
    MOVE.L #$00000000,D7

    MOVE.L #$44434241, $2100
    MOVE.L #$00000000, $2104
    MOVE.L #$25530000, $2108
    MOVE.L #$01EF0000, $210C
    MOVE.L #$FFFFCCCC, $2110
    MOVE.L #$87652222, $2114
    MOVE.L #$BBBB3333, $2118
    MOVE.L #$ABCDEF00, $211C

    LEA  $002100,A1

    MOVE.L  #10,D7
    MOVEQ   #27,D0
    MOVE.B  #27,D1
    MOVE.B  #-28,D2
    MOVE.W  #1001,D3
    MOVE.L  #$01010101,D4
    MOVE.B  16(A1,D7),D5
    MOVE.B  $002110(PC),D6


* Put program code here

    SIMHALT             ; halt simulator

* Put variables and constants here

    END    START        ; last line of source
```

Memory before execution:



Memory after execution:



Lab 3.C Log-Trace:

EASy68K execution log file: 2/26/2021 6:39:20 PM

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002100  Code=43F8 0000            Line=    9      LEA.L $00000000,A1

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002104  Code=7000                 Line=   11      MOVE.L #$00000000,D0

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002106  Code=7200                 Line=   12      MOVE.L #$00000000,D1

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002108  Code=7400                 Line=   13      MOVE.L #$00000000,D2

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000210A  Code=7600                 Line=   14      MOVE.L #$00000000,D3

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000210C  Code=7800                 Line=   15      MOVE.L #$00000000,D4
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000210E  Code=7A00                Line=   16      MOVE.L #$00000000,D5

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002110  Code=7C00                Line=   17      MOVE.L #$00000000,D6

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002112  Code=7E00                Line=   18      MOVE.L #$00000000,D7

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002114  Code=21FC 44434241 2100     Line=   20      MOVE.L #$44434241, $2100

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000211C  Code=21FC 00000000 2104     Line=   21      MOVE.L #$00000000, $2104

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002124  Code=21FC 25530000 2108     Line=   22      MOVE.L #$25530000, $2108

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
```

```
PC=0000212C  Code=21FC 01EF0000 210C     Line=   23      MOVE.L #$01EF0000, $210C

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002134  Code=21FC FFFFCCCC 2110     Line=   24      MOVE.L #$FFFFCCCC, $2110

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000213C  Code=21FC 87652222 2114     Line=   25      MOVE.L #$87652222, $2114

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002144  Code=21FC BBBB3333 2118     Line=   26      MOVE.L #$BBBB3333, $2118

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000214C  Code=21FC ABCDEF00 211C     Line=   27      MOVE.L #$ABCDEF00, $211C

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002154  Code=43F8 2100              Line=   29      LEA  $002100,A1

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002100 A5=00000000 SR=0010000000001000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00002158  Code=7E0A                   Line=   31      MOVE.L  #10,D7

D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=0000000A A3=00000000 A7=01000000 SS=01000000
```

```
PC=0000215A  Code=701B              Line=   32      MOVEQ   #27,D0


D0=0000001B D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=0000215C  Code=123C 001B            Line=   33      MOVE.B  #27,D1

D0=0000001B D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=00002160  Code=143C 00E4            Line=   34      MOVE.B  #-28,D2

D0=0000001B D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000000 A1=00002100 A5=00000000 SR=0010000000001000
D2=000000E4 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=00002164  Code=363C 03E9            Line=   35      MOVE.W  #1001,D3

D0=0000001B D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=000000E4 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=000003E9 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=00002168  Code=283C 01010101        Line=   36      MOVE.L  #$01010101,D4

D0=0000001B D4=01010101 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000000 A1=00002100 A5=00000000 SR=0010000000000000
D2=000000E4 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=000003E9 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=0000216E  Code=1A31 7010            Line=   37      MOVE.B  16(A1,D7),D5

D0=0000001B D4=01010101 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000033 A1=00002100 A5=00000000 SR=0010000000000000
D2=000000E4 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=000003E9 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=00002172  Code=1C3A FF9C            Line=   38      MOVE.B  $002110(PC),D6

D0=0000001B D4=01010101 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=0000001B D5=00000033 A1=00002100 A5=00000000 SR=0010000000001000
D2=000000E4 D6=000000FF A2=00000000 A6=00000000 US=00FF0000
```

```
D3=000003E9 D7=0000000A A3=00000000 A7=01000000 SS=01000000
PC=00002176  Code=FFFF FFFF            Line=   43      SIMHALT            ; halt simulator
```

LAB 5.C----------

Objective:

The objective of this lab is to study the use of pointer types and linked data structures.

Procedure:

First we move our data into different memory locations stated by the instructions of the lab, we the load effective addresses into address registers A1-A6, and use a pointer going to A5 between the two.

Program Description:

This program simulates an experiment that helps to understand the use of a pointer and linked list data structure in the x68 instruction set.

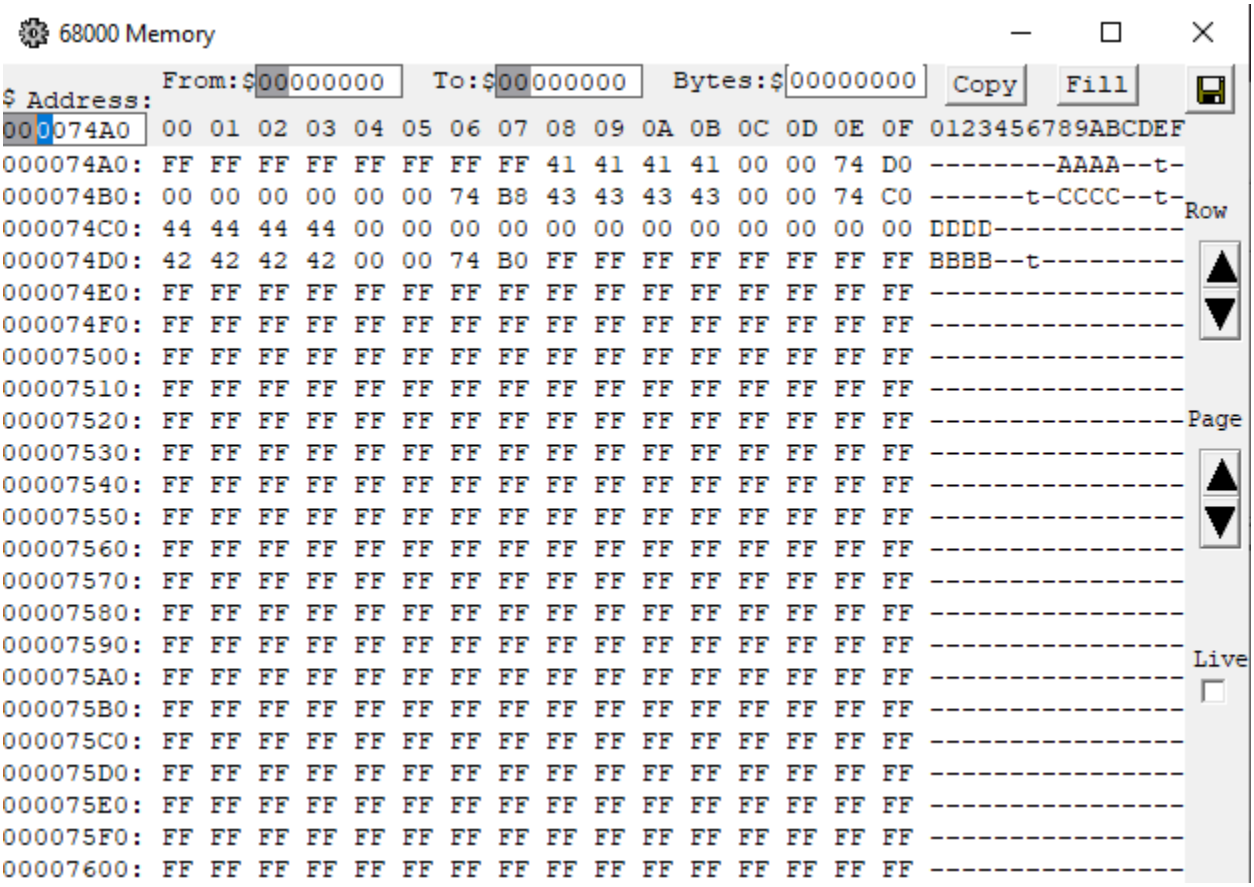
Source File:

```
*-----------------------------------------------------------
* Title      : Lab 5.C
* Written by : Dalton Wright
* Date       : 03/20/2021
* Description: Pointers and Linked Data Structures
*-----------------------------------------------------------
    ORG    $1000
START:                  ; first instruction of program
    MOVE.L #$41414141, $74A8
    MOVE.L #$000074D0, $74AC
    MOVE.L #$00000000, $74B0
    MOVE.L #$00000000, $74B4
    MOVE.L #$43434343, $74B8
    MOVE.L #$000074C0, $74BC
    MOVE.L #$44444444, $74C0
    MOVE.L #$00000000, $74C4
    MOVE.L #$00000000, $74C8
    MOVE.L #$00000000, $74CC
    MOVE.L #$42424242, $74D0
    MOVE.L #$000074B8, $74D4

    LEA.L $00000000,A1
    LEA.L $00000000,A2
    LEA.L $00000000,A6
    LEA.L $00000000,A5
    LEA.L $00000000,A3

    LEA.L  $0074A8,A6
    MOVE.L 4(A6),A1
    MOVE.L 4(A1),A2
    LEA.L  $000074B0,A5
    MOVE.L A2,4(A5)
    MOVE.L A5,4(A1)

* Put program code here

    SIMHALT             ; halt simulator

* Put variables and constants here

    END    START        ; last line of source
```

Memory before execution:

```
68000 Memory
$ Address:  From:$00000000  To:$00000000  Bytes:$00000000  Copy  Fill
000074A0  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF
000074A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000074B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000074C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000074D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000074E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000074F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007500: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007510: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007520: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007530: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007540: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007550: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007560: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007570: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007580: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007590: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000075F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00007600: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
Row
Page
Live
```

Memory after execution:



Lab 3.C Log-Trace:

EASy68K execution log file: 3/20/2021 2:20:06 PM

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001000  Code=21FC 41414141 74A8     Line=    9      MOVE.L #$41414141, $74A8
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001008  Code=21FC 000074D0 74AC     Line=   10      MOVE.L #$000074D0, $74AC
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001010  Code=21FC 00000000 74B0     Line=   11      MOVE.L #$00000000, $74B0
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001018  Code=21FC 00000000 74B4     Line=   12      MOVE.L #$00000000, $74B4
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001020  Code=21FC 43434343 74B8     Line=   13      MOVE.L #$43434343, $74B8
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001028  Code=21FC 000074C0 74BC     Line=   14      MOVE.L #$000074C0, $74BC
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
```

```
PC=00001030  Code=21FC 44444444 74C0     Line=   15      MOVE.L #$44444444, $74C0


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001038  Code=21FC 00000000 74C4     Line=   16      MOVE.L #$00000000, $74C4


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001040  Code=21FC 00000000 74C8     Line=   17      MOVE.L #$00000000, $74C8


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001048  Code=21FC 00000000 74CC     Line=   18      MOVE.L #$00000000, $74CC


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
```

```
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001050  Code=21FC 42424242 74D0     Line=   19      MOVE.L #$42424242, $74D0



D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001058  Code=21FC 000074B8 74D4     Line=   20      MOVE.L #$000074B8, $74D4



D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001060  Code=43F8 0000             Line=   22      LEA.L $00000000,A1



D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001064  Code=45F8 0000             Line=   23      LEA.L $00000000,A2
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001068  Code=4DF8 0000            Line=   24      LEA.L $00000000,A6


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000106C  Code=4BF8 0000            Line=   25      LEA.L $00000000,A5


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001070  Code=47F8 0000            Line=   26      LEA.L $00000000,A3


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
```

```
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001074  Code=4DF8 74A8            Line=   28      LEA.L  $0074A8,A6


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=000074A8 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001078  Code=226E 0004            Line=   29      MOVE.L 4(A6),A1


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=000074D0 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=00000000 A6=000074A8 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000107C  Code=2469 0004            Line=   30      MOVE.L 4(A1),A2


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=000074D0 A5=00000000 SR=0010000000000000

D2=00000000 D6=00000000 A2=000074B8 A6=000074A8 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001080  Code=4BF8 74B0            Line=   31      LEA.L  $000074B0,A5
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=000074D0 A5=000074B0 SR=0010000000000000
D2=00000000 D6=00000000 A2=000074B8 A6=000074A8 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001084  Code=2B4A 0004            Line=   32      MOVE.L A2,4(A5)
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=000074D0 A5=000074B0 SR=0010000000000000
D2=00000000 D6=00000000 A2=000074B8 A6=000074A8 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001088  Code=234D 0004            Line=   33      MOVE.L A5,4(A1)
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=000074D0 A5=000074B0 SR=0010000000000000
D2=00000000 D6=00000000 A2=000074B8 A6=000074A8 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000108C  Code=FFFF FFFF            Line=   37      SIMHALT            ; halt simulator
```

LAB 4.O----------

Objective:

The objective of this lab is to use Hamming technique for encoding and decoding information to enable detection and correction.

Procedure:

First we have our 4bits (abcd) and we want the parity bits (rst) these bits are known as the check bits, the resulting outcome is abcrdst .

Program Description:

This program simulates use of Hamming encode and decode algorithm.

Source File:

```
*-----------------------------------------------------------
* Title      : Lab 4.0 Hamming Code
* Written by : Dalton Wright
* Date       : 03/26/2021
* Description: Hamming Code Algorithm
*-----------------------------------------------------------
       ORG    $1000
START:                  ; first instruction of program

    MOVE.L #0, D2
    MOVE.L #0, D3
    MOVE.L #0, D4
    MOVE.L #0, D5
    MOVE.L #0, D6
    MOVE.L #0, D7
    MOVE.B #11,$00002400
    LEA.L  $00002400,A0
    MOVE.B (A0),D1
    MOVE.L #1,D1
    MOVE.L #2,D2
    MOVE.L #4,D3
    MOVE.L #8,D4
    MOVE.L #16,D5
    MOVE.L #32,D6
    MOVE.L #64,D7

    AND.L  D0,D1
    AND.L  D0,D2
    AND.L  D0,D3
    AND.L  D0,D4
    AND.L  D0,D5
    AND.L  D0,D6
    AND.L  D0,D7

    AND.W  D1,D2
    AND.W  D1,D3
    AND.W  D1,D4
    AND.W  D1,D5

    LSR.W #1,D2
    LSR.W #2,D3
    LSR.W #3,D4
    LSR.W #4,D5
    LSR.W #5,D6
    LSR.W #6,D7


    EOR.W D7, D4
    EOR.W D6, D4
    EOR.W D5, D4
    EOR.W D7, D2
    EOR.W D6, D2
    EOR.W D3, D2
    EOR.W D7, D1
    EOR.W D5, D1
```

```
    EOR.W D3, D1

    MOVE.B D4,D0
    LSL.W #1, D0

    EOR.W D2, D0
    LSL.W #1, D0

    EOR.W D1, D0

* Put program code here
    SIMHALT             ; halt simulator
* Put variables and constants here
    END    START        ; last line of source
```

Memory after execution:

C:\Users\Dalton\Desktop\Spring 2021\CSCI 320 - Computer Architecture 2\Labs\Lab #7\Lab 4.O.S68

File Search Run View Options Help

Registers

D0= 00000000	D4= 00000000	A0= 00002400	A4= 00000000		T S INT XNZVC		Cycles
D1= 00000000	D5= 00000000	A1= 00000000	A5= 00000000	SR=	0010000000000100		298
D2= 00000000	D6= 00000000	A2= 00000000	A6= 00000000	US=	00FF0000		Clear Cycles
D3= 00000000	D7= 00000000	A3= 00000000	A7= 01000000	SS=	01000000	PC=	00001068

```
   Address  --------Code---------   Line -----------Source----------->>
00001042  E84D                     43      LSR.W #4,D5
00001044  EA4E                     44      LSR.W #5,D6
00001046  EC4F                     45      LSR.W #6,D7
00001048                           46
00001048                           47
00001048  BF44                     48      EOR.W D7, D4
0000104A  BD44                     49      EOR.W D6, D4
0000104C  BB44                     50      EOR.W D5, D4
0000104E  BF42                     51      EOR.W D7, D2
00001050  BD42                     52      EOR.W D6, D2
00001052  B742                     53      EOR.W D3, D2
00001054  BF41                     54      EOR.W D7, D1
00001056  BB41                     55      EOR.W D5, D1
00001058  B741                     56      EOR.W D3, D1
0000105A                           57
0000105A  1004                     58      MOVE.B D4,D0
0000105C  E348                     59      LSL.W #1, D0
0000105E                           60
0000105E  B540                     61      EOR.W D2, D0
00001060  E348                     62      LSL.W #1, D0
00001062                           63
00001062  B340                     64      EOR.W D1, D0
00001064                           65
00001064                           66  * Put program code here
00001064  FFFF FFFF                67      SIMHALT             ; halt simulator
00001068                           68  * Put variables and constants here
00001068                           69      END    START        ; last line of source
```

```
S0 = 68KPROG   20CREATED BY EASY68K
.S68 file read successful
```

68000 Memory

From:$00000000 To:$00000000 Bytes:$00000000 Copy Fill

```
$ Address:
00001000  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF
00001000: 74 00 76 00 78 00 7A 00 7C 00 7E 00 11 FC 00 0B t-v-x-z-|-~-----
00001010: 24 00 41 F8 24 00 12 10 72 01 74 02 76 04 78 08 $-A-$---r-t-v-x-
00001020: 7A 10 7C 20 7E 40 C2 80 C4 80 C6 80 C8 80 CA 80 z-| ~@----------
00001030: CC 80 CE 80 C4 41 C6 41 C8 41 CA 41 E2 4A E4 4B -----A-A-A-A-J-K
00001040: E6 4C E8 4D EA 4E EC 4F BF 44 BD 44 BB 44 BF 42 -L-M-N-O-D-D-D-B
00001050: BD 42 B7 42 BF 41 BB 41 B7 41 10 04 E3 48 B5 40 -B-B-A-A-A---H-@
00001060: E3 48 B3 40 FF FF FF FF FF FF FF FF FF FF FF FF -H-@------------
00001070: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001080: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001090: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000010F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001100: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001110: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001120: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001130: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001140: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001150: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00001160: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
```

Row

Page

Live

Lab 4.O Log-Trace:

EASy68K execution log file: 3/27/2021 2:33:14 PM

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001000  Code=7400              Line=   10      MOVE.L #0, D2


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001002  Code=7600              Line=   11      MOVE.L #0, D3


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001004  Code=7800              Line=   12      MOVE.L #0, D4


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
```

```
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001006  Code=7A00              Line=   13      MOVE.L #0, D5


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001008  Code=7C00              Line=   14      MOVE.L #0, D6


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000100A  Code=7E00              Line=   15      MOVE.L #0, D7


D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000100C  Code=11FC 000B 2400        Line=   16      MOVE.B #11,$00002400
```

```
D0=00000000 D4=00000000 A0=00000000 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001012  Code=41F8 2400            Line=   17      LEA.L  $00002400,A0


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001016  Code=1210                 Line=   18      MOVE.B (A0),D1


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=0000000B D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001018  Code=7201                 Line=   19      MOVE.L #1,D1


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
```

```
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000101A  Code=7402              Line=   20      MOVE.L #2,D2


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000101C  Code=7604              Line=   21      MOVE.L #4,D3


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000004 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000101E  Code=7808              Line=   22      MOVE.L #8,D4


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000004 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001020  Code=7A10              Line=   23      MOVE.L #16,D5
```

```
D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000004 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001022  Code=7C20              Line=   24      MOVE.L #32,D6


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000020 A2=00000000 A6=00000000 US=00FF0000
D3=00000004 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001024  Code=7E40              Line=   25      MOVE.L #64,D7


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000001 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000000
D2=00000002 D6=00000020 A2=00000000 A6=00000000 US=00FF0000
D3=00000004 D7=00000040 A3=00000000 A7=01000000 SS=01000000
PC=00001026  Code=C280              Line=   27      AND.L  D0,D1


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000002 D6=00000020 A2=00000000 A6=00000000 US=00FF0000
```

```
D3=00000004 D7=00000040 A3=00000000 A7=01000000 SS=01000000

PC=00001028  Code=C480              Line=   28      AND.L  D0,D2


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000020 A2=00000000 A6=00000000 US=00FF0000

D3=00000004 D7=00000040 A3=00000000 A7=01000000 SS=01000000

PC=0000102A  Code=C680              Line=   29      AND.L  D0,D3


D0=00000000 D4=00000008 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000020 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000040 A3=00000000 A7=01000000 SS=01000000

PC=0000102C  Code=C880              Line=   30      AND.L  D0,D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000010 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000020 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000040 A3=00000000 A7=01000000 SS=01000000

PC=0000102E  Code=CA80              Line=   31      AND.L  D0,D5
```

```
D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000020 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000040 A3=00000000 A7=01000000 SS=01000000
PC=00001030  Code=CC80              Line=   32      AND.L  D0,D6


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000040 A3=00000000 A7=01000000 SS=01000000
PC=00001032  Code=CE80              Line=   33      AND.L  D0,D7


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001034  Code=C441              Line=   35      AND.W  D1,D2


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
```

```
PC=00001036  Code=C641              Line=   36     AND.W  D1,D3


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001038  Code=C841              Line=   37     AND.W  D1,D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000103A  Code=CA41              Line=   38     AND.W  D1,D5


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000103C  Code=E24A              Line=   40     LSR.W #1,D2


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
```

```
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000103E  Code=E44B              Line=   41      LSR.W #2,D3


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001040  Code=E64C              Line=   42      LSR.W #3,D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001042  Code=E84D              Line=   43      LSR.W #4,D5


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001044  Code=EA4E              Line=   44      LSR.W #5,D6
```

```
D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001046  Code=EC4F                Line=   45      LSR.W #6,D7


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001048  Code=BF44                Line=   48      EOR.W D7, D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000104A  Code=BD44                Line=   49      EOR.W D6, D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
```

```
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000104C  Code=BB44                Line=   50      EOR.W D5, D4


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=0000104E  Code=BF42                Line=   51      EOR.W D7, D2


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001050  Code=BD42                Line=   52      EOR.W D6, D2


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001052  Code=B742                Line=   53      EOR.W D3, D2
```

```
D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001054  Code=BF41              Line=   54      EOR.W D7, D1


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001056  Code=BB41              Line=   55      EOR.W D5, D1


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001058  Code=B741              Line=   56      EOR.W D3, D1


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
```

```
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000105A  Code=1004              Line=   58      MOVE.B D4,D0


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000105C  Code=E348              Line=   59      LSL.W #1, D0


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=0000105E  Code=B540              Line=   61      EOR.W D2, D0


D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC

D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100

D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000

D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000

PC=00001060  Code=E348              Line=   62      LSL.W #1, D0
```

```
D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001062  Code=B340                Line=   64      EOR.W D1, D0
```

```
D0=00000000 D4=00000000 A0=00002400 A4=00000000    T_S__INT___XNZVC
D1=00000000 D5=00000000 A1=00000000 A5=00000000 SR=0010000000000100
D2=00000000 D6=00000000 A2=00000000 A6=00000000 US=00FF0000
D3=00000000 D7=00000000 A3=00000000 A7=01000000 SS=01000000
PC=00001064  Code=FFFF FFFF            Line=   67      SIMHALT            ; halt simulator
```

LAB x86----------

Objective:

The objective of this lab is to be introduced to x86, analyze, edit, assemble, link and run the listed programs for the lab activity.

Procedure:

Using the GUI Turbo Assembler to analyze, edit, link and run the programs. Basic commands of x86, assemble, link, and run.

Program Description:

This program simulates use of the x86 instruction set.

Source Files:

PGM4_1:

```
TITLE PGM4_1:  ECHO PROGRAM
.MODEL SMALL
.STACK 100H
.CODE
MAIN    PROC
;display prompt
MOV     AH,2        ;display character function
MOV     DL, '?' ;character is ?
INT  21H        ;display it
;input a character
MOV     AH,1        ;read character function
INT  21H        ;character in AL
MOV     BL,AL       ;save it in BL
;go to a new line
MOV  AH,2       ;display character function
MOV  DL,0DH ;carriage return
INT     21H     ;execute carriage return
MOV     DL,0AH  ;line feed
INT  21H        ;execute line feed
;display character
MOV     DL,BL       ;retrieve character
INT     21H     ;and display it
;return to DOS
MOV     AH,4CH  ;DOS exit function
INT     21H     ;exit to DOS
MAIN    ENDP
END MAIN
```

PGM4_1.asm

```
TITLE PGM4_1:  ECHO PROGRAM
.MODEL SMALL
.STACK 100H
.CODE
MAIN    PROC
;display prompt
MOV     AH,2        ;display character function
MOV     DL, '?' ;character is ?
INT  21H        ;display it
;input a character
MOV     AH,1        ;read character function
INT  21H        ;character in AL
MOV     BL,AL       ;save it in BL
;go to a new line
MOV  AH,2       ;display character function
MOV  DL,0DH ;carriage return
INT     21H     ;execute carriage return
MOV     DL,0AH  ;line feed
INT  21H        ;execute line feed
;display character
MOV     DL,BL       ;retrieve character
INT     21H     ;and display it
;return to DOS
MOV     AH,4CH  ;DOS exit function
INT     21H     ;exit to DOS
MAIN    ENDP
END MAIN
```

```
4/10/2021 12:04:41 PM :   Assembling file:  PGM4_1.asm
4/10/2021 12:04:41 PM :   Error messages:  None
4/10/2021 12:04:41 PM :   Warning messages:  None
4/10/2021 12:04:41 PM :   Passes:       1
4/10/2021 12:04:41 PM :   Remaining memory:  468k
4/10/2021 12:04:41 PM :
```

PGM4_2:

```
TITLE PGM4_2:  PRINT STRING PROGRAM
.MODEL SMALL
.STACK 100H
.DATA
MSG DB  "HELLO!$"
.CODE
MAIN    PROC
;initialize DS
   MOV     AX,@DATA
   MOV     DS,AX       ;initialize DS
;display message
   LEA  DX,MSG ;get message
   MOV     AH,9        ;display string function
   INT     21H     ;display message
;return to DOS
   MOV     AH,4CH
   INT     21H     ;DOS exit
MAIN    ENDP
   END MAIN
```

PGM4_2.asm

```
TITLE PGM4_2:  PRINT STRING PROGRAM
.MODEL SMALL
.STACK 100H
.DATA
MSG DB  "HELLO!$"
.CODE
MAIN    PROC
;initialize DS
    MOV     AX,@DATA
    MOV     DS,AX       ;initialize DS
;display message
    LEA  DX,MSG ;get message
    MOV     AH,9        ;display string function
    INT     21H     ;display message
;return to DOS
    MOV     AH,4CH
    INT     21H     ;DOS exit
MAIN    ENDP
    END MAIN
```

```
4/10/2021 12:49:32 PM :   Assembling file:  PGM4_2.asm
4/10/2021 12:49:32 PM :   Error messages:   None
4/10/2021 12:49:32 PM :   Warning messages: None
4/10/2021 12:49:32 PM :   Passes:        1
4/10/2021 12:49:32 PM :   Remaining memory: 468k
4/10/2021 12:49:32 PM :
```

PGM4_3:

```
TITLE PGM4_3:  CASE CONVERSION PROGRAM
.MODEL SMALL
.STACK 100H
.DATA
MSG1    DB  "ENTER A LOWER CASE LETTER: $"
MSG2    DB  0DH,0AH,"IN UPPER CASE IT IS: "
CHAR    DB  '?,'$''
.CODE
MAIN    PROC
;initialize ds
   MOV AX,@DATA    ;get data segment
   MOV DS,AX       ;initialize DS
;print user prompt
   LEA DX,MSG1 ;get first message
            ;display string function
            ;display first message
;input a character and convert to upper case
            ;read character function
            ;read a small letter into AL
   SUB AL,20H  ;convert it to upper case
   MOV CHAR,AL ;and store it
;display on the next line
            ;get second message MSG2
            ;display string function
            ;display message and upper case
;DOS exit
   MOV AH,4CH
   INT 21H     ;DOS exit
MAIN    ENDP
   END MAIN
```

PGM4_3.asm

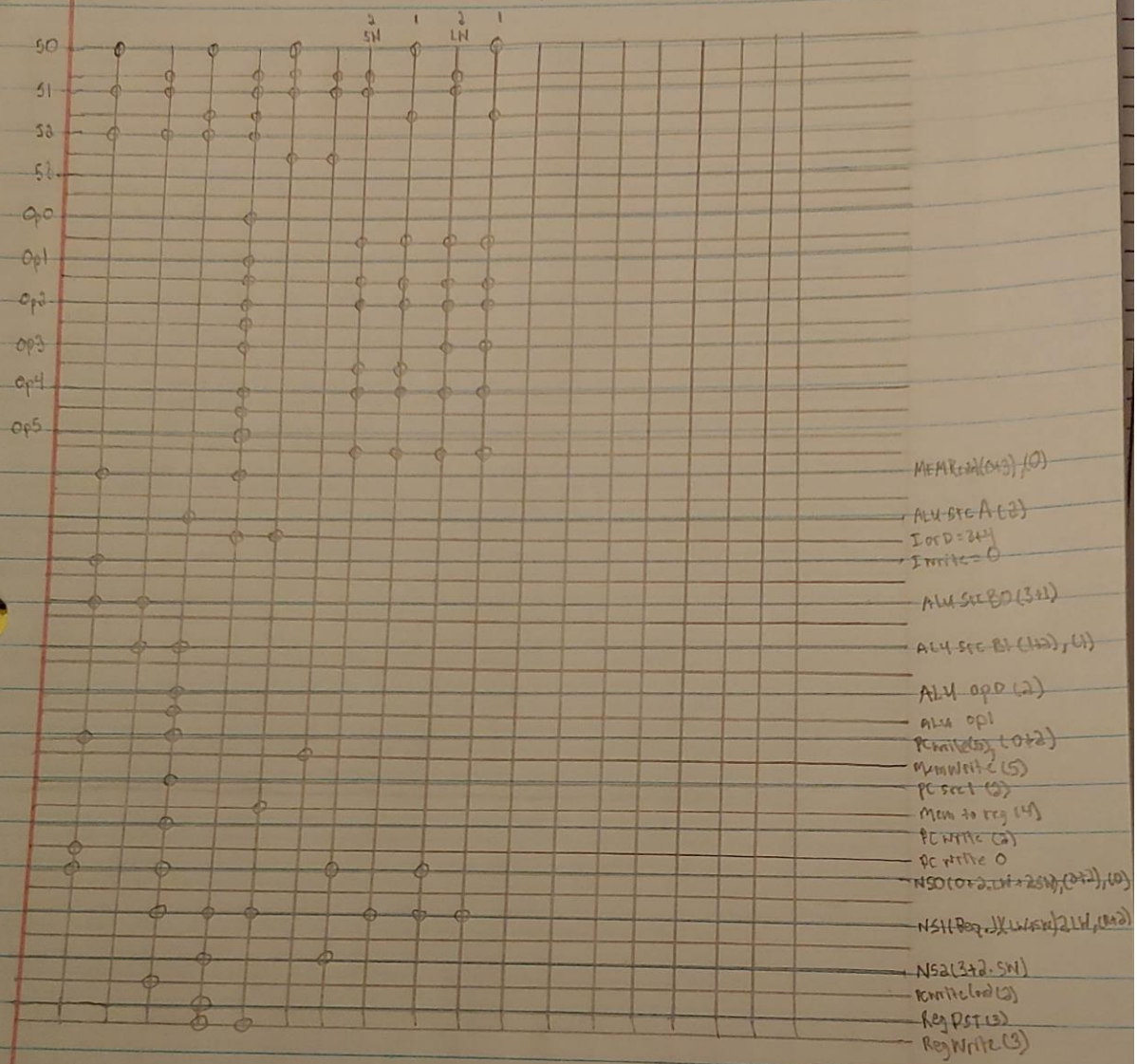
```
.STACK 100H
.DATA
MSG1    DB  "ENTER A LOWER CASE LETTER: $"
MSG2    DB  0DH,0AH,"IN UPPER CASE IT IS: "
CHAR    DB  '?,'$''
.CODE
MAIN    PROC
;initialize ds
    MOV AX,@DATA    ;get data segment
    MOV DS,AX       ;initialize DS
;print user prompt
    LEA DX,MSG1 ;get first message
                ;display string function
                ;display first message
;input a character and convert to upper case
                ;read character function
                ;read a small letter into AL
    SUB AL,20H  ;convert it to upper case
    MOV CHAR,AL ;and store it
;display on the next line
                ;get second message MSG2
                ;display string function
                ;display message and upper case
;DOS exit
    MOV AH,4CH
    INT 21H     ;DOS exit
MAIN    ENDP
    END MAIN
```

```
4/10/2021 12:52:53 PM :   Assembling file:  PGM4_3.asm
4/10/2021 12:52:53 PM :   Error messages:  None
4/10/2021 12:52:53 PM :   Warning messages:  None
4/10/2021 12:52:53 PM :   Passes:        1
4/10/2021 12:52:53 PM :   Remaining memory:  467k
4/10/2021 12:52:53 PM :
```

RISC PLA Controller Lab----------

Due: 04/17/2021

CSCI 330: Lab #9 (PLA Diagram for R, I (LW+SW), J, beq



- PLA: Programmable Logic Array
  - architecture logic used to build reconfigurable digital circuit.

- The process used was to compute boolean eq. formulas from elements of the diagram from the logic gates of that diagram.