# Lab 2.O

## DESCRIPTION

This lab is concerned with program relocatable code. PC relative addressing modes are useful here. In a multiple user environment, a user’s program should be capable of residing anywhere in memory. That is, user programs should be address independent.

Your assignment here is to reverse the elements of a vector. The procedure is as follows:

1. Create a vector of the ASCII characters ‘A ... J’ at location $004AC4.
2. Construct a sequence of operations beginning at location $004ACE which will reverse the elements of the vector.
3. Display both the ASCII vector and the instructions.
4. Execute your program.
5. Display the vector to insure that it was indeed reversed.

In order for all of this to work, references to data must be PC relative. Turn in all items which you were asked to display along with your evaluation of the lab. Consider the consequences of not being able to relocate your programs or having to specify a particular memory address to ensure proper program execution.

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\* Title : Vector Reversal Program

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\* Date : February 24, 2024

\* Description: This program reverses the elements of a vector

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ORG $004AC4 ; Set origin address

\* Define ASCII vector

VECTOR DC.B 'ABCDEFGHIJ',0

\* Start of program

START LEA VECTOR,A0 ; A0 points to the start of VECTOR

MOVE.L #10,D1 ; Length of the vector (number of elements - 1)

REVERSE MOVEQ #0,D2 ; Initialize D2 to 0

MOVEQ #9,D3 ; Initialize D3 to 8 (the last index)

LOOP MOVE.B (A0,D2),D4 ; Load byte from start of VECTOR to D4

MOVE.B (A0,D3),D5 ; Load byte from end of VECTOR to D5

MOVE.B D5,(A0,D2) ; Store byte from D5 to start of VECTOR

MOVE.B D4,(A0,D3) ; Store byte from D4 to end of VECTOR

ADDQ.L #1,D2 ; Increment start index

SUBQ.L #1,D3 ; Decrement end index

CMP.L D2,D3 ; Compare start and end indices

BGE LOOP ; Continue until start exceeds end

DONE SIMHALT ; Halt simulator

END START ; End of program