

CSC205
Project 1: Assembly Language Programming in MARIE
PartA: Multiplication

Total possible points: 5 bonuses for part A

How to Submit:

Please submit the following deliverables through Blackboard by the due date:

1. An electronic copy of the source code of your program (the .mas file) with proper documentations of what your code does.
2. A listing of the outputs given by your program for the specific inputs.

Write a program using the MARIE assembly language to evaluate the expression:

$$A * B + C * D$$

Your program should be able to perform the following:

1. [1 pts] Read in A , B , C , and D as inputs entered by the user. Output your result to the screen. (Your program does not need to create any user prompt. Figure out how to do the input/output in decimal values.)
2. [2 pts] Handle all inputs that are positive integers. Test your program on Test set I.
3. [1 pts] Handle any non-negative inputs. Test your program on Test set II.
4. [1 pts] Handle any integer inputs. Test your program on Test set III.

| Test Set | Test number | Input | | | | Correct output | Your output |
|----------|-------------|-------|-----|-----|-----|----------------|-------------|
| | | A | B | C | D | | |
| I | 1 | 2 | 3 | 4 | 5 | 26 | |
| | 2 | 1 | 1 | 1 | 1 | 2 | |
| | 3 | 8 | 3 | 3 | 2 | 30 | |
| | 4 | 2 | 11 | 12 | 1 | 34 | |
| II | 5 | 0 | 7 | 9 | 2 | 18 | |
| | 6 | 7 | 0 | 1 | 3 | 3 | |
| | 7 | 0 | 0 | 3 | 8 | 24 | |
| | 8 | 0 | 0 | 0 | 0 | 0 | |
| III | 9 | -5 | 4 | 4 | 1 | -16 | |
| | 10 | 0 | -9 | 3 | 0 | 0 | |
| | 11 | 3 | 0 | -9 | -1 | 9 | |
| | 12 | -3 | 1 | 4 | -8 | -35 | |
| | 13 | 2 | 0 | 0 | -9 | 0 | |
| | 14 | -3 | 3 | 0 | 6 | -9 | |
| | 15 | -4 | -2 | -1 | -7 | 15 | |
| | 16 | -9 | -1 | 0 | 1 | 9 | |
| | 17 | 3 | -2 | 2 | 0 | -6 | |

Grading criteria:

1. Your program is expected to assemble without error. Any program that cannot be assembled will receive NO credits.
2. Your program is expected to terminate gracefully. Any program that descends into an infinite loop on valid inputs will receive NO credits.
3. Your program will be *loaded exactly once*, and then *run multiple times*. You need to make sure that your variables are properly initialized at each run, without requiring the user to reload your program, or to reset the simulator.
4. The following is the testing procedure of your program:

Step 1: Your program (.mas) file will be loaded into MARIE's editor and assembled.

Step 2: Your program's machine code (.mex) file will be loaded into MARIE's simulator, through the "File->Load" button on the menu bar.

Step 3: Your program will be run six (6) times through the "Run->Run" button on the menu bar.

Your program will be tested on one (1) random input quadruple (A, B, C, D) from *each* of the three provided test sets, and then three (3) random valid input quadruples from a private set.

Step 4: Done.