

Project 10 Sample Solution

- Run the provided sample solution for all sample input files provided.

`/home/work/cpe112/Executables/Project_10/Project_10_solution`

- Try an empty input file
- Try a file with invalid data
 - missing one entry
 - Invalid value for an entry – in matrix 1, in matrix 2
- Try entering an invalid file name

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Project 10 Overview

- Implement a program to perform arithmetic on 2x2 matrices
- Matrices are stored in a structure variable
- When reading data from the input file, errors in the data must be detectable

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Project 10 Constraints

- Global variables are not allowed
 - Using global variables, that is variables declared outside of any function body, will result in [zero \(0\) credit on this project](#)
- Arrays are not allowed
- An input file is continually prompted for until a correct file name is entered

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Project 10 Constraints Continued

- You must use at least five, non-trivial, functions in addition to your main() function
 - Make each matrix operation a function
 - At least one function is to have a reference parameter that is a structure
 - At least one function is to return a structure as its return value
 - **Functions can have at most 3 parameters**

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Project 10 Structure

- A single structure with four members
 - Each structure member is a matrix element
 - Each matrix element is an integer

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Input File Information

- The input file can contain problems:
 - Invalid value (non-integer) in matrix 1
 - Invalid value (non-integer) in matrix 2
 - Not enough values contained in the input file which includes the empty input file case
- Print out appropriate error messages for the above conditions.

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Open of Input file

- Use a function to open the input file.
- Prompt for, read, echo print and open an input file
- If an invalid input file name is given, reset the input stream and prompt the user for a valid filename
- Prompt for, read, echo print and open this new file.
- Continue until a successful name is entered or the user enters ctrl-c.

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Reading Structure Values

- Use a function to read the elements for a **single matrix** into the correct structure members.
 - After reading the elements, test the input stream
 - Return the status of the input stream
- Call the function twice to read in element values for both matrices.
- If valid values (integers) were read, output the matrix otherwise, terminate the program with an error message.
- After both matrices successfully read, perform the arithmetic operations: $A+B$, $A-B$, $A*B$ and $B*A$

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Short Functional Decomposition

Main Program

- Declare variables
- Open an input file – function call
- Load values for matrix 1 – function call
 - If successful print matrix otherwise exit
- Load values for matrix 2 – function call
 - If successful print matrix otherwise exit
- Add Matrices – function call
- Print result with proper heading – function call

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Short Functional Decomposition

Main Program continued

- Subtract Matrices – function call
- Print result with proper heading – function call
- Multiply Matrices – $A \times B$ – function call
- Print result with proper heading – function call
- Multiply Matrices – $B \times A$ – function call
- Print result with proper heading – function call

End Main

Start of function definitions

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