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Report for Pgm5

Problem Statement

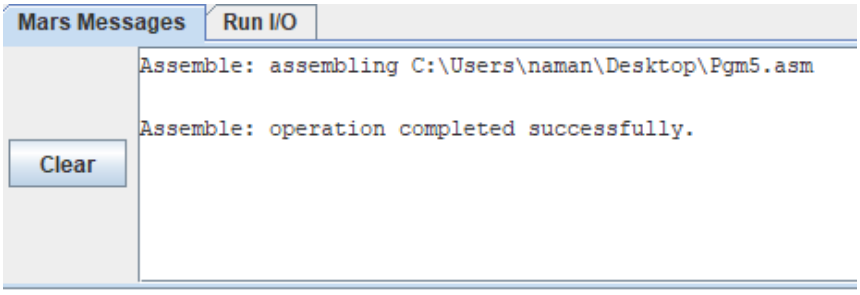
The purpose of this assignment is to read a machine code file from a filename inputted by the user and then output the fields of instruction according to the instruction type. The file must be readable by a scanner, and each line must have 32 bits to represent an instruction. The output must display the instruction type (R, I, J, FR, FI, or Invalid) and its respective components for each line of instruction. Furthermore, the supplied file "fibs.txt" may be used as a sample file, but the program must work for all valid files.

Approach to Solution

The printing of instruction types in the specified file should be done utilizing the MIPS assembly language with the Mars IDE. Knowledge of the working with expression evaluation, system calls, functional programming, reading from files, reading the length of strings, evaluating ASCII codes, masking bit strings, converting from binary to decimal, and basic structure of loops will be required. A computer running the Java Virtual Machine (JVM) will be needed along with access to the computer's registers for storage. Additionally, tools inside the IDE such as the assembling and running of the current program are essential.

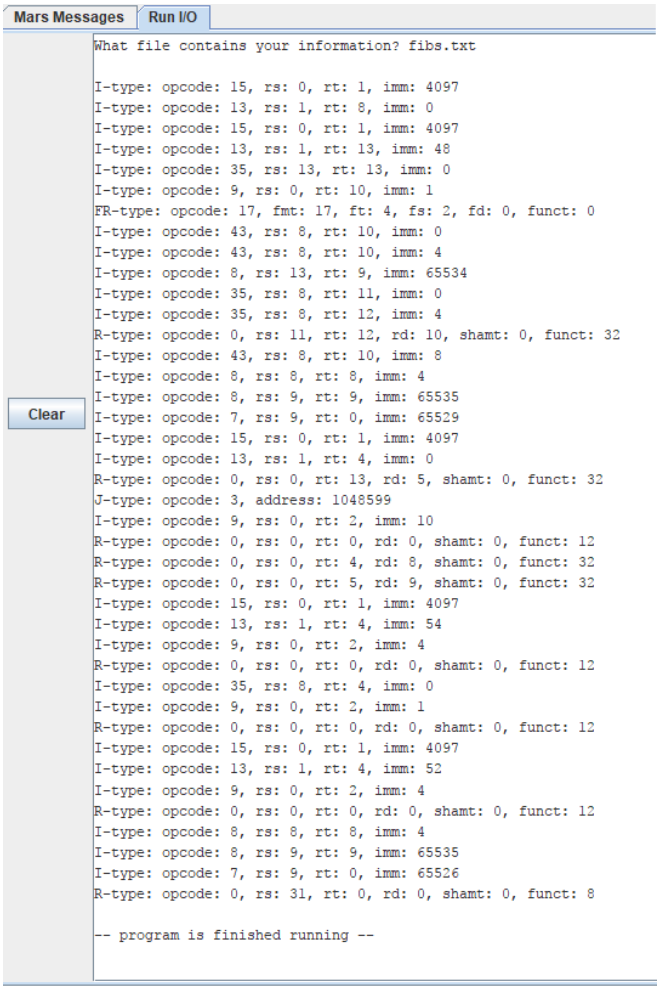
Solution Description

When writing the program, old code such as opening a file from a user inputted file name and the "strlen" procedure have been re-used, but line processing, reading bits, and converting from binary to decimal have been written from scratch. When the Mars IDE has been launched and Pgm5.asm has been opened, it is important to build (or "assemble") the program before running it. To do so, click the wrench and screwdriver button found in the tool icon layout. After clicking it, the program should successfully assemble, and there should be a success message from the "Mars Messages" tab at the bottom of the screen.



The message given after the Pgm5.asm has been successfully assembled with no errors.

Once the program has successfully compiled, it is now time to run it. At the top of the screen, click the green play button in the tools to the right of the assemble button pressed earlier. The user will be prompted to enter the name of a file in the “Run I/O” tab. If the filename is valid and found in the same directory as the executable MARS launcher, the “Run I/O” tab should the instruction types for each 32-bit machine code instruction (R, I, J, FR, FJ, or Invalid) along with its respective components (opcode, rs, rt, rd, shamt, funct, imm, address, fmt, ft, fs, and/or fd), each on a separate line as shown in the screencap below. If the filename is invalid, the program will simply output nothing and terminate.



The fields of instructions printed out in the output after reading the user inputted file which includes the types of instructions and their respective components.