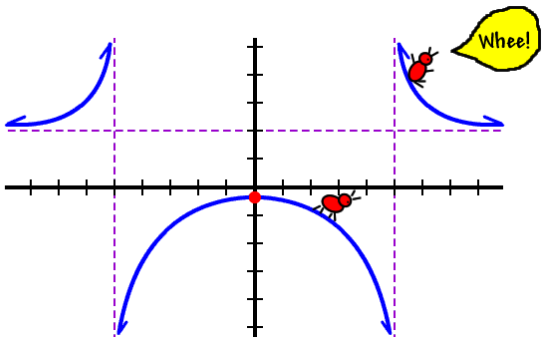
CS 254 PROGRAMMING ASSIGNMENT #6
Rational Function
3/04/2022



Write a program to evaluate a rational function:

$$(8x^2-3x+12) \ / \ (3x^2+2x-16)$$

x is a location in memory in the data section (a symbolic address.) The user will edit the data section to change x. Set up a base register for loading and storing. Look at poly.asm in chapter 15. Use x = 0 and x = 1 to start with to make debugging easy. Then try some other values, including negative values.

Before the division, check the denominator. If it is zero, set a memory location, symbolically called `error`, to 1 and exit by jumping to the end of the program. Otherwise, set `error` to 0 and store the value of the rational function (the quotient) at another memory location, symbolically called `ratio`. Store the remainder at a third memory location, symbolically called `remain`. If `error` is set to 1, then leave `ratio` and `remain` at zero. The last instruction of the program should be a no-op instruction so there is a common ending point. Use only those instructions that have been discussed in the notes through chapter 18.

A value loaded from memory can only be used after a one instruction delay slot. Also use the basic assembly two-operand instructions for two's complement multiply and divide and to retrieve the results of the operation from the `lo` and `hi` registers. Assume that all values fit into 32 bits.

Set MIPS settings to the following:

ON	Bare Machine	ON	Enable Delayed Loads
ON	Enable Delayed Branches	OFF	Load Exception Handler
OFF	Enable Mapped IO	OFF	Accept Pseudo Instructions

Set these options as specified or QtSpim will start up with options you don't want. If you use different settings the start of the .data section will be used by the system and variables will be somewhere else in memory. Look at SPIM's memory display to verify that data is where expected. Single-step execution to see memory change.

Include a register use table in the documentation at the top of your source program. The source program should be nicely formatted. Labels (symbolic addresses) should start in column one. Mnemonics should start at an indented column. Nearly every line of the program will have a meaningful comment. All comments should start in the same column, perhaps column 35. Make sure that the source file has no tab characters in it.