CSE2312, Spring 2016, Programming Assignment 4

Due Date via Blackboard: April 18, 2016 at 11:59pm Central

In the fourth programming assignment, we will slightly change the input/output behavior of the 4 function calculator developed in programming assignment 3. In programming assignment 3, your calculator returned to accepting new operands after computing a result. Instead, we will now reuse the computed result.

The encoding for the operations are the same as assignment 3, and are as follows:

- `ADD: +: result = input_1 + input_3`
- `SUB: -: result = input_1 – input_3`
- `MUL: *: result = input_1 * input_3`
- `DIV: /: result = input_1 / input_3`
- `NEG: -: result = -input_2`

You should modify your program from assignment 3 to have input/output function as shown below in the example log. More examples are provided in the given files on the blackboard course site. If at any point the user enters invalid input, the calculator should reset itself to the initial state and display “Input operation or operand:”.

Example Logs

```
$qemu-system-arm -nographic -s -M versatilepb -m 128M -d in_asm,cpu,exec -
singlestep -D pa03.log -kernel pa03.bin

Starting calculator

Input operation or operand:

-

Input operand:

5

-5

Input operation:

+

Input operand:

10

5

Input operation:
```

```
*
Input operand:
10
Input operation:
-
Input operand:
10
40
Input operation:
/
Input operand:
4
10
Input operation:
q
Quitting calculator
```

Directory Structure, Given Files, and Submission

Unlike the other assignments, no files are given for assignment 4. You should modify your pa03.s file to meet the requirements using the files given in assignment 3. You should turn in assignment 4 just as you did assignment 3 by zipping the pa03 folder, which contains your pa03.s file and all other given files. **DO NOT CHANGE THE NAME OF THE DIRECTORY OR ANY FILES TO pa04!!!**

Closing QEMU with stdin/stdout Redirection

Because we redirect stdin and stdout to interface with the UART, pressing Ctrl+C will not cause the qemu-system-arm process to close. To close the process, in another terminal/console window, type:

```
ps aux | grep qemu
```

You will see something like:

```
yathaar+ 15700 96.0  0.1 297828  6992 pts/0    Sl+  10:05   0:15 qemu-system-arm -nographic -s -M versatilepb -m 128M -d in_asm,cpu,exec -singlestep -D pa02.log -kernel pa02.bin
```

The second column (15700) is the process id. To close the process, type:

```
kill -9 15700
```

If you go back to the first terminal window (where qemu-system-arm had been called), you will see a message indicating it has terminated:

```
Killed
```