

Homework 6: Calculator in MIPS

You must implement a basic calculator program in MIPS assembly. The source code you turn in will be called `calculator.asm`.

Your program should take 3 separate inputs:

1. an integer
2. an operation (+, -, *, or /)
3. another integer

Assuming that the input does not produce an error, print the answer and exit. All operations are signed, and in the case of division you must output both the quotient and the remainder.

If the operation produces an error (overflow or divide-by-0), you must output a friendly error message telling the user which error occurred, and exit. You must do your own error detection—do not just use the ugly built-in messages when such an error occurs.

In the case of multiplication, “overflow” means that the answer is too big to fit in a 32-bit integer. You will have to check both `hi` and `lo` to determine if this is the case.

You must create functions for this assignment, though it is your choice how you divide them up. Here are some possible ideas that you may use:

- Functions that return 0 if there is no error when doing a particular operation, or 1 if there is.
- A function that returns a quotient in `$v0` and a remainder in `$v1`.
- Functions that return the result of a calculation in `$v0`, and a possible error code in `$v1` (0 for no error).

Your program might give outputs like the following:

```
Please enter an integer: 5
Please enter an operation (+,-,*,/): +
Please enter an integer: 9
Thank you.  5 + 9 = 14.
```

```
Please enter an integer: 23
Please enter an operation (+,-,*,/): /
Please enter an integer: 9
Thank you.  23 / 9 = 2 r 5.
```

```
Please enter an integer: 2000000000
Please enter an operation (+,-,*,/): +
Please enter an integer: 2000000000
I'm sorry, that would overflow.
```

Please enter an integer: 32768
Please enter an operation (+,-,*,/): *
Please enter an integer: 65536
I'm sorry, that would overflow.

Please enter an integer: 5
Please enter an operation (+,-,*,/): /
Please enter an integer: 0
I'm sorry, you cannot divide by 0.

Please enter an integer: -2147483648
Please enter an operation (+,-,*,/): /
Please enter an integer: -1
I'm sorry, that would overflow.



Est. 1888

UNIVERSITY *of*
PUGET
SOUND