CS 2110 Lab 9 Assignment: Stack Subtract

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1 Problem

1.1 Problem Description

For this lab, you will have to write an LC-3 subroutine called `subtract` which subtracts one number from another. You will also need to write the main function which will call this subroutine. You will write your solution in `stacksubtract.asm`.

1.2 Pseudocode

You will be implementing `subtract` from the pseudocode available below. We have provided a code skeleton for you to complete. **We recommend you write this first**.

You will also be implementing a `main` routine which will run when the LC-3 starts up. Please code `main()` in between `.orig x3000` and `HALT`.

```
int subtract(int a, int b) {
    return a + (-b);
}


void main() {
    int a = MEM[A];
    int b = MEM[B];
    int result = subtract(a,b);
    MEM[RESULT] = result;
}
```

1.3   Important Details

- The inputs are stored at labels `A` and `B`.

- You must properly handle the stack when writing `subtract` and calling `subtract`. Keep in mind that you are passing two arguments to this function.

- Please check out the slides and lab guide for information on how to structure your stack frame. This lab is designed to make you think about how to implement the stack frame yourself.

- You should write the result into `RESULT`.

2   Testing and Autograder

2.1   Testing in Complx

1. Load the `stacksubtract.asm` file into Complx inside your Docker container.

2. Run the program. At the end, you may check the `RESULT` label in memory to determine the result. See if it matches what you expect.

NOTE: To test your `subtract` subroutine before implementing `main`, you may find it helpful to use the "Debug → Simulate Subroutine Call" feature of Complx.

2.2   Autograder

- **On Mac or Linux**

  1. Navigate in your host machine terminal to the same directory as `stacksubtract.asm`
  2. Run `sudo chmod +x grade.sh`
  3. Run `./grade.sh`

- **On Windows**

  1. Navigate in Git Bash (or Docker Quickstart Terminal for legacy Docker installations) to the same directory as `stacksubtract.asm`
  2. Run `./grade.sh`

Once you're done, complete the Lab 9 quiz that's available in Canvas! Your TAs should have already given you the quiz code at the start of lab.