

Lab 3: The Maximum Absolute Values

Due date: By the end of Thursday, 9/19/2019.

This Lab worse max of 10 points.

Objectives

The goal of this lab is to implement a function with MIPS instructions that works on a word array. You will practice with the following skills:

- Write simple functions.
- Control flow: if and loop structures.
- Access every element in an array.

Tasks

First read the skeleton code and understand the functions provided. The code initializes an array of words with pseudo-random numbers. You can also change the number of words (stored in \$s1) to test your code.

Implement the `max_abs` function to

- Change the words in an array to their absolute value, and
- Return the largest absolute value.

The function returns -1 if the number of elements in the array is less than 1.

The C implementation of the function is listed on the next page. Please pay attention to the registers you use in your function and follow the calling conventions we have discussed in the lecture.

Set up proper arguments to call the `max_abs` function, and print out the returned value in decimal. The following table shows expected output when \$s1 is set to different initial values.

\$s1	0	1	2 - 16	128	1024
<code>max_abs</code>	-1	976191589	1986111499	2118803972	2145929731

Add brief comments to explain your code.

Deliverables

Submit revised `lab3.s`, which has your code and comments, in HuskyCT.

Submit a screenshot of the output and your `lab3.s` file.

To receive full credits, your code should use proper MIPS instructions/pseudo instructions for the tasks.

`/* Comments`

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The function returns the largest of the absolute values in array p.

p is the starting address of the word array.

n is the number of words in the array.

The function returns -1 if n is less than 1.

```
*/
int max_abs(int p[], int n)
{
    /* define local variables. */
    int maxa, a, i;

    maxa = -1;

    /* For every word in the array,
       calculate its absolute value,
       update the array element if necessary, and
       update maxa if necessary.
       In Python, you would write the for loop like
       for i in range(n):
    */
    for (i = 0; i < n; i += 1) {
        a = p[i];
        if (a < 0) {
            a = -a;
            p[i] = a;
        }
        if (a > maxa)
            maxa = a;
    }
    return maxa;
}
```