

Instructions:

Please solve the following tasks without directly using ChatGPT or any other AI tools. Focus on optimizing performance, reducing branching, and avoiding redundant variables. Your code will be evaluated on both correctness and efficiency.

Tasks:

Task 1: Update Function

Write a function called `update` that performs the following operations on two integers, `a` and `b`:

- Set `a` to the sum of `a` and `b`.
- Set `b` to the absolute difference between `a` and `b`.

After calling the `update` function, print the updated values of `a` and `b`.

Task 2: Delete Node in Linked List

Given the following definition of a Linked List Node:

```
struct Node {  
    int data;  
    struct Node *next;  
};
```

Write a function `delete_with_position` that takes the head of a linked list and a position as arguments and deletes the node at that position. For example, to delete the 7th node, start counting from the head of the Linked List. The `head` is considered the 0th element. Assume all nodes are dynamically allocated.

```
void delete_with_position(struct Node **head, int position) {  
    // implement your code here  
}
```

Task 3: Find the Smallest Element

Write a template function `smallest` that takes the start address and the length (number of elements) of an array as arguments and returns the index of the smallest element. The function should be able to operate on arrays of any type.

Task 4: Count Total Lines in Directory

Implement a C++ program that calculates the total number of lines in all files within a given directory.

- Assume that the files in the directory are text files.
- The program must efficiently utilize all available CPU cores.

Task 5: Find the Longest Word in a File

Write a C++ program that finds the longest word in a given text file. The program should:

- Take the path to the text file as input.
- Print the longest word along with its length.

Assume that the text file contains only alphabetical words separated by spaces, and that the words are case-insensitive (e.g., "Hello" and "hello" should be considered the same word). If there are multiple words with the same length, you may output any one of them.