

Systems Software

Assignment 5: Hash Tables

Lab Objectives

In this activity, students should demonstrate the following abilities:

1. Create a Hash Table class for the type `string`
2. Read a text file of English words and store them in a hash table as a dictionary
3. Use the hash table to check the spelling of an input text file

Assignment

In this lab, you will create a hash table and use it to store thousands of English words that you will use as a dictionary to check the spelling of the words in an input text file.

1. Create the class **HashTable** as shown in lecture 10 but for the type **string** instead of **Student**. To compute a numeric hash value for a string use the sum of the ASCII value of every character in the string and then compute the modulus of the sum using the size of the hash table. The code to compute the hash value is shown below.

```
int HashTable::computeHash(string s){
    int hash = 0;
    for(int i=0; i<s.length(); i++)
        hash += s[i];
    return hash % capacity;
}
```

2. Write a C++ program that reads in a text file (given as a command-line argument), parses each word, and determines whether each word is in the hash table and if not output the line number and the misspelled word. Use the text file **words.txt** as the dictionary to fill in the hash table. Test your spell-checker program on the provided file **sample_text.txt**. Note that some words are capitalized in **sample_text.txt**. A sample run of the program is provided below. You can also use other sample text files to verify your spell checker program (one additional file is provided with the assignment, **speech.txt**).
3. Submit all your files on courseSite as a zipped folder named **spell_checker**.

----- **Sample run** -----

```
>./spell_checker sample_text.txt  
File words.txt opened successfully.  
File sample.txt opened successfully.  
line 1: misspelled word - creat  
line 2: misspelled word - english  
line 3: misspelled word - as  
line 4: misspelled word - speling  
Spell check completed.
```

----- **sample_text.txt** -----

```
In this lob, you will creat a hash table.  
Store English words in the hash table.  
Use the hash table as a dictionary to check  
the speling of the words in an input text file.
```