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Lab 03
27 FEB 22

Part 1
A)
swap.cpp
For part a I wrote a script with a function that takes two integers as pointers and swaps their values. I coded lines 17-18 using the following source:
https://www.geeksforgeeks.org/swap-two-numbers-without-using-temporary-variable/
These lines check the addresses of the two pointers to ensure that they are not pointing to the same location. The function adds the value of the first int to the second, then subtracts the value of the second int from itself, then subtracts the value of the second from the first.

B)
arith_ops.cpp
For this section I wrote four functions that take two pointers of float type and perform the four basic arithmetic operations on them. The first function adds the two values, the second subtracts the second value from the first, the third multiplies the two values and the fourth divides the first value by the second.

Part 2
matrix.cpp
This program prompts the user to enter values for two 3x3 matrices. The program then multiplies the two matrices by one another. Lines 64-74 of the file were coded directly using
https://stackoverflow.com/questions/936687/how-do-i-declare-a-2d-array-in-c-using-new
These lines declare and populate a 2-Dimensional array using pointer notation, meaning the array can be dynamically allocated. Passing these values as pointers also allows us to keep variable values when passing them to functions such as the mul_matrix() function. The resulting matrix is then written to the file result.txt. See matrix.pdf for samples of the file outputs.

Part 3
display_cost.cpp
A) This file prompts the user to enter a number n. This then creates a dynamic array of size n. The user is then prompted to enter n ‘prices’ which are then stored in the array. The program then prints the n sizes the user entered, and deletes the previously allocated memory.

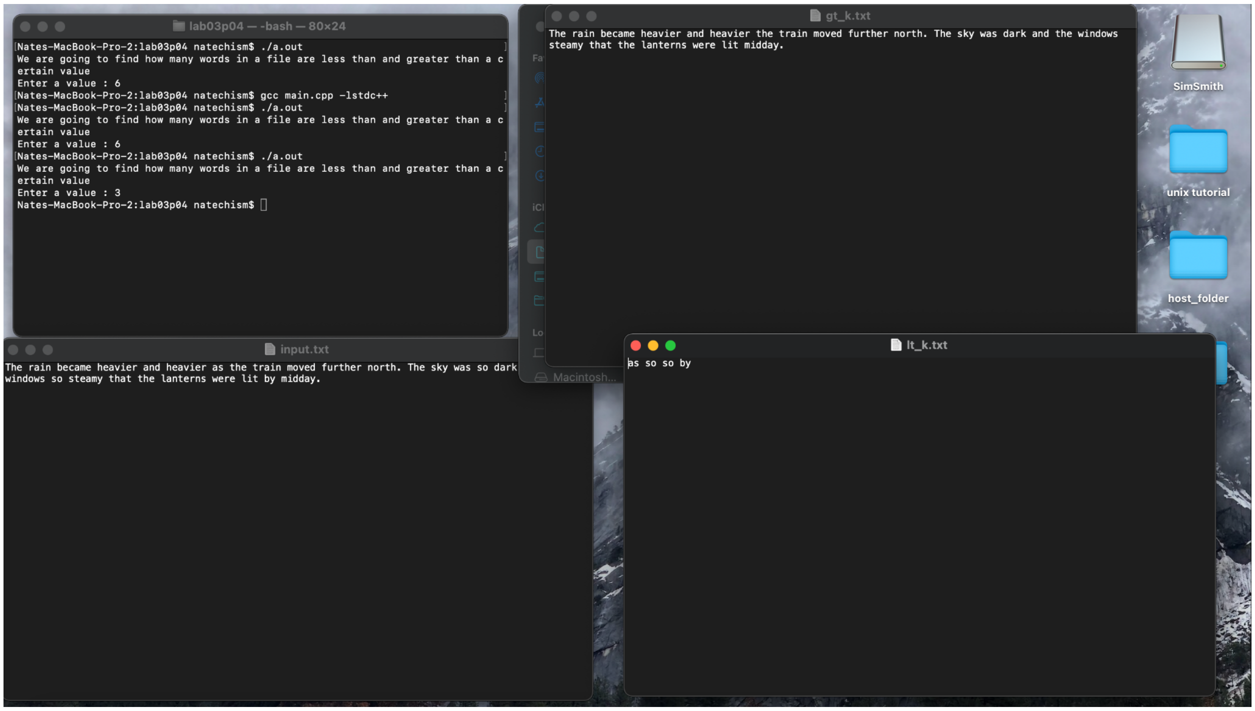
string_355.cpp
B) This file creates a class similar to the C++ class string. This class (called str_class) stores an array of character pointers and the size of the string. There are 3 constructors for this class, one that fills the value with a nullptr of size 0, one takes an array of character pointers and a size, and one is a copy constructor that creates a deep copy of the str_class value. The function add_new_item appends a new character to the end of the string. The function delete_last_item removes the last character from the string. There are also two functions str_size() returns the

size of the string and str_data() returns a character array that contains the contents of the string. Lines 33 - 38 of the file were directly coded using https://github.com/bryangoodrich/cpp_String/blob/master/String.cpp. This creates a deep copy of the new str_class variable being created when this copy constructor is called.

Part 4

greater_than_k.cpp

This file contains a program that reads the contents of a text file (input.txt). The program prompts the user for a value k. The program then compares every word in input.txt and checks if its value is greater than or equal to k. If the word is >= k, the the word is written to the file gt_k.txt. If not, the word is written to lt_k.txt. Below are some examples of the same file being evaluated with different values for k.

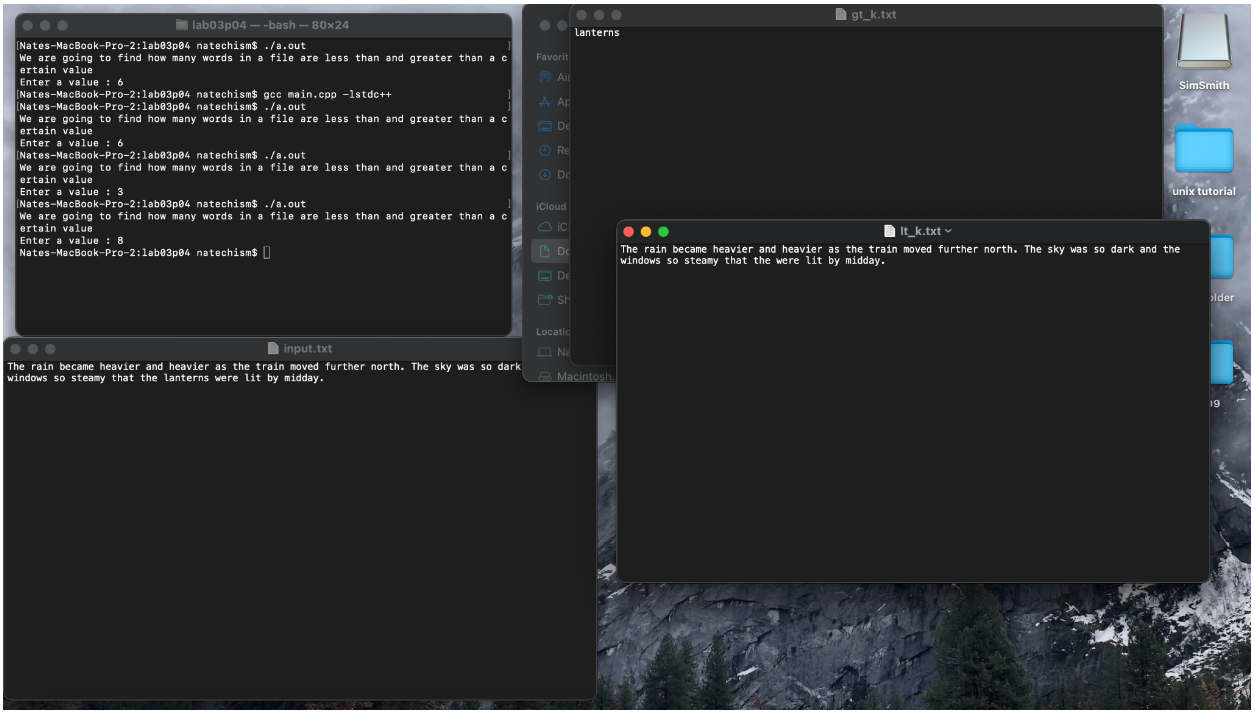


```
Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
Nates-MacBook-Pro-2:lab03p04 natechism$ gcc main.cpp -lstdc++
Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 3
Nates-MacBook-Pro-2:lab03p04 natechism$ 
```

```
The rain became heavier and heavier the train moved further north. The sky was dark and the windows
steamy that the lanterns were lit midday.
```

```
The rain became heavier and heavier as the train moved further north. The sky was so dark
windows so steamy that the lanterns were lit by midday.
```

```
as so so by
```

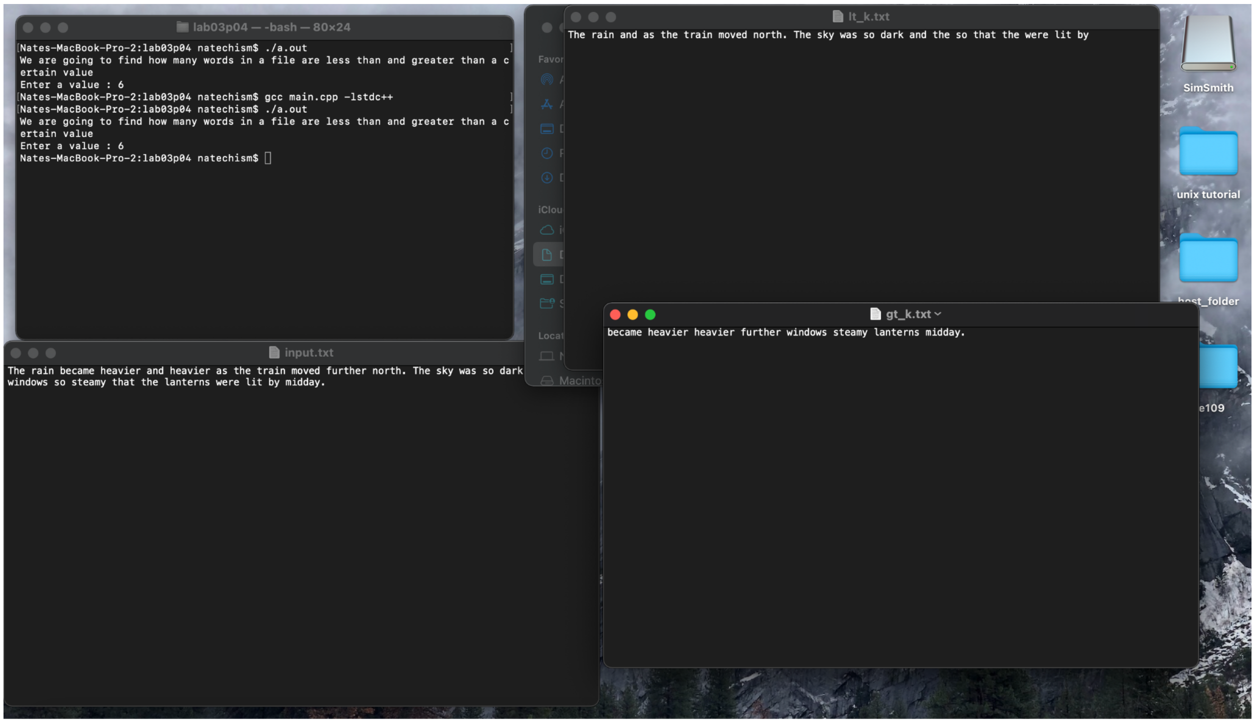


```
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
[Nates-MacBook-Pro-2:lab03p04 natechism$ gcc main.cpp -lstdc++                 ]
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 3
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 8
Nates-MacBook-Pro-2:lab03p04 natechism$ 
```

```
lanterns
```

```
The rain became heavier and heavier as the train moved further north. The sky was so dark and the
windows so steamy that the were lit by midday.
```

```
The rain became heavier and heavier as the train moved further north. The sky was so dark
windows so steamy that the lanterns were lit by midday.
```



```
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
[Nates-MacBook-Pro-2:lab03p04 natechism$ gcc main.cpp -lstdc++                 ]
[Nates-MacBook-Pro-2:lab03p04 natechism$ ./a.out                               ]
We are going to find how many words in a file are less than and greater than a c
ertain value
Enter a value : 6
Nates-MacBook-Pro-2:lab03p04 natechism$ 
```

```
The rain and as the train moved north. The sky was so dark and the so that the were lit by
```

```
became heavier heavier further windows steamy lanterns midday.
```

```
The rain became heavier and heavier as the train moved further north. The sky was so dark
windows so steamy that the lanterns were lit by midday.
```