Faculty of Engineering and Applied Science

SOFE 3200U Systems Programming

Lab Report 5

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Objective

The objective of this lab was to learn general PowerShell programming as well as learn to develop programs using the visual studio development environment. For the first part of this lab, we simply create a PowerShell script to open both the visual studio development environment and a command prompt window. For the second part, we use the development environment to write a basic c program to sort numbers using bubble sort.

Questions

1. When working with Windows, what are the main structural differences you see that separate Windows and Linux?

   The file system in Linux works very differently from that of Windows. Windows has a main directory structure, and saves temporary files in multiple other folders related to the user. Windows also specifies paths by drive name rather than root folder. When working with the Windows command prompt, we noticed that it is much less powerful when compared to the Linux terminal. Also, since Linux includes its own package manager on most distributions, we don't need to manually add applications to our $PATH variable after installing them. Rather, the package manager will usually do this for us.

   Batch scripts and PowerShell files are also very different from bash scripts. The syntax in PowerShell is very similar to that of a higher-level programming language.

2. What are other types of sorts that exist? When compared to other methods, why is Bubble Sort not the most optimal?

   Bubble sort is an in-place sorting algorithm. This means that it does not use any excess memory when sorting. Some other types of in-place sorting algorithms include insertion sort and selection sort. Merge sort is an example of a sorting algorithm that required more memory. Algorithms like merge sort and quick sort require partitioning and recursion. There are also algorithms like counting sort, bucket sort and radix sort. These algorithms require sorting based on lexical values of the elements being sorted.

   The reason why bubble sort is not effective is because it has a general run time complexity of $O(n^2)$. The algorithm must iterate through the same set an unnecessary amount of times.

Individual Contributions

Jasindan Rasalingam – Helped work on the micro.bat file. Figuring out how to start the visual studio development environment regardless of the install location.

Darron Singh – Also helped work on micro.bat file. Helped compile the report.

Kaushal Patel – Helped write the report and write the bubble sort algorithm for task 2.

Ashwin Kamalakannan - Helped write the bubble sort algorithm and completed the rest of the report.

Conclusion

In this lab we learned new concepts about windows programming, PowerShell scripting and c programming. We had to find differences between Windows and Linux and we analyzed how sorting algorithms worked under the hood. We each contributed to the lab tasks and learned from them.