Jay Authement: A Self-assessment

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A professional overview of my journey through the computer science program

Jay Authement

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**Overview**

The intent of this professional self-assessment is to establish myself as an individual who has a solid foundation built upon core computer science concepts. Through my journey in the Computer Science Program at Southern New Hampshire University during the periods of January 2019 to the present, I have been introduced to large amounts of knowledge from Professors that have a passion in their fields of study, the type of passion that has driven me to go back to school and perform my best. My intent is to absorb every bit of technological advice presented to me and apply it to the real world to one day help create the software, robots, artificial intelligence, or any accompanying tools that will help to create better lives for everyone. Completing the various courses throughout my time at Southern New Hampshire University has opened my eyes to an extremely large field of possibilities, some that I never knew existed. This self-assessment is an artifact that will explain my accomplishments and where I intend to go with all this newfound knowledge.

**Professional Goals**

My original goal for starting the Computer Science Program at Southern New Hampshire University was not very defined. I wished to change my current career and pursue my passion in the computer science field, but I never knew specifically what careers really appealed to me. After completing my first few courses, I quickly learned of many different fields that grabbed my attention. The first class that really stood out to me was my DAT-220 course on data mining. In this class, I was shown how businesses in today’s world are constantly collecting more and more data on individuals and that there is a large need for data scientists and engineers to help sort through this data. The idea of being an individual in charge of finding hidden trends in enormous quantities of data that will help companies learn more about their customers sounds very exciting. I wish to be an essential asset to a company one day and being someone that can consistently find relevant information using data analysis tools, such as JMP, seems very enticing to me. Another class that has really narrowed down my career choices was my CS-350 class on integrated systems. Working on intricate machines and writing the software that makes it possible to interact with hardware is almost magic-like. The possibilities seem almost endless and careers in this type of field would seem to require a great deal of imagination and creativity. For either of these careers that I have been specifically looking at, a great deal of technological knowledge is required. I believe that my path so far has helped prepare me for careers such as these, as proven in my ePortfolio. A proficient understanding of algorithms is a must when it comes to sorting through big data quickly, which is exactly what my second artifact, Upgraded Vector Sorting, in my ePortfolio presents. With this program, I have effectively created sorting algorithms that can sort data using multiple techniques, usually that are chosen based on the amount of data that is to be sorted. As for my career interest in software integration, the Pi Weather Station I created shows exactly how my code interacts with the connected hardware, an essential skill required in this field. Hopefully with these skills I will one day be able to get one of these careers and help contribute to some project that has an impact on the world, big or small.

**Professional Strengths**

With the creation of my ePortfolio, I was given the opportunity to revisit projects that would help display my comprehension of some very important software engineering concepts: software design, algorithm design, and database design. Looking through and reviewing previous assignments for its creation was a great reminder of all the skills that I have gained through my schooling. Software design and engineering was presented in almost every class, but creating sequence diagrams and use cases, all part of learning the Unified Modeling Language in my IT-315 course, was an excellent resource to learn more on the subject. For my final project in this class, I created a use case diagram as well as use cases for a student information system, which is show below.

Diagram

Description automatically generated

(*IT-315 Use Case Diagram Example*)

Designing a program on paper using the UML is just as important as actually coding the program, as it will help to uncover methods and variables not thought of, especially for larger programs. From completing this class, I can now say that I have a solid base on designing a piece of software before it is even written in code. Database design has been taught in multiple classes, as well, but for the purpose of showcasing my skills I will display part of my final project from DAD-220. In this class I have learned to properly use MySQL and interact with a SQL database. Performing commands on the database such as deleting certain records and querying for specific results helps to show my knowledge in this field. Below is a picture from one part of a SQL query performed in this class.

Graphical user interface, text, application

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(*DAD-220 MySQL example*)

Finally, to help show my strengths in algorithm design, I have performed many exercises in my CS-260 class, ranging from creating hash tables to creating sorting algorithms. One specific example comes the deletion of nodes in a binary search tree. In this type of algorithm, the element to be deleted is replaced with the deepest rightmost node in the tree. First the algorithm traverses the tree to find the element to be removed, then traverses the tree to find the element that will replace it. Below shows an example of this type of function from my CS-260 class.

Text

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*(CS-260 Use Case Diagram Example)*

The included examples are just some of my works completed here at Southern New Hampshire University to help show my strengths in these categories.

**Professional Skills**

Throughout my current professional career and my studies here at Southern New Hampshire University, I have learned what it takes to be a successful member of a team. In a working environment, effective communication goes a long way. It does not help to sit quietly and wait for an answer to jump out at you, sometimes asking for help is essential. Being able to talk to others in a professional manner, especially when collaborating on a project, is a critical skill that is required in the computer science field. The best example to demonstrate this from my schooling comes from using GitHub to collaborate on a Java project the entire class worked on. Every student was required to clone and pull from a certain repository, while making it known what was changed and by who in the comments for any commits made. From this practice, I have learned just how developers collaborate remotely, while keeping the entire team up to date on any changes being made to the project. I have also learned the importance of stakeholders are in the development of software. Through many of my courses, I played the role of a developer in a scrum environment writing code, only to find out that a client’s requirements have changed from their original requests. Working in an Agile environment, this was to be expected and dealt with in a timely fashion by incorporating as much as possible in the next sprint. Ensuring the stakeholders are happy and their requirements are met is critical to ensuring a lasting working relationship with them.

**ePortfolio Artifacts**

To better demonstrate my skills learned during my time in the Computer Science Program, three specific artifacts have been chosen to further showcase my abilities in the software design, algorithm design, and database design categories. Each artifact was specifically chosen to showcase my strengths in these categories and further proven by enhancing and upgrading the artifacts.

The first artifact chosen to display my aptitude in software design was my Pi Weather Station that was created in my CS-350 class. This program uses a Raspberry Pi computer to connect to a variety of sensors and LEDs that read temperature, humidity, and light. The program was designed to take in the temperature and humidity, light up a corresponding LED to indicate the current conditions being monitored, and then output all the collected data to a JSON file once the program is stopped. To further enhance this project, a startup and shutdown function was introduced in version 1.1.0. When the program is started, a startup message will print to an attached LCD screen and the terminal, while also blinking the green LED twice before collecting weather data. When the program is shutdown with ctr-c, the shutdown sequence will run. This also prints a shutdown message to the terminal and LCD screen, while blinking the red LED twice.

About algorithms, a program from my CS-260 class was chosen that displays the knowledge I have learned from the course. The Vector Sorting program was designed to create and utilize the quick sort and selection sort algorithms, while displaying the time required to sort a list of elements. To enhance this artifact, version 1.1.0 introduces a new algorithm, the upgraded selection sort, which is a modified, slightly quicker version of the original selection sort. This sorting algorithm begins by first finding the minimum and maximum elements in an array and then placing the elements at the very beginning and the very end of the array during the first pass. Every following pass through the array will search for the minimum and maximum values again, except it will only search through what is left of the array after placing the previous minimum and maximum values. Understanding how to follow these loops and how the algorithms work is a critical skill to be successful in a career of either robotics or data mining.

My final artifact chosen to create my ePortfolio comes from my CS-340 course and was used to show my capability of working with databases, particularly MongoDB. In this program, a database of animals from a local shelter is imported into MongoDB. After a user is created to login to the database, they can perform CRUD (create, read, update, and delete) operations on the data that the database contains. All four functions were created from scratch using Python to interact with the database. For version 1.1.0, a new database was imported, and new functions were created to interact with it. First a new user was created to login and a new menu was created for the user to switch between the two separate databases. To perform CRUD operations on the new database, an entirely new set of functions were created that allowed interaction with the new database. This was a great opportunity to show my database skills, and successfully create a method of switching between two different databases, while still allowing for CRUD operations on each.

**ePortfolio Link**

[Jay’s ePortfolio | Jay Authement’s ePortfolio (formulagp.github.io)](https://formulagp.github.io/) or

https://formulagp.github.io