**4-2 Milestone Three: Enhancement Two: Algorithms and Data Structure**

**Graham Swenson**

**CS499 – SNHU**

In this narrative I will discussing the following prompts; first I will briefly describe the artifact. Secondly, I will justify the inclusion of the artifact in my ePortfolio. I will say why I selected the item, what specific components of the artifact showcase my skills and abilities for algorithms and data structure. Then, I will state if I met course outcomes that I planned to meet in my Module One outline; I will also provide any updates to my outcome-coverage plans. Finally, I will reflect on the process of enhancing and modifying the artifact. What did I learn as I was creating it and improving it.

First, I will describe the artifact; this C code is code I used in the course CS350: Emerging Systems, Architectures, and Technologies to provide logic for an embedded controller. Specifically, this code is used to control a Texas Instruments micro-controller that displays different flashing lights based off the temperature. This was created a year ago by me for this course, with aid from the course work.

I am using this artifact in my ePortfolio because I enjoy embedded software engineering and two, there are lots of organizations around where I live that utilize technology from embedded software companies. I live in a rural farming area and all modern farming implementations use multiple facets of embedded software engineering. Therefore, it was included in my ePortfolio so I could provide a relevant experience base for local organizations. The specific components of this artifact that show my skills in the algorithms and data structure category is the use of dynamic memory allocations for “sensors” and “malloc”, which showcases my understanding of dynamic memory allocation. Next, I used time driven task scheduling to trigger specific events with the function “timerCallback”. Additionally, I defined a sensor structure that demonstrates I know how to implement user-defined data types to organize data. The artifact was improved because I changed the code from a static array to a dynamic array.

In this next section, I will state if I met the course outcomes, I planned to meet with the enhancement in Module One. The original course outcomes I intended to meet in Module One were outcomes three and four; those being design and evaluate computing solutions to solve a given problem. Then it is to demonstrate an ability to use well-founded and innovative techniques, skills and tools in computing practices. I believe that I met both of those requirements, and I also met outcome two, which refers to develop and deliver professional quality communications in a coherent manner. I believe I accomplished this by making a working program with the relevant in-line statements, so other engineers can understand what I have made.

In this final paragraph I will reflect on the process of enhancing and modifying the artifact. I did learn how to make a dynamic array in this process, and I now understand better the benefits of dynamic arrays. First their ability to “grow” or “shrink” based upon a given set is important for efficient machine usage. The challenges I faced was how do I transfer any error handling, so my program doesn’t crash and works properly.