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CS-499 Capstone

SNHU

Professional Assessment:

My journey through the Computer Science program has significantly contributed to my professional growth and readiness to advance in my current career as a Systems Engineer with a specialization in cybersecurity. My ePortfolio represents a subset of my achievements, it highlights key competencies that are directly relevant to my career progression. For my selection and enhancement plan I selected 2 Artifacts, CS-330 Comp Graphic and Visualization and CS-250

The Enhancement 1 project in the ePortfolio that exemplified my knowledge of Software Design and Engineering, is the 3D Pyramid. This artifact was created and enhanced using Microsoft Visual Studio. In this project, a 2D image was the subject of becoming a 3D image using OpenGL. Enhancing a 3D image using Visual Studio and OpenGL is a multifaceted process that involves technical, artistic, and problem-solving skills. I included a narrative of the enhancement that describes the artifact further. I added multiple textures to the pyramids, by identifying an issue with the shader program. Shaders are essential for manipulating and enhancing 3D images. I added vertices to each object to rendered with its unique transformations, textures, and material properties. The code allows transformations to position, scale, and rotate objects within the scene and how to specify their appearance with textures and lighting. It also switches between shader programs (**gSurfaceProgramId** and **gLightProgramId**) as needed for different types of objects (surface and light source). During the process of enhancing a 3D image, I gained a deeper understanding of OpenGL and computer graphics in general. I used the C++ coding language, to update and create floating 3D Pyramid over a vast landscape:

A pyramid on a cliff

Description automatically generated

Figure 1 3D Pyramid Enhancement – Added textures and Shapes

The specific component of this project was to focus on applying more texture and include better camera control to create immersive and interactive 3D experiences. This enhancement aligns with the Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals course outcome.

Enhancement 2 of the ePortfolio was to focus on the Algorithms and Data Structures category. I used the same artifact and improved the camera function named to allow input from a user via keyboard keys using the keyboard keys. In the image below, you can see that this part of the code is a good example to discuss data structures used for representing objects in a 3D scene. This portion of the code is responsible for rendering a pyramid-like object (Pyramid\_1) in the 3D scene. It involves setting up the object's transformations, binding textures, and then drawing the object using OpenGL functions. I wanted to showcase that the project combines algorithms and data structures to manipulate the 3D objects, apply lighting models, and efficiently manage resources within the OpenGL graphics pipeline. By adding these components and arrays, it showcases the context of computer graphics and real-time rendering. It shows that I understand how shaders work and how to pass data to and from them to create realistic graphics. This enhancement was to align with the “Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution, while managing the trade-offs involved in design choices” course outcome.

A screenshot of a computer program

Description automatically generated

Figure 2 3D Pyramid Enhancement 2 - Algorithm

For the Enhancement 3 project, Databases was the category and I wanted to showcase my skills and knowledge in developing and implementing security measures for protecting the company’s sensitive information. I chose this artifact because it deals with data, and I wanted to demonstrate my skills and knowledge in developing and implementing security measures for protecting the company’s sensitive information. The artifact was improved by incorporating the Data Protection Plan (DPP). It was designed to show leadership, key stakeholders, company staff and future employers how critical database components are vulnerable to attacks due to several factors. The process of creating and enhancing the DPP reinforced the idea that cybersecurity is not just a technical matter but a multidisciplinary effort that involves technology, people, and processes. It underscored the need for adaptability, clear communication, and a commitment to continuous improvement in the ever-evolving landscape of cybersecurity. This enhancement aligns with two of the Course outcomes: “Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision making in the field of computer science” and the “Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources” course outcomes.

As a System Engineer, collaboration with team members, clients and stakeholders is paramount. The ability to communicate effectively with cross-functional teams ensures the seamless integration of systems and applications. Throughout my coursework, I have actively participated in group projects, during the CS-310 Collaboration and Team Project course and CS-250 Software Development Lifecycle course, these courses were integral in building my collaborative skills, by enabling me to communicate and coordinate effectively with stakeholders and other key roles when developing an application or software. These collaborative courses gave me the opportunity to apply these skills in my current position as well. Communicating with stakeholders is crucial for an organization’s success because they should be involved in the decision making by providing input and feedback. It helps build relationships, and ensure that everyone involved understands the organization's plans, progress, and challenges.

There have been other courses throughout the Computer Science journey that have also equipped me with expertise in database management. The IT-320 Network Security and DAD-220 Intro to Structure Database Environment. These courses have allowed me to learn and apply them to my current employment. This experience not only showcased my ability to create databases but also reinforced my understanding of data security and integrity, a critical aspect of modern database management. These courses not only expanded my technical skill set but also emphasized the importance of safeguarding data in our interconnected world, demonstrating the critical role that network security and structured database management play in today's digital landscape.

This overall experience of delving into programming, working with algorithms, and introduced to software development, gave me the gratification of coding solution. Moreover, the communication and collaboration skills I acquired in group projects were invaluable. Learning to convey complex technical ideas in a clear and concise manner to peers and stakeholders became a crucial aspect of my education. This not only enhanced my understanding of the subject but also highlighted the importance of effective communication within the realm of technology.

During my tenure in the Computer Science program at Southern New Hampshire University, I have undergone a transformative journey that has not only shaped my professional goals and values but has also equipped me with the skills and knowledge necessary to become an asset to prospective employers. I have been contacted by numerous Technical Recruiters since I displayed that I have a Computer Science degree and my some of federal program managers have offered employment opportunities too.