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Final Capstone Narrative

My passion for computer science and the endless opportunities that come with it have only grown since studying at South New Hampshire University. Throughout my time at SNHU my understanding and skills have developed into a skill set that has prepared me for the technical field of computer science. While working on my computer science capstone I have been able to not only refine my technical skills but also showcase my strengths while also helping to enhance my professional goals. During the Computer Science program at SNHU I was able to get a strong support structure to encourage learning but also experience not only in technical projects but also group environments. I have developed many applications throughout my time in university, one that really showcases my graphical prowess and strong understanding of an applications goals would involve a project for cs330 which involves recreating a picture you take within a 3D environment utilizing OpenGL.

A computer screen shot of a computer

Description automatically generated

This project was based on recreating an image you took that needed to have a specific number of objects within view. I decided to make the project more complicated to help showcase my expertise by introducing clear layers and a snow globe that features clear glass and a figure within it. Utilizing the shapes, we were given to create the objects within the picture although limiting did help explore my creativity and help me reach the goals of the assignment in a way that I felt would help showcase my understanding working with OpenGL.

My expertise, skills, and mindset when working within a team environment has been sharpened thanks to my time at SNHU. I have a strong understanding of the mindset you should have within a team environment and how to not only adjust to change but also excel. I also have firsthand experience working within the SCRUM mindset and have a strong understanding of the SCRUM roles and goals. My understanding and expertise are only one topic that I have been able to grow expertise in, communicating with stakeholders and users has also been an extremely important area of focus within my studies and development process. I have developed a goal and development focused mindset while ensuring I take into consideration not only the stakeholders needs but also the user’s needs. Ensuring I have a strong foundational understanding of how to communicate the goals of the stakeholders and the needs of the users is a skill that I have been able to develop through my time at SNHU.

Data structures, algorithms, software engineering, and databases were all integral to my learning process and throughout my time at SNHU I was able to grow a strong understanding and expertise in each of these areas. I utilized my knowledge of Data structures and Algorithms to help optimize performance within my application. My expertise in Software Engineering ensured my code was maintainable, scalable, and user friendly. My database utilization helped maintain data integrity, organization, and efficiency throughout my projects. By Utilizing databases within my projects, I was able to ensure my data could be accessed through the application while also ensuring data collected was safe and secure. The security mindset I developed during my time of SNHU helped showcased my dedication and expertise in keeping applications, and information secure and safe from outside eyes. Security is of major importance and ensuring users continue to trust applications I work on is of extreme importance. Ensuring my ethics for computer science and my integrity are firm help ensure safe developmental practices that do not harm the users or put any users at risk. Ethics are extremely important to not only the applications success but also to the safety of the users and the company image.

For my Computer Science Capstone I utilized only one Artifact, the artifact I chose was Called Spaceship Escape!!! and each enhancement I made on the application helped showcase my skills and expertise when demonstrating my computer science abilities. Within this ePortfolio I have showcased the following skills and abilities:

* Ensuring and promoting a collaborative coding environment.
* Highly detailed code documentation, functionality, and details.
* Encourage code adaptation and improvement through well designed code.
* Showcasing high level understanding of code and gameplay.
* Support future code enhancements by other developers.
* Android Studio Environment utilization and adaptation.
* Supporting a strong understanding for UI/UX Design.
* Improved application navigation and audience engagement.
* Strong understanding of optimizing code and increasing efficiency.
* Utilizing algorithmic logic to ensure smooth application processes.
* Database utilization and integration within an application.
* Ability to utilize a wide range of unique databases such as MongoDB and Firebase.
* Understanding data requirements and best database solution.
* CRUD Development and Utilization.
* Android Studio Utilization and the Mobile environment for development.
* Security mindset utilizing best practices to ensure the safety of the application and user data.
* Data Validation and Data Encryption.
* Application expansion and adaptation during the development process.

Course Outcome 1: I Employed strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science by completing the following enhancements, I ensured and promoted a collaborative coding environment by utilizing well documented code that brown down how my code functioned and the intent of my application. I also made sure that my code was well commented which would all other developed to easily adjust features of the application. My code is also designed in a way that would allow for further adaptation and improvement to the code.

Course Outcome 2: I Designed, Developed, and Delivered professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts by completing the following enhancements, I ensured that communication within my applications code and gameplay was clear. This would allow clear communication not only for the players of the application but also for any future developers that utilize my code. I also ensured that my application was appropriately adapted to the android studio environment and adapted to the needs of the users of that environment. I also utilized a clear user interface design which will help audiences better understand the application navigation.

Course Outcome 3: I Designed and Evaluated 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 by completing the following enhancements, I created algorithms that would solve the problem of a game timer and of room randomization. With this I have been able to utilize algorithmic principles and computer science practices and standards that were able to appropriately solve the problem at hand. To overcome these challenges, I utilized Array Lists and HashMap’s to better randomize the rooms while also ensuring consistency in room connectivity. With this enhancement I introduced uncertainty and a timer to players of the game. Although this was an initial downside for the player this will add more intensity and engagement for the player base while also introducing a more interactive experience when playing through the game. In order to meet the expectations of the enhancement I also had to keep in mind the potential trade-offs and effects this would have on the original aspect and design of the game. Removing description guides of where the player should move to encourage a more exploration-based gameplay was important to increasing the playability of the game.

I optimized my code by ensuring the systems I utilized would benefit not only the player but also the efficiency of the games code. I utilized countdown timer for use when working on my in-game timer. Using the built in java tool ensured I the countdown was accurate, updated, and ensured I could avoid having to loop through the timer as I initially attempted to. Time complexity was very important when it came to ensuring consistent usage and efficiency of the game. Utilizing lists, HashMap’s, loops, and timers meant I needed to ensure the game was running smoothly and was optimized appropriately. O(n) complexity was used when going through the rooms of the ship and when setting a timer number. Were as O(1) complexity Was involved when adding or manipulating lists, HashMap’s, and each tick of the timer since those aspects would remain constant. Ensuring the complexity also ensured that each game state would follow the same rules and ensure game completion was always possible.

The efficiency of Algorithmic logic was important in ensuring the smooth gameplay and running of spaceship escape. By ensuring the countdown timer provided real time accurate feedback and ensuring the timer updated appropriately helped the users gameplay experience and the efficiency in how the system runs. I also focused on adding, removing, and cycling rooms from lists to ensure I could sort the rooms in the order they needed to without needing to do unnecessary checks as I know since the rooms were removed or added it was working as expected. By ensuring to focus on the optimization, time complexity, and algorithmic logic efficiency elements I was able to ensure the game was accurate, efficient, and engaging to the player experience.

Course Outcome 4: I Demonstrated 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 by completing the following enhancements, I showcased my ability to understand the data requirements and find the best database solution that not only ensured clean integration but also data security and encryption. I was able to showcase my skills with the Firebase Database which I was able to utilize through Android Studio which in of itself is a tool which is used for implementing industry specific goals of creating applications for the android system. By also introducing CRUD techniques into my database design, I was able to deliver industry specific utilization.

Course Outcome 5: I Developed 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 by completing the following enhancements, I developed a security mindset by ensuring my firmware, and frame ware were up to date involved fixing past potential vulnerabilities that came with old updates. I also ensured the database I chose had encryption for all information being transferred to the system to protect against data vulnerabilities. I mitigated the opportunities within my game that would allow vulnerabilities to be present. I ensured that the data that the user input into my database was validated ensuring no potential SQL injections. By choosing Firebase I ensured enhanced privacy and security when utilizing the Firebase database. I also ensured that all data within my database were protected by Administrators, So the program itself will be able to read and write data to the database as intended but will be unable to update or delete information from the leaderboard without direct administrative privileges which is tied behind unique email, password, and two factor authentication.