Team Members:

1. Grant Fullenkamp
   - Email: fullengm@mail.uc.edu
   - Phone: 937-478-4464
   - Role: Project Manager (Responsible for coordinating team meetings, setting agendas, and ensuring that the project stays on track in terms of timelines and goals.)

2. Trevor Darst
   - Email: darsttd@mail.uc.edu
   - Phone: 440-785-4177
   - Role: Researcher (Responsible for conducting research related to the project, gathering data, and providing insights and information to support decision making.)

3. Roshan Krishnan
   - Email: krishnr2@mail.uc.edu
   - Phone: 513-795-9630
   - Role: Content Creator (Oversees producing written content, visuals, or other media required for the project, ensuring it aligns with our goals and objectives.)

4. Noah Heinen
   - Email: heinennc@mail.uc.edu
   - Phone: 513-767-5271
   - Role: Quality Assurance and Editing (Responsible for reviewing and editing the project deliverables to ensure accuracy, clarity, and overall quality before submission.)

Team Meetings:

Frequency: We will hold team meetings weekly throughout the term. Outside of this, meetings will occur on Discord when group members are available to collaborate.

Timing: Our weekly catch-up meetings will take place on Tuesdays and Thursdays at 2pm EST in Automata class, Baldwin 544.

Project Focus:

Our project for this term is to leverage Unity in implementing reinforcement learning for virtual agents. These agents will learn and adapt within immersive scenarios, using neural networks to optimize their actions based on rewards and penalties. Our goal is to showcase how reinforcement learning enhances the intelligence of virtual agents, with potential applications in simulations.

Our computer science senior design project revolves around the exciting realm of using Unity for implementing reinforcement learning in virtual agents. In this ambitious endeavor, we aim to create a dynamic and immersive virtual environment where simulated robotic agents can learn and adapt through reinforcement learning algorithms. Unity, with its versatile game development capabilities and robust physics engine, provides an ideal platform for crafting lifelike scenarios for our virtual agents to navigate and interact within. Our project's primary focus is to design and implement cutting-edge reinforcement learning algorithms that enable these agents to acquire intelligent decision-making skills and exhibit adaptive behaviors, such as problem-solving, exploration, and goal achievement. By integrating Unity's powerful real-time rendering and physics simulation with reinforcement learning, we hope to advance the field of AI and gaming by fostering the development of more intelligent and realistic virtual characters and scenarios, with potential applications spanning from gaming to training simulations and beyond. I hope to show our advisor the skills we have learned from classes here and extend them to a growing sector of interest that we will enjoy applying ourselves to.

Our project's success in Unity for implementing reinforcement learning in virtual agents hinges on a comprehensive foundation in data analysis, software development, introductory AI concepts, and statistics. Data analysis skills will prove instrumental in preprocessing and understanding the vast amount of data generated during agent-environment interactions, enabling us to make informed decisions about model training and performance evaluation. Software development expertise will ensure the efficient and well planned integration of Unity with reinforcement learning algorithms, allowing us to create a seamless virtual environment. Our understanding of introductory AI concepts will provide the necessary theoretical underpinning to design and fine-tune reinforcement learning algorithms for our virtual agents. Lastly, a strong grasp of statistics will enable us to evaluate the agents' learning progress objectively, providing key insights for refining our models and optimizing their performance. Together, these interdisciplinary skills form a robust framework that guides us in developing intelligent, adaptive virtual agents that can navigate Unity-based environments with competence and sophistication.

Drawing from my diverse experiences as a test engineer, software developer, and robotics application engineer, I bring a unique perspective and skill set to our project focused on leveraging Unity for implementing reinforcement learning in virtual agents. As a test engineer, I've honed my ability to methodically identify and address issues within complex systems, which will prove invaluable when debugging and refining different virtual agent's interactions in created Unity environments. My software development background equips me with the technical prowess to efficiently code and integrate the reinforcement learning algorithms and ensure seamless compatibility with Unity's powerful capabilities. Moreover, my experience in robotics applications offers insights into real-world problem-solving and sensor integration, translating well into the design of realistic virtual environments where our agents will learn and adapt. These diverse roles collectively inform our project strategy. This will enable us to approach the development of intelligent virtual agents with a holistic understanding of the technical challenges and practical applications, and ultimately, resulting in a more robust and sophisticated implementation.

As a fan of microcontrollers, human-machine interaction, and computer vision, my passion for the intersection of technology and human experience serves as a powerful motivator for our project aimed at this reinforcement learning project. My affinity for microcontrollers underscores my appreciation for hardware-software integration. This will be pivotal in crafting immersive and responsive simulations within Unity. My interest in human-machine interaction fuels my drive to create virtual agents that can engage and interact with users in intuitive and meaningful ways, pushing the boundaries of user experience in virtual spaces. Furthermore, my enthusiasm for computer vision encourages me to explore advanced visual perception techniques within Unity, enabling our agents to possibly navigate and interact with their virtual surroundings more realistically. As a computer science student, this project represents the culmination of my academic journey, where I can apply my acquired knowledge and skills to develop innovative solutions at the crossroads of artificial intelligence, human-computer interaction, and immersive technologies, making this endeavor all the more inspiring and fulfilling.

Our initial approach to designing a solution for using Unity in implementing reinforcement learning for virtual agents involves much work in different technologies. With for groupmates this will be hard coordinating all the work so frequent meetings are to be expected during planing and start up. I'm thinking of everyone hands on deck for creating a base environment/agent in unity and reinforcement learning processes to successfully interact with this, but then to possibly move in different directions with this base in order to specialize in our own self interest. The planning phase will take a lot of research on possibilities of deliverables. We do not know now on the exact criteria we wish the project to be judged on, but we want to get in depth experience on simulation and utilization of unity and the application of reinforcement learning. With the help of Grant and our mentor from Riverside Research, we should have a good knowledge base to tap into for these goals.