Senior Design
Constraint Essay
Cameron Estridge

The development of Pixel Coliseum faces several constraints that shape the final design scope of the project. Economically, the project must rely entirely on open-source and freely available technologies due to the absence of an external budget. This limitation restricts the use of certain premium tools, asset libraries, and multiplayer hosting services, requiring careful optimization and self-hosted testing environments. Professionally, the project contributes to my growth as a software engineer by strengthening my skills in full-stack web development, networking, and AI design, while also requiring adherence to software engineering standards and maintainable coding practices. Because this project may be publicly demonstrated, professionalism in code quality, UI design, and documentation directly affects its credibility. Ethically, the project avoids collecting personal data and ensures that no offensive or inappropriate content is included in player chat, art, or AI behavior. Efforts will be made to foster a positive and respectful player experience through moderation and ethical design choices. Security constraints also play a major role, as online multiplayer functionality introduces risks of data interception, cheating and unauthorized access. To mitigate these risks, secure WebSocket connections, input validation, and sanitized server communication will be implemented. Overall, these constraints guide the project toward an efficient, ethical, and technically responsible implementation suitable for both academic and professional presentation.