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Generative AI and Learning: Using Retrieval-Augmented Generation (RAG) for C++ Tutoring

By utilizing advancements from the field of AI, we aim to develop a tutoring app that answers the questions of intro-level C++ programming students, while creating a framework to expand into other academic areas. A Retrieval-Augmented Generation (RAG) approach will provide targeted feedback, dynamically generating context-specific responses by interfacing with a locally hosted AI.

Our goal is to minimize the risk of oversaturated or hallucinated responses. By processing incoming questions from users and communicating with the AI model, a RAG method ensures that the answers generated by the backend are both concise and relevant to the search. The front end will allow students to easily input their questions and view immediate feedback, ultimately enhancing the interactive learning experience. The functionality will be custom-built, while the graphic design from a previous personal project will be used. Combined, these systems will create a user-friendly application that provides students with clear and direct responses to their specific queries.

Overall, the project aims to create a scalable and efficient tutoring tool. Not only would this tool improve students’ understanding of C++ programming concepts, but it could be integrated into other educational platforms. Unlike the VS Code extension Continue or other similar tools, our project is designed as a two-part web application for easy integration into current LMSs (Learning Management Systems).  The desired outcome is an engaging, adaptive, and accessible learning environment that can be extended to additional subjects and environments in the future.