

Web-Compatible Graphics Visualization Framework for Online Instruction and Assessment of Hardware Concepts.

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WEB-COMPATIBLE GRAPHICS VISUALIZATION FRAMEWORK FOR ONLINE INSTRUCTION AND ASSESSMENT OF HARDWARE CONCEPTS

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ABSTRACT

This paper explains the design of a graphics-based virtual environment for instructing computer hardware concepts to students, especially those at the beginner level. Photorealistic visualizations and simulations are designed and programmed with interactive features allowing students to practice, explore, and test themselves on computer hardware and architecture concepts. Despite the essential lab-oriented nature of hardware courses, theoretical knowledge is still a significant aspect of hardware and computer architecture courses. The use of a visual framework serves to reduce the cognitive load and also facilitates bridging the gap between lab and theory components. The framework includes virtual demonstrations that help students get familiarized with and understand the hardware concepts, practice the exercises for as long as required, and also finally take self-assessment to evaluate mastery of the concepts. This framework greatly reduces the restrictions experienced in educational institutions in terms of limited hardware, space and time limitations (of laboratories), as well as costs associated with installation, operation, and maintenance. Besides, there is a reduced risk while using a visual framework as opposed to an electrical equipment. Hence, on the whole, this framework offers an easy-to-access and use modality for users to get trained on computer hardware and architecture costs and also can serve as a valuable tool for educational institutions in supplementing hardware courses.

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