An Interactive Tool for Self-Studying or Teaching the Inner Workings of a Simple 8-Bit Central Processing Unit

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The project is a tool for simulating a simplified version of an 8-bit computer processor and how data moves inside one. This open source tool is built with Processing 3 and can be compiled into an executable file for most platforms or run directly from the Processing IDE. The purpose of this tool is to simplify something complex to make it easier to learn and understand. It can be used to learn the processor fundamentals, which can also help with understanding the very basics of cyber security aspects regarding processors and optimizing computational algorithms. The interactive user interface is a 3D cube, which the user can navigate with the arrow keys. The sides of the cube contain the processor view, the Random-Access Memory explanation view, the component explanation view and a configuration page. The system speed can be adjusted, and a simple program can be selected from the configuration page. The application has been presented in three occasions: for a professional audience, for a group of young programmers aged 7-16 and to a programming teacher. All feedback received about the project has been positive, especially that the visual side of the application looks clear and interesting and that the Graphical User Interface is intuitive. The application is available for anyone for use from GitHub as open-source. The application runs stable and no logical errors have been reported. Finding the right educational target group for this tool would require further testing, but it works as a self-learning tool for anyone interested.

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