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i - Ja M C S I I X  
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# ABSTRACT BOOK 2023

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INTERNATIONAL JASIN  
MULTIMEDIA AND COMPUTER SCIENCE  
INVENTION AND INNOVATION EXHIBITION

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# **i - J a M C S I I X**

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## **8th November 2023 Wednesday**

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## 2023

INTERNATIONAL JASIN MULTIMEDIA & COMPUTER SCIENCE  
INVENTION AND INNOVATION EXHIBITION (I-JaMCSIIIX) 2023

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## International Jasin Multimedia & Computer Science Invention and Innovation Exhibition



# PLC-Based Water Filling Machine Simulator for Teaching and Learning Activities

Kamaru Adzha Kadiran<sup>1</sup>, Rozi Rifin<sup>2</sup>, Mohamad Zhafran Hussin<sup>3</sup>, and Ezril Hisham Mat Saat<sup>4</sup>

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**Abstract**— The Omron PLC-Based Water Filling Machine Simulator is an innovative educational tool poised to revolutionize industrial automation education. This simulator offers an immersive and practical learning experience, making it an invaluable asset for educational institutions, trainers, and individuals seeking to gain hands-on expertise in PLC programming and industrial automation processes. The conventional approach to teaching Programmable Logic Controller (PLC) programming and industrial automation has often suffered from a lack of hands-on practice, hindering the development of practical skills among learners. To address this educational gap, this study introduces the Omron PLC-Based Water Filling Machine Simulator, aiming to revolutionize the way industrial automation education is delivered and elevate the effectiveness of PLC programming instruction. The primary objective of this study is to design and create a highly realistic simulator that accurately emulates the operation of a water filling machine commonly found in industrial settings. Besides, it's used to facilitate hands-on PLC programming practice by seamlessly integrating Omron PLC technology and offering diverse programming challenges. A comprehensive review of industrial automation processes, PLC programming principles, and existing simulators informed the design and functionality of the simulator. Utilizing cutting-edge software development tools, a dynamic and user-friendly interface was created, allowing users to interact with the virtual water filling machine. The simulator accurately replicates the behavior of industrial components, including conveyors, sensors, pumps, valves, and tanks. A diverse set of programming challenges, ranging from basic ladder logic to advanced tasks involving timers, counters, and sequential control, was incorporated. The Omron PLC-Based Water Filling Machine Simulator has demonstrated remarkable success in enhancing teaching and learning activities in industrial automation. Learners gain a profound understanding of PLC programming principles and industrial automation processes through interactive, hands-on experience. The simulator effectively fosters users' problem-solving abilities by challenging them to address simulated faults and optimize system performance. Apart from that, users develop practical skills in configuring, programming, and troubleshooting Omron PLCs, preparing them for real-world applications. The Omron PLC-Based Water Filling Machine Simulator has emerged as a transformative tool for industrial automation education. It bridges the gap between theory and practice by providing a realistic, interactive learning environment. This simulator not only enriches educational curricula but also prepares learners to excel in the field of industrial automation, contributing to the advancement of modern manufacturing processes. Embracing this innovation ensures that the future of industrial automation education is dynamic, engaging, and highly effective.

**Keywords**—PLC, Simulator, Water Filling Machine, Automation, Education, CX Programmer, CX Designer



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