

DIR-V Symposium Hackathon

Track: Hardware Product Development

Objective:

To conduct a RISC-V product development hackathon that allows participants to experiment with RISC-V architecture and develop applications on this open-source hardware platform. The RISC-V Product Development Hackathon aims to foster innovation, collaboration, and the practical application of RISC-V technology. By providing participants with the necessary tools, guidance, and resources, we seek to empower them to create groundbreaking RISC-V-based products. This hackathon will serve as a catalyst for the development of new ideas, networking opportunities, and the advancement of the RISC-V ecosystem. We invite enthusiasts, developers, and researchers to participate in this exciting event and help shape the future of RISC-V technology.

How: Hands-on Online

Participants will

- Gain hands-on experience with RISC-V tools (Spike, Verilator, RV32/64 gcc).
- Understand performance and code-size trade-offs in embedded systems.
- Learn advanced compiler optimizations, pragma usage, and extended assembly integration.

Who can Participate:

1. Students
2. Researchers
3. Start-Ups (Active for 2 years)

#	Challenge	Key Tips
1	Local Smart Home Automation	- Use temperature, humidity, and motion sensors. - Implement Wi-Fi/Bluetooth for communication. - Provide secure, user-friendly interfaces.
2	Local Robotics and Automation	- Integrate sensors like ultrasonic and cameras. - Centralize control logic for navigation and obstacle avoidance. - Enable precise movements.
3	Wired IoT Solutions	- Use I2C, SPI, or UART for communication. - Aggregate and normalize sensor data centrally. - Offer real-time monitoring interfaces.

4	Energy Efficiency and Management	- Monitor energy using sensors and actuators. - Analyze data for optimization. - Provide mobile dashboards with secure access.
5	Water Conservation	- Integrate flow and moisture sensors. - Optimize irrigation with actuators. - Offer actionable insights through user-friendly interfaces.
6	Assistive Technologies	- Use sensors and actuators for mobility or communication aids. - Tailor features to user needs. - Provide secure, reliable communication.
7	Disaster Response and Management	- Integrate sensors like seismic and weather. - Use satellite or mesh networks for communication. - Provide real-time alerts and updates.

Pre-requisites

1. Technical Knowledge

1. Basic Electronics and Microcontrollers:

Understanding of sensors, actuators, and development boards

2. Programming Skills:

Proficiency in programming languages such as Python, C/C++, or JavaScript.

2. Communication Protocols

1. Networking:

Knowledge of wired and wireless communication protocols (e.g., WiFi, Bluetooth, I2C, SPI, GSM).

2. Data Transmission:

Understanding of sensors, actuators, and development boards