**WHAT IS RISC-V?**

RISC-V (pronounced "RISC-Five") is a revolutionary instruction set architecture (ISA) that has a strong connection to VLSI (Very-Large-Scale Integration) because it's open-source, modular, and hardware-friendly, making it ideal for VLSI design and custom chip development.

It is designed at UC Berkeley for efficiency.

Why is RISC-V important in VLSI?

1. Custom Processor Design

VLSI engineers can design custom chips (SoCs) using RISC-V cores tailored for:

Low power (IoT)

High performance (AI, embedded systems)

Security (crypto cores)

2. RTL Implementation

You can use HDL (like Verilog/VHDL) to implement RISC-V cores in synthesisable RTL, and simulate/test on tools like:

Xilinx Vivado

ModelSim

Cadence

Synopsys

3. Fabrication Ready

4. Toolchain & Ecosystem

Available open-source cores (e.g., Rocket, PicoRV32, BOOM)

Toolchains: GCC, LLVM, OpenOCD, QEMU

Works well with FPGA prototyping, a key step in VLSI chip design

Applications of RISC-V

ASIC Design Custom chips with RISC-V cores for niche applications

FPGA Prototyping-Test RISC-V designs on FPGAs before fabrication

SoC Projects RISC-V cores + peripherals (UART, GPIO, etc.) on a chip

**Questions asked to AI chatbots:**

1)Windows: Do not change your existing OS. Install Ubuntu 22.04 LTS in Oracle VirtualBox (2

vCPUs, 4–8 GB RAM, 30 GB disk). Then run the tasks inside that Ubuntu VM. help me step by step

2)I just installed Ubuntu. What should I do with the ISO image, and how do I add it to the new virtual machine in VirtualBox?

3)code and keyword explanations for the processes step by step.

**Points Noted**

1)The memory allocation for the virtual disk creation was followed according to the instructions given in the introduction pdf given.

2)SATA-virtual hard disk controller that your virtual machine uses.

3)BOOT oder correction check for smooth functioning of vm.

**CODES AND COMMANDS**

**cd:** This command stands for change directory.

pwd:is a command that stands for "print working directory." It prints the full path of your current location in the filesystem.This is a bit redundant and doesn't affect the filesystem, but it's a valid shell command.

**mkdir -p riscv\_toolchain**:

* mkdir stands for "make directory." It is used to create new directories (folders).
* riscv\_toolchain is the name of the directory you wish to create.
* -p is a flag that means "parents”.

The purpose is mainly organisation.

* **cd riscv\_toolchain**: This command changes your current working directory to the newly created riscv\_toolchain directory. After running this command, any subsequent commands will be executed from within the riscv\_toolchain directory.
* After getting the code format and ubuntu usage:  
  Code compilation for unique test:nano unique\_test.c

Write code

ctrl+o=file names

ctrl+x=exiting writing of code