Week 5 Task – OpenROAD Flow Setup and Floorplan + Placement

Objective

To set up the **OpenROAD Flow Scripts** environment and execute the **Floorplan** and **Placement** stages of the physical design flow.
This task transitions you from SPICE-level transistor design (Week 4) to **backend implementation**, where logic is converted into an actual physical layout.

Why This Task Is Important

After understanding how timing arises from transistor-level circuits, it's time to see how those circuits are physically realized on silicon.
This task introduces you to **OpenROAD**, an open-source RTL-to-GDSII flow widely used in academic and industrial research.
Learning to perform **floorplanning** and **placement** helps you understand:

- How design constraints are applied before routing.
- How standard cells are arranged to minimize delay, area, and congestion.
- How physical design choices affect timing and manufacturability.

This is your first step toward a full **physical implementation flow** in VLSI design.

Task Reference

Use the following repository as your reference for installation and running the required flow steps:
OpenROAD Reference – https://github.com/spatha0011/spatha_vsd-hdp/blob/main/Day14/README.md

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Task Components

1. Install OpenROAD Flow Scripts

- Clone and install **OpenROAD Flow Scripts** on your Linux system.
- Follow all prerequisite installations as listed in the reference repo.

- Verify successful setup by launching the OpenROAD environment (flow.tcl or equivalent).

2. Execute Floorplan and Placement (Strictly Only These Two Stages)

- Run the OpenROAD flow up to the **Floorplan** and **Placement** stages.
  ⚠️ *Do not proceed to routing or any later stages this week.*
- Confirm:
  - Core area and die dimensions are generated.
  - Standard cells are placed successfully.
- Review generated logs and intermediate design files.

Deliverables

Submit documentation showing **clear installation and execution proof**:

1. **Snapshots / Screenshots** of your terminal with:
   - Commands executed
   - Visible Linux username (to confirm personal setup)
   - OpenROAD installation success messages
   - Floorplan and placement completion logs
2. **Images / Outputs** of:
   - Floorplan view
   - Placement layout (standard cells visible)
3. **Short Summary** (3–4 lines) describing:
   - The steps you followed
   - Any challenges faced and how you resolved them

✅ **By the end of Week 5**, you will have:

- Successfully installed **OpenROAD Flow Scripts**.

- Executed and verified **floorplan + placement** stages.
- Produced visual and logged evidence of your working environment.