

ICLAD 2025 GenAI Hackathon



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Hackathon Overview



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Problem Categories and Track

Hackathon Tracks

The hackathon features two exciting tracks:

SLM Challenge

- Solve design tasks using **small language models (SLMs)** on **low-cost laptops** provided at the event.

Open Challenge

- Use any **GenAI models**, including **large language models (LLMs)** running in the **cloud**. For this hackathon, we have support for Gemini APIs via Google Cloud Platform (GCP).

Participants choose
any one track



Problem Categories and Track

-  **GenAI for Spec2Tapeout (ASU)**
Build an agent that generates RTL and GDS from design specs—automated start-to-finish flow.
-  **GenAI for Design Verification (Google)**
Given buggy RTL and specs, create testbenches to catch sneaky logic bugs  
-  **Miscellaneous CVDP Problems (NVIDIA)**
Different tasks that include RTL debugging, testbench integration, design edits, and EDA workflow setup.
-  **GenAI for Logic Synthesis (Qualcomm, NXP)**
Generate buggy RTL from the buggy netlist and correct RTL files.

Each category has **multiple problems** with varying levels of difficulty. Solve as many problems as you can across multiple categories. Winners will be named **in each category and track**.

Participants choose any number of problem categories that can be solved with either track



Acknowledging the Group Effort



Animesh Basak
Chowdhury
Qualcomm/NXP



Guillaume
Shippee
Qualcomm



Mark Ho
NVIDIA



Vidya Chhabria
Arizona State
University



Ivan Lobov
Google

Problem contributors:
People you can find
and ask questions!

NVIDIA Team:

- Mark Ren
- Nathaniel Pickney
- Mark Ho

Qualcomm Team:

- Rajeev Jain
- Ankita Nayak
- Guillaume Shippee
- Lindsay Kostas
- Animesh Basak Chowdhury (NXP)
- Adrian Nunez-Rocha

ICLAD General Chairs:

- Mark Ren, NVIDIA
- Siddharth Garg, NYU

Google Team:

- Sergio Guadarrama
- Ivan Lobov
- Nathalie Beauguerlange

ASU Team:

- Vidya A. Chhabria
- Vikram Gopalakrishnan
- Sai Harika Julakanti



Problem Categories



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ASU Spec2Tapeout

Vidya A. Chhabria



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Problem Description

Your goal:

- Use an LLM to write RTL for a given specification
- Evaluate the RTL using the provided testbench or use an agent to generate a testbench
- Use an LLM to write a script that runs OpenROAD flow-scripts by generating the required intermediate files

Visible problems (5 problems)



Hidden problems (5 hidden problems)



Inputs and Outputs

Input p1.yaml

```
seq_detector_0011:
  description: Detects a binary sequence "0011" in the input stream.
  tech_node: SkyWater 130HD
  clock_period: 1.1ns
  ports:
    - name: clk
      direction: input
      type: logic
      description: Clock input
    - name: reset
      direction: input
      type: logic
      description: Synchronous reset (active high)
    - name: data_in
      direction: input
      type: logic
      description: Serial data input
    - name: detected
      direction: output
      type: logic
      description: Asserted high for one cycle when '0011' is detected.
  module_signature: |
    module seq_detector_0011(
      input clk,
      input reset,
      input data_in,
      output reg detected
    );
    sequence_to_detect: '0011'
    sample_input: '0001100110110010'
    sample_output: '0000010001000000'
  
```

Intermediate files

Name
..
README.md
config.mk
constraint.sdc
iclad_seq_detector_tb.v

Outputs

Name
..
6_final.odb
6_final.sdc
README.md
iclad_seq_detector.v

One possible path to arrive at the solution



Submission and Evaluations

Submission Instructions

- Place **visible solutions** inside the solutions/ folder in the GH repository for each problem.
- For **hidden problems**, include clear **documentation** on how to run your agent.
- Once your solutions are ready:
 - Email the path of the solutions/ folder in your VM, and your **VM name**, to: iclad2025-hackathon@googlegroups.com
 - Fork the ASU repository to your own GitHub account and email the link to your forked repository to the same address.

Evaluation

- Testbenches and scripts are provided to verify your solutions
 - Functional correctness via testbench
 - Metrics correctness for specification via OpenROAD
- Each problem has a different score based on difficulty
- Hidden problems carry more weight



Google Design Verification

Ivan Lobov



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Problem Description: Inputs and Outputs

Goal: Build an AI agent that automatically writes a *Verilog testbench* based on a **natural language specification**.

- **Inputs:**
 - A **natural language spec** describing RTL behavior
 - **31 RTL module implementations**, only one is correct
- **Outputs:**
- Testbench that passes for the correct RTL but fails for the rest

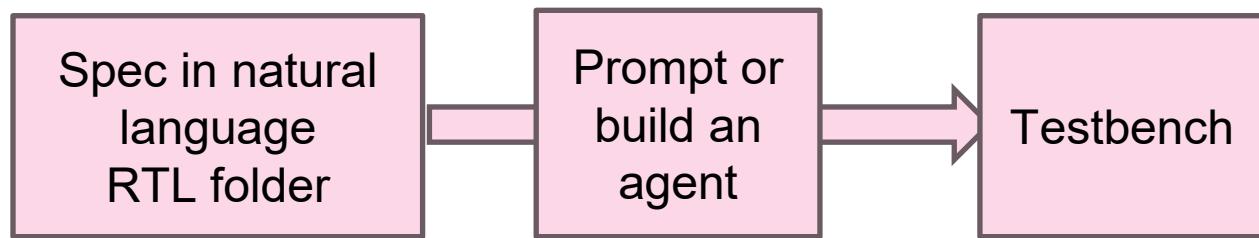


Instructions to build agent

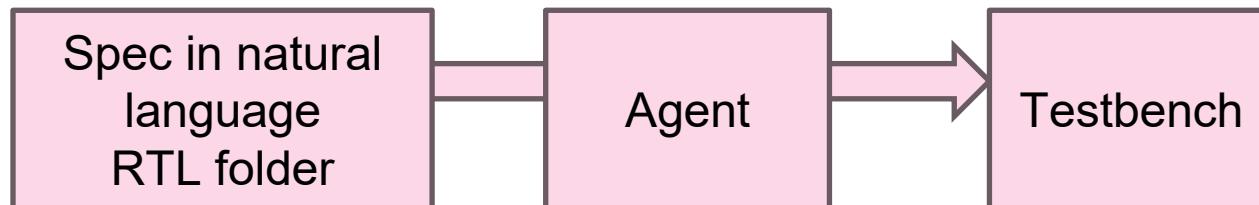
Agent Implementation:

- Implement the `generate_testbench()` function in `test_harness/agent.py`
- Must output a complete **Verilog testbench** string
- Execution must finish within 5 minutes
- Use iverilog (via `subprocess.run`) to simulate

Visible problems (10 problems)



Hidden problems (10 problems)



Submissions and Evaluation

Submission Instructions

- Place testbenches for visible problems in the GH repository for each problem (replace the current dummy testbench)
- Replace the test_harness/agent.py file for hidden problems
- Once your solutions are ready:
 - Email the path of the repo in your VM, and your VM name, to: iclad2025-hackathon@googlegroups.com
 - Fork the repository to your own GitHub account and email the link to your forked repository to the same address.

Evaluation Details

<https://github.com/ICLAD-Hackathon/Google-Verification-ICLAD25-Hackathon>



Qualcomm Logic Synthesis

Animesh Basak Chowdhury, Guillaume Shippee



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Problem: Regenerate Buggy RTL and Smart ECO patch generation

- cd Qualcomm-Problems directory
- Use golden_rtl + buggy_netlist to recreate buggy_rtl
- Testbenches provided under tb/

Directory Structure

```
└── buggy_netlist/
    └── aes_bug_v1/
└── buggy_rtl/
    └── aes_bug_v1/
        └── team_01/
            └── aes_bug_v2/
└── golden_rtl/
    └── aes/
└── patched_netlist/
    └── team_01/
└── tb/
    └── buggy_v1/
        └── golden/
```



Objective

- 1) Reverse-engineer the **buggy RTL** from the **synthesized netlist**, using the **golden RTL** as a reference.
- 2) Generate minimal patch to buggy netlist to correct functionality.

You'll be evaluated on whether your reconstructed RTL passes the testbench designed for the buggy version.

Details: [RTL re-construction and ECO generation](#)



Problem: Regenerate Buggy RTL and Smart ECO patch generation

Golden RTL Test

```
cd tb/golden  
iverilog -o golden_test  
tb_aes_cipher_top.v  
../../golden_rtl/*.v  
vvp golden_test
```

```
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/golden_rtl/aes$ iverilog -o golden_test ../../tb/golden_tb_aes_cipher_top.v  
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/golden_rtl/aes$ vvp golden_test  
VCD info: dumpfile aes.vcd opened for output.  
-----  
Test 1:  
Key : 2b7e151628aed2a6abf7158809c4f3c  
Plaintext : 6bc1bee22e409f96e93d7e117393172a  
Expected : 3ad77bb40d7a3660a89ecaf32466ef97  
Output : 3ad77bb40d7a3660a89ecaf32466ef97  
Test 1 PASSED  
-----  
Test 2:  
Key : 000102030405060708090a0b0c0d0e0f  
Plaintext : 00112233454566778899aaabbccddleeff  
Expected : 69c4ed86a7b043d8cd7807b4c55a  
Output : 69c4ed86a7b043d8cd7807b4c55a  
Test 2 PASSED  
-----  
Test 3:  
Key : 10a58869d74be5a374cf867cfb473859  
Plaintext : 00000000000000000000000000000000  
Expected : 6d251e6944b051e04aa6fb4dbf78465  
Output : 6d251e6944b051e04aa6fb4dbf78465  
Test 3 PASSED  
-----  
Test 4:  
Key : 00000000000000000000000000000000000000  
Plaintext : ffffffffffffffffffffcfffffff  
Expected : 3f5b8cc9ea855a0afa7347d23e8d664e  
Output : 3f5b8cc9ea855a0afa7347d23e8d664e  
Test 4 PASSED  
-----  
PERCENTAGE TEST PASSED: 100% (4/4)  
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/golden_rtl/aes$ |
```

Buggy RTL Test

Place your generated RTL inside
buggy_rtl/team_name/.

```
cd tb/buggy_v1  
iverilog -o buggy_test  
b_aes_cipher_top.v  
../../buggy_rtl/team_name/*.v  
vvp buggy_test
```

```
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/buggy_rtl/aes_bug_v1$ iverilog -o buggy_test ../../tb/buggy_v1/tb_aes_cipher_top.v  
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/buggy_rtl/aes_bug_v1$ vvp buggy_test  
VCD info: dumpfile aes.vcd opened for output.  
-----  
Test 1:  
Key : 2b7e151628aed2a6abf7158809c4f3c  
Plaintext : 6bc1bee22e409f96e93d7e117393172a  
Expected : c34feed2a9e8a2b46032dcce21f0c52  
Output : c34feed2a9e8a2b46032dcce21f0c52  
Test 1 PASSED  
-----  
Test 2:  
Key : 000102030405060708090a0b0c0d0e0f  
Plaintext : 00112233454566778899aaabbccddleeff  
Expected : d1b7eb0ef5440d98b2399bcd60ec4866  
Output : d1b7eb0ef5440d98b2399bcd60ec4866  
Test 2 PASSED  
-----  
Test 3:  
Key : 10a58869d74be5a374cf867cfb473852  
Plaintext : 00000000000000000000000000000000  
Expected : bb7bcc52c0c0fb1fc149625a8c7854b  
Output : bb7bcc52c0c0fb1fc149625a8c7854b  
Test 3 PASSED  
-----  
Test 4:  
Key : 00000000000000000000000000000000000002  
Plaintext : ffffffffffffffffffffcfffffff  
Expected : e20f147bd56f5bfa5946e2a40d0d6598  
Output : e20f147bd56f5bfa5946e2a40d0d6598  
Test 4 PASSED  
-----  
PERCENTAGE TEST PASSED: 100% (4/4)  
(base) gmr01@gmr01:~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories/Qualcomm-Problems/buggy_rtl/aes_bug_v1$ |
```



How to submit the solutions?

Submit your solution as a ZIP file: team_name.zip

On unzipping, it should contain:

```
ICLAD-Hackathon-2025/
└── problem-categories/
    └── Qualcomm-Problems/
        ├── buggy_rtl/
        │   └── team_name/
        ├── patched_netlist/
        │   └── team_name/
        └── logs/
            └── team_name/ <- Chat logs, code, notes
```

 **Include your LLM prompt logs and intermediate explorations for extra credit!**

 **Code of conduct:** We expect participants to use only the SLMs in solving problems.

FAQ on SLM submission for other tracks:

For **ASU-ICLAD** and **Google** tracks, create under their subproblem:

- o submission/<team_name>/problemK/
- o logs/<team_name>/

For OPEN challenge, refer to the readme for more details on the submission category for each submission category.



Snapshot Diagrams (For PPT/Docs)

Add the following diagrams to logs:

- Workflow for EDA tool invocation
- Agentic/Non-agentic approaches used to interact with SLMs and corresponding logs.



NVIDIA ICLAD25 MISC

Mark Ho



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NVIDIA-ICLAD25 ENV

- Agent under test docker env for every problem -> Participant provide their agent code and build the docker image
- Evaluation test harness docker env

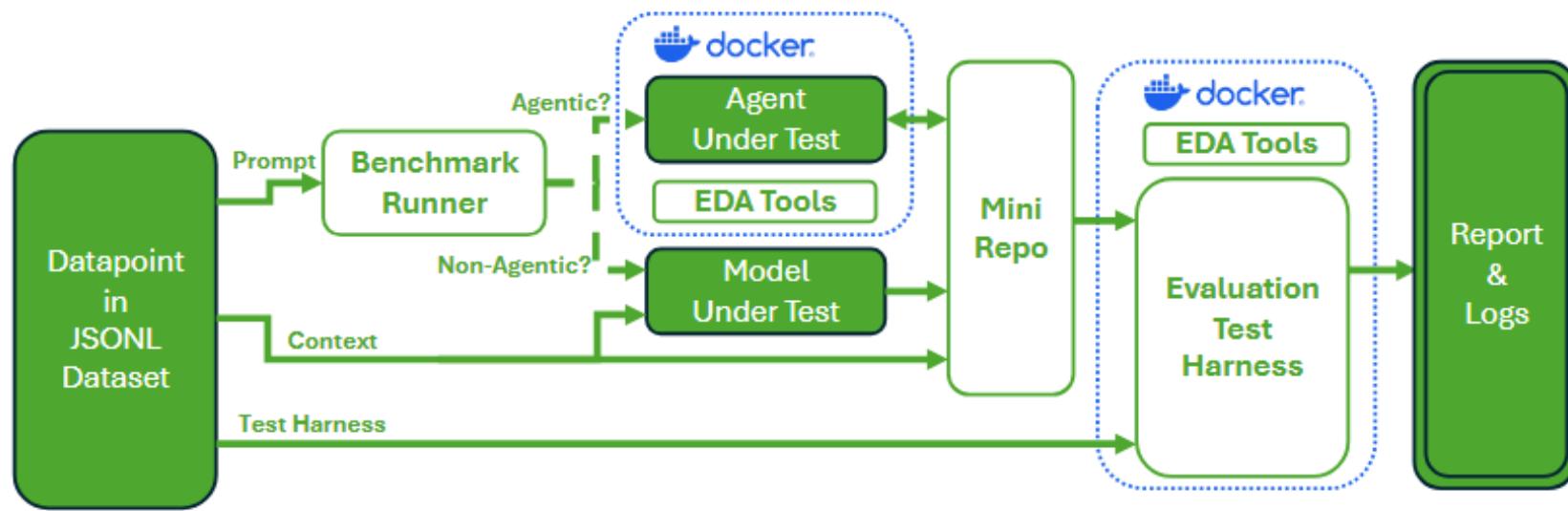


Figure 1: Benchmark Evaluation Flow.

NVIDIA-ICLAD25 Installation Steps

Step 1: Install the framework required python libraries

Setup Instructions

1. Create a virtual environment (recommended):

```
# Create virtual environment  
python -m venv agent_env  
  
# Activate virtual environment  
# On Linux/macOS:  
source agent_env/bin/activate  
# On Windows:  
agent_env\Scripts\activate
```

2. Install Python dependencies:

```
pip install -r requirements.txt
```



NVIDIA-ICLAD25 Installation Steps

Step 2: Build your agent

```
# Copy the complete agent example  
cp -r examples/agent/ ./my-agent/  
cd my-agent/  
  
# Build using the provided script  
../build_agent.sh
```



```
#!/bin/sh  
  
# SPDX-FileCopyrightText: Copyright (c) 2025 NVIDIA CORPORATION & AFFILIATES. All rights reserved.  
# SPDX-License-Identifier: Apache-2.0  
  
docker build -f Dockerfile-base -t example-agent-base .  
docker build -f Dockerfile-agent -t example-agent --no-cache .  
~
```

If you only changes some code, skip the example-agent-base docker build.



NVIDIA-ICLAD25 Run benchmark

Recommended Steps:

Step 1: Use the dummy agent to run through the bench mode to create all the problems in work directory

```
python run_benchmark.py -f ./dataset/hackathon-agentic-obfuscated_final_corrected.jsonl -l -g example-agent  
# check the run and each problem  
cd work
```



Step 2: Example work directory

```
(llm_env) [chiatungh@nvrdaMarco work]$ ls  
cvdp_agentic_amber_eagle_lambda cvdp_agentic_compass_breeze_obsidian cvdp_agentic_echo_obsidian_lunar cvdp_agentic_horizon_whisper_panther cvdp_agentic_nebula_nova_castle prompt_response.jsonl  
cvdp_agentic_amber_prism_tiger cvdp_agentic_crimson_river_butterfly cvdp_agentic_ember_meadow_sunrise cvdp_agentic_ivory_cloud_ocean cvdp_agentic_starlight_phoenix_comet raw_result.json  
cvdp_agentic_azure_sapphire_tiger cvdp_agentic_diamond_dolphin_whisper cvdp_agentic_falcon_willow.dragon cvdp_agentic_lagoon_dragon_diamond cvdp_agentic_summit_horizon_diamond report.json  
cvdp_agentic_breeze_crystal Zenith cvdp_agentic_diamond_orbit_valley cvdp_agentic_forest_fountain_river cvdp_agentic_meadow_canyon_sunrise cvdp_agentic_sunrise_ivory_glacier report.txt  
cvdp_agentic_breeze_velvet_violet cvdp_agentic_eagle_crystal_lunar cvdp_agentic_garden_sapphire_amber cvdp_agentic_meadow_marble_castle cvdp_agentic_thunder_compass_river run.log  
cvdp_agentic_comet_cloud_tiger cvdp_agentic_eagle_jade_forest cvdp_agentic_glacier_amber_cosmic cvdp_agentic_meadow_river_prism cvdp_agentic_thunder_diamond_horizon
```

prompt_response.jsonl
raw_result.json
report.json
report.txt
run.log

Step 3: Check one case and develop agentic approach

```
cd work/cvdp_agentic_programmable_fsm_dynamic_state_encoding/harness/1/  
# invoke the agent run  
.run_docker_agent.sh  
# debug the agent  
.run_docker_agent.sh -d  
# run evaluation  
.run_docker_harness_direct.sh
```



NVIDIA-ICLAD25 Additional info

```
# Check individual run reports
```

```
cd NVIDIA-ICLAD25-Hackathon/work/cvdp_agentic_diamond_orbit_valley/reports
```

1_agent.txt: agent run log file

1.txt: direct evaluation log file

```
# Debug and run the test
```

```
cd NVIDIA-ICLAD25-Hackathon/work/cvdp_agentic_diamond_orbit_valley/harness/1/
```

The evaluation identify the .patch file. The agent needs to write out answers to the specified /rtl directory.

```
./run_docker_agent.sh -> run the agent on the problem
```

```
./run_docker_harness_<problem>.sh -> run the individual test
```

```
# Network license issue:
```

Solution: docker network create licnetwork



NVIDIA-ICLAD25 Evaluation Weights

Problem Name	Evaluate Weight (based on difficulty)
cvdp_agentic_eagle_crystal_lunar_2638	1.15
cvdp_agentic_crimson_river_butterfly_1181	1.15
cvdp_agentic_garden_sapphire_amber_0307	1.15
cvdp_agentic_forest_fountain_river_0702	1.3
cvdp_agentic_echo_obsidian_lunar_0001	1.3
cvdp_agentic_meadow_canyon_sunrise_0439	1.45
cvdp_agentic_nebula_nova_castle_8184	1.6
cvdp_agentic_starlight_phoenix_comet_6246	1.75
cvdp_agentic_glacier_amber_cosmic_3144	1.75
cvdp_agentic_diamond_dolphin_whisper_4792	1.75
cvdp_agentic_meadow_river_prism_8091	1.75
cvdp_agentic_meadow_marble_castle_0301	1.75
cvdp_agentic_azure_sapphire_tiger_4476	1.75
cvdp_agentic_sunrise_ivory_glacier_9089	1.75
cvdp_agentic_amber_eagle_lambda_0001	1.75
cvdp_agentic_ember_meadow_sunrise_1765	1.75
cvdp_agentic_horizon_whisper_panther_1434	1.75
cvdp_agentic_thunder_diamond_horizon_0119	1.75
cvdp_agentic_compass_breeze_obsidian_0016	1.75
cvdp_agentic_summit_horizon_diamond_3314	1.8
cvdp_agentic_amber_prism_tiger_1687	2
cvdp_agentic_eagle_jade_forest_0681	2
cvdp_agentic_ivory_cloud_ocean_3516	2
cvdp_agentic_breeze_velvet_violet_7060	2
cvdp_agentic_lagoon_dragon_diamond_4339	2
cvdp_agentic_comet_cloud_tiger_9313	2
cvdp_agentic_falcon_willow_dragon_8753	2
cvdp_agentic_thunder_compass_river_8383	2
cvdp_agentic_breeze_crystal Zenith_1259	2
cvdp_agentic_diamond_orbit_valley_0001	2



Final Submission

- Agent source code and a Dockerfile
 - Path to both of these files inside your VM or fork and upload the repo in your own GH account.
 - Email the path and the link to : iclad2025-hackathon@googlegroups.com
- Evaluate the benchmark with participants' agent docker image
- Good luck and Enjoy!





Infrastructure

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Open Challenge Infrastructure

Google Cloud Platform (GCP)



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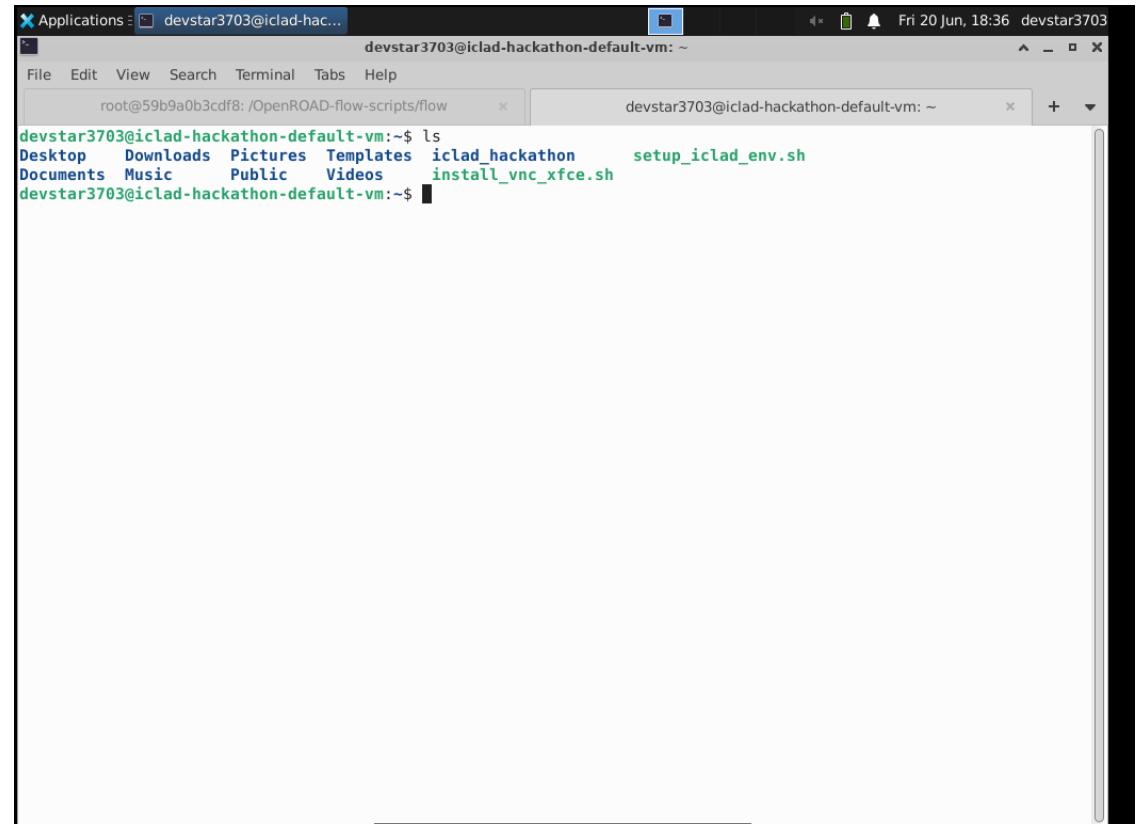
Setup and login to GCP VM

- Username/Password: Provided/will be provided via email.
- VNC Viewer: External IP address and VNC password provided for existing VM (recommended)
- Optional: Documentation to create more VMs is also provided



Virtual Machine Environment

- The ICLAD Hackathon Repository is already pre-cloned and available
 - `~/iclad_hackathon/ICLAD-Hackathon-2025`
- The problem categories repository has submodule to all the problems.
- Each problem category:
 - Detailed description
 - Submission process
 - Evaluation



The screenshot shows a terminal window titled "Applications" with the command "ls" run in it. The output shows a directory structure with several files and subdirectories:

```
root@59b9a0b3cdf8:/OpenROAD-flow-scripts/flow
devstar3703@iclad-hackathon-default-vm:~$ ls
Desktop  Downloads  Pictures  Templates  iclad_hackathon  setup_iclad_env.sh
Documents  Music  Public  Videos  install_vnc_xfce.sh
devstar3703@iclad-hackathon-default-vm:~$
```



Docker Image Setup For Prerequisites

For the following problem categories:

- GenAI for Spec2Tapeout (ASU)
- GenAI for Design Verification (Google)
- GenAI for Logic Synthesis (Qualcomm)

Prerequisites:
OpenROAD-flow-scripts,
iVerilog gtkwave

In the VNC viewer

Start the docker image with the installed prerequisites and mount your repository

- `docker run -it --rm -v ~/iclad_hackathon:/workspace/iclad_hackathon iclad_hackathon:latest bash`

The docker has the workspace mounted and it will have preinstalled prerequisites



Docker Image Setup For Prerequisites

For the following problem categories:

- Miscellaneous NVIDIA CVDP problems
- ~/iclad_hackathon/ICLAD-Hackathon-2025/problem-categories

From the virtual machine:

- Follow instructions available <https://github.com/ICLAD-Hackathon/NVIDIA-ICLAD25-Hackathon/README.md>
- Docker image will be pre-built for you on the VM to save some time



Interacting with Gemini on GCP

Hello World with Gemini on GCP

```
from vertexai.preview.generative_models import GenerativeModel
import vertexai
vertexai.init(location="us-central1")
model = GenerativeModel("gemini-2.0-flash-001")
response = model.generate_content("Say hi from inside the ICLAD Hackathon container!")
print(response.candidates[0].text)
```



SLM Track Laptop Setup

Qualcomm

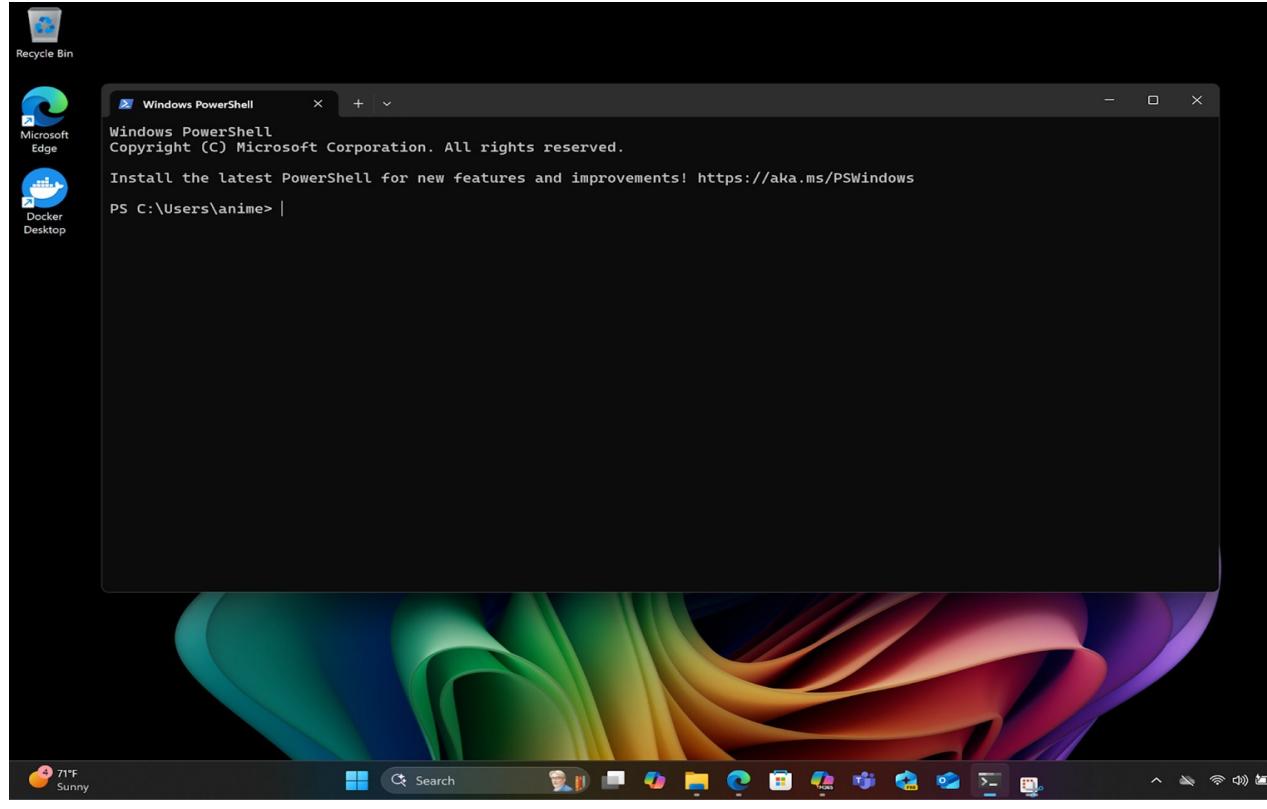


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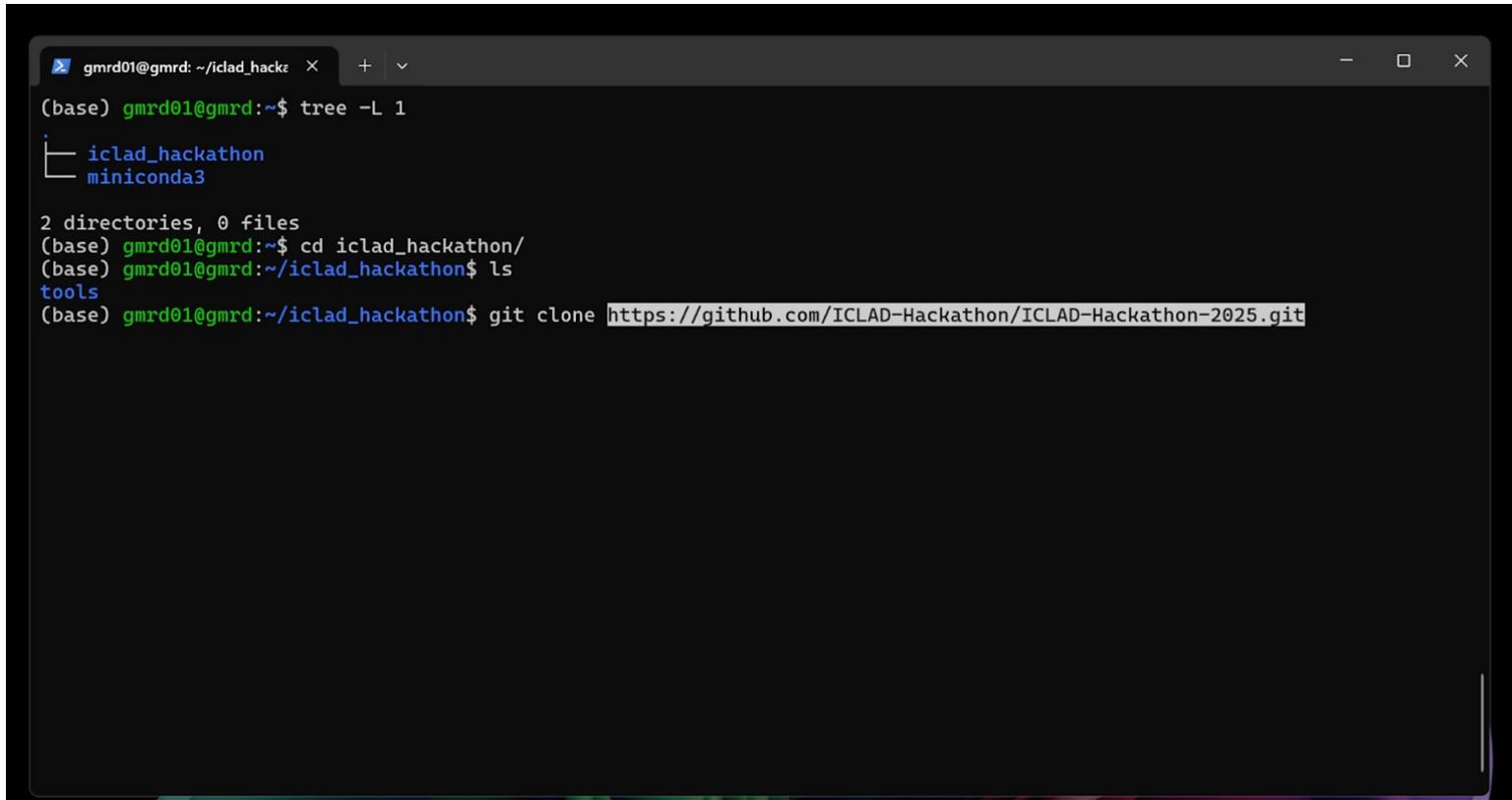
Setup and login

- Username/Password: To be provided
- Launch WSL: wsl --list; wsl -d iclad_2025
- Go to the directory: cd /home/gmrd01
- Run: su gmrd01



Clone ICLAD Repo

- Navigate to iclad_hackathon
- git clone <https://github.com/ICLAD-Hackathon/ICLAD-Hackathon-2025.git> --
 recurse-submodules



```
gmr01@gmr01:~/iclad_hackathon$ tree -L 1
.
└── iclad_hackathon
    └── miniconda3

2 directories, 0 files
gmr01@gmr01:~/iclad_hackathon$ cd iclad_hackathon/
gmr01@gmr01:~/iclad_hackathon$ ls
tools
gmr01@gmr01:~/iclad_hackathon$ git clone https://github.com/ICLAD-Hackathon/ICLAD-Hackathon-2025.git
```



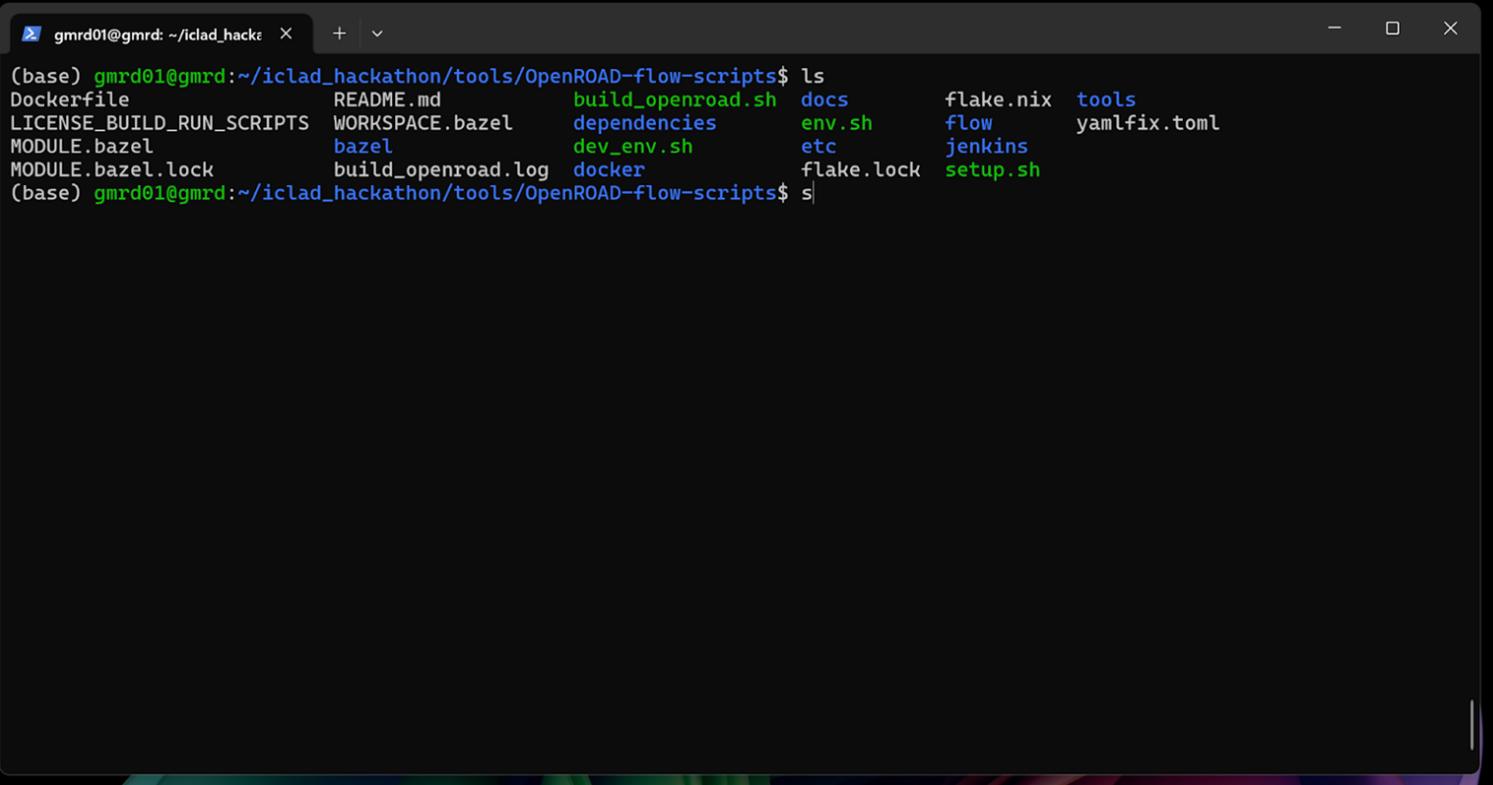
Test EDA tools

- OpenROAD: source env.sh; make (RTL2GDSII flow for benchmark GCD)
- Icarus Verilog: iverilog + vvp hello (Verilog simulation)
- GTKWave: gtkwave dump.vcd (Testbench visualizer)
- Verilator: Verilog simulator with C++ backend



Test EDA tools

```
cd ~/iclad_hackathon/tools/OpenROAD-flow-scripts  
source env.sh  
cd flow/  
make
```

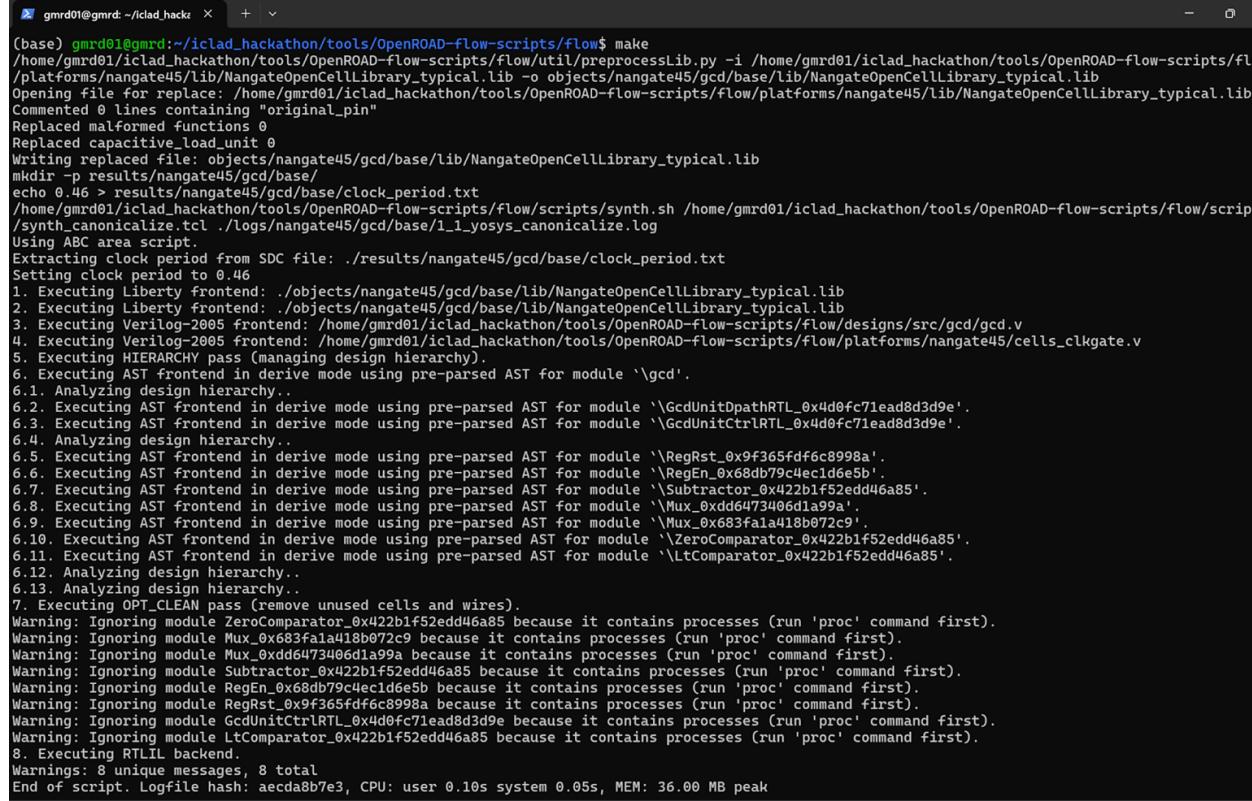


```
(base) gmr01@gmr01:~/iclad_hackathon/tools/OpenROAD-flow-scripts$ ls  
Dockerfile README.md build_openroad.sh docs flake.nix tools  
LICENSE_BUILD_RUN_SCRIPTS WORKSPACE.bazel dependencies env.sh flow yamlfix.toml  
MODULE.bazel bazel dev_env.sh etc jenkins  
MODULE.bazel.lock build_openroad.log docker flake.lock setup.sh  
(base) gmr01@gmr01:~/iclad_hackathon/tools/OpenROAD-flow-scripts$ s|
```



Test EDA tools

```
cd ~/iclad_hackathon/tools/OpenROAD-flow-scripts  
source env.sh  
cd flow/  
make
```



```
(base) gmr01@gmr01:~/iclad_hackathon/tools/OpenROAD-flow-scripts/flow$ make  
/home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/util/preprocessLib.py -i /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/platforms/nangate45/lib/NangateOpenCellLibrary_typical.lib -o objects/nangate45/gcd/base/lib/NangateOpenCellLibrary_typical.lib  
Opening file for replace: /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/platforms/nangate45/lib/NangateOpenCellLibrary_typical.lib  
Commented 0 lines containing "original_pin"  
Replaced malformed functions 0  
Replaced capacitive_load_unit 0  
Writing replaced file: objects/nangate45/gcd/base/lib/NangateOpenCellLibrary_typical.lib  
mkdir -p results/nangate45/gcd/base/  
echo 0.46 > results/nangate45/gcd/base/clock_period.txt  
/home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/scripts/synth.sh /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/scripts/synth.sh /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/scripts/synth_canonicalize.tcl ./logs/nangate45/gcd/base/1_l_yosys_canonicalize.log  
Using ABC area script.  
Extracting clock period from SDC file: ./results/nangate45/gcd/base/clock_period.txt  
Setting clock period to 0.46  
1. Executing Liberty frontend: ./objects/nangate45/gcd/base/lib/NangateOpenCellLibrary_typical.lib  
2. Executing Liberty frontend: ./objects/nangate45/gcd/base/lib/NangateOpenCellLibrary_typical.lib  
3. Executing Verilog-2005 frontend: /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/designs/src/gcd/gcd.v  
4. Executing Verilog-2005 frontend: /home/gmr01/iclad_hackathon/tools/OpenROAD-flow-scripts/flow/platforms/nangate45/cells_clkgate.v  
5. Executing HIERARCHY pass (managing design hierarchy).  
6. Executing AST frontend in derive mode using pre-parsed AST for module '\gcd'.  
6.1. Analyzing design hierarchy..  
6.2. Executing AST frontend in derive mode using pre-parsed AST for module '\GcdUnitDpathRTL_0x4d0fc71ead8d3d9e'.  
6.3. Executing AST frontend in derive mode using pre-parsed AST for module '\GcdUnitCtrlRTL_0x4d0fc71ead8d3d9e'.  
6.4. Analyzing design hierarchy..  
6.5. Executing AST frontend in derive mode using pre-parsed AST for module '\RegRst_0x9f365fd6c8998a'.  
6.6. Executing AST frontend in derive mode using pre-parsed AST for module '\RegEn_0x68db79c4ec1d6e5b'.  
6.7. Executing AST frontend in derive mode using pre-parsed AST for module '\Subtractor_0x422b1f52edd46a85'.  
6.8. Executing AST frontend in derive mode using pre-parsed AST for module '\Mux_0xdd6u73406d1a99a'.  
6.9. Executing AST frontend in derive mode using pre-parsed AST for module '\Mux_0x683fa1a418b072c9'.  
6.10. Executing AST frontend in derive mode using pre-parsed AST for module '\ZeroComparator_0x422b1f52edd46a85'.  
6.11. Executing AST frontend in derive mode using pre-parsed AST for module '\LtComparator_0x422b1f52edd46a85'.  
6.12. Analyzing design hierarchy..  
6.13. Analyzing design hierarchy..  
7. Executing OPT_CLEAN pass (remove unused cells and wires).  
Warning: Ignoring module ZeroComparator_0x422b1f52edd46a85 because it contains processes (run 'proc' command first).  
Warning: Ignoring module Mux_0x683fa1a418b072c9 because it contains processes (run 'proc' command first).  
Warning: Ignoring module Mux_0xd6473a06d1a99a because it contains processes (run 'proc' command first).  
Warning: Ignoring module Subtractor_0x422b1f52edd46a85 because it contains processes (run 'proc' command first).  
Warning: Ignoring module RegEn_0x68db79c4ec1d6e5b because it contains processes (run 'proc' command first).  
Warning: Ignoring module RegRst_0x9f365fd6c8998a because it contains processes (run 'proc' command first).  
Warning: Ignoring module GcdUnitCtrlRTL_0x4d0fc71ead8d3d9e because it contains processes (run 'proc' command first).  
Warning: Ignoring module LtComparator_0x422b1f52edd46a85 because it contains processes (run 'proc' command first).  
8. Executing RTLIL backend.  
Warnings: 8 unique messages, 8 total  
End of script. Logfile hash: aeccda8b7e3, CPU: user 0.10s system 0.05s, MEM: 36.00 MB peak
```

a) *RTL2GDS inside openroad flow. This will synthesize GCD with nangate45nm lib*



Test EDA tools



Icarus Verilog (Simulation)

```
iverilog -o hello hello.v (The file will be present in the cloned repo)  
vvp hello
```

Expected output: Hello, World!



GTKWave (Waveform Viewer)

To view generated .vcd files:

```
gtkwave dump.vcd
```



Using SLMs on Edge



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General Info

- Default mode for uploading and using models will be **AnythingLLM**
- Snapdragon X-Elite Laptops will come with desktop app already installed and WSL configured to use the REST API for interacting with the models
- Default models will be provided, but you can bring your own if you have compiled into GGUF format



Model on-boarding



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NPU Optimized Models

Anything LLM

INSTANCE SETTINGS

- AI Providers
- LLM**
- Vector Database
- Embedder
- Text Splitter & Chunking
- Voice & Speech
- Transcription

Admin

- General Settings
- Workspace Chats

Agent Skills

Community Hub

Customization

- UI Preferences
- Chat

Tools

- Event Logs
- Developer API
- System Prompt Variables
- Browser Extension

Save changes

LLM Preference

These are the credentials and settings for your preferred LLM chat & embedding provider. It is important that these keys are current and correct, or else AnythingLLM will not function properly.

LLM Provider

AnythingLLM NPU

Run LLMs locally on NPU exclusively on Snapdragon X CoPilot+ machines.

Microsoft

Phi 3.5 Mini Instruct 4K 2.00GB Active

NPU-ready Microsoft Phi 3.5 Mini Instruct with 4k context window prepared by the Qualcomm AI Hub. Perfect for CoPilot+ P... [Read more](#)

Uninstall

Meta

Llama 3.2 3B Chat 8K 2.49GB

NPU-ready Meta Llama 3.2 3B with a 8k context window from Meta prepared by AnythingLLM. Fast and accurate enough to use ... [Read more](#)

model requires download

Llama 3.2 3B Chat 16K 2.49GB

NPU-ready Meta Llama 3.2 3B with a larger 16k context window from Meta prepared by AnythingLLM. Fast and accurate to use... [Read more](#)

Uninstall

Llama 3.18B Chat 8K 4.2GB

NPU-ready Meta Llama 3.1 8B with a 8k context window from Meta prepared by AnythingLLM. Offers higher accuracy, but slig... [Read more](#)

model requires download

Bring your own models

Anything LLM

INSTANCE SETTINGS

1 AI Providers

LLM

Vector Database

Embedder

Text Splitter & Chunking

Voice & Speech

Transcription

Admin

General Settings

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Save changes

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LLM Provider

2 AnythingLLM
Download & run models from Meta, Mistral and more on this device with zero setup. Powered by Ollama.

3 Import GGUF file + Import model from Ollama or Hugging Face

Imported Models

qwen-7b-q4_k_m
This is a model imported or pulled from a registry.
[View licenses](#)
[Text only](#) Uninstall

Meta

Llama3.2 3B 2.0GB
Meta Llama 3.2: The new state-of-the-art model from Meta. [View licenses](#)
[Text only](#)

Llama3.2 Vision 11B 7.9GB
Meta Llama 3.2 Vision: The new multimodal state-of-the-art model from ... [Read more](#)
[Multimodal](#)

Llama3.18B 4.7GB
Meta Llama 3.1: The new state-of-the-art model from Meta. [View licenses](#)
[Text only](#)

LLaVA Llama3 8B 5.5GB
A LLaVA model fine-tuned from llama 3 to create a powerful multi-modal... [Read more](#)
[Multimodal](#)

Llama3 8B 4.7GB
Meta Llama 3: The previous generation of the Llama model by Meta. [View licenses](#)
[Text only](#)

Provided On-Edge Models

Model Name	Parameter Count	Context Window	NPU Optimized
Phi3.5 Mini Instruct	3.8B	4k	Yes
Llama3.2	3B	8k	Yes
Llama3.2	3B	16k	Yes
Llama3.1	8B	8k	Yes
<u>Qwen-2.5-Instruct-Verilog-7B</u>	7.62B	32k	No
Bring your own model	??	??	No



SLM usage



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Demo of Desktop App Features

- Basic chatbot usage
- Data connectors
- Agents



[+ New Workspace](#)

GETTING STARTED 4 tasks left

Create a workspace



Set up a system prompt

Set Up

Send a chat

Chat

Embed a document

close

Define a slash command

Define

Visit Community Hub

Browse

QUICK LINKS

Send Chat

Embed a Document

+ Create Workspace

EXPLORE MORE FEATURES

Custom AI Agents

Build powerful AI Agents and automations with no code.

[Chat using @agent](#)

New

[Build an agent flow](#)

Slash Commands

Save time and inject prompts using custom slash commands.

[Create a Slash Command](#)[Explore on Hub](#)

System Prompts

Modify the system prompt to customize the AI replies of a workspace.

[Modify a System Prompt](#)

New

[Manage prompt variables](#)

UPDATES & ANNOUNCEMENTS



MCP Support

Import and leverage MCP tools using AnythingLLM.

[AnythingLLM](#) April 8, 2025

NVIDIA NIM Support

Unlock the power of NVIDIA NIM on Windows with RTX GPU in our latest...

[AnythingLLM](#) March 25, 2025

Community Hub Updates

We refreshed the Community Hub with a new look and feel. Check it out!

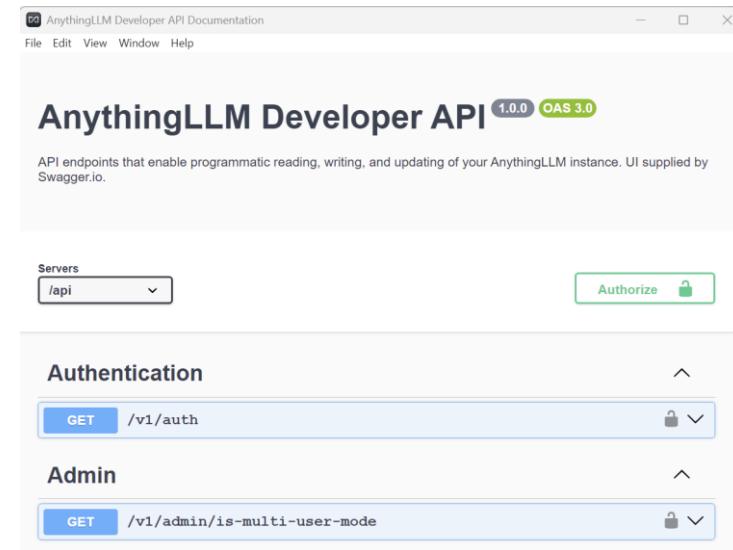
[AnythingLLM](#) March 12, 2025

RESOURCES



Demo of Developer API

- API Access
- Basic chatbot GUI built programmatically ([GitHub - thatrandomfrenchdude/simple-npu-chatbot: An NPU-accelerated chatbot running via AnythingLLM](#))
- Anything LLM Developer Docs is a great resource for understanding the REST API ([AnythingLLM Developer API Documentation](#), maybe can even upload to chatbot to help you write scripts with the REST API)



Anything LL M

[+ New Workspace](#)

Workspace 1

GETTING STARTED 4 tasks left

[Create a workspace](#)[Send a chat](#)[Chat](#)[Embed a document](#)[close](#)[Set up a system prompt](#)[Set Up](#)[Define a slash command](#)[Define](#)[Visit Community Hub](#)[Browse](#)

QUICK LINKS

[Send Chat](#)[Embed a Document](#)[+ Create Workspace](#)

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AnythingLLM March 12, 2025

RESOURCES

[Docs](#) [Setup](#) [GitHub](#) [Keyboard Shortcuts](#)

11:18 PM

6/17/2025



END GAME



THE CHIPS
TO SYSTEMS
CONFERENCE



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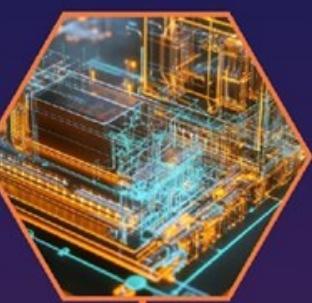
What to submit?

- Compose an email to [**iclad2025-hackathon@googlegroups.com**](mailto:iclad2025-hackathon@googlegroups.com) that includes:
 - **Mention the problem categories** (ASU, NVIDIA, Google, Qualcomm)
 - **Mention the track (LLM, SLM)**
 - Your fork of the GH repo with solutions
 - If LLM, include the VM instance name and the path to your solutions





EDA



AI



Security



Systems



Design



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