



Recruitment Process Questions

Horizon Software Team

CONFIDENTIAL DO NOT SHARE

V1.3

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SOFTWARE TEAM - HORIZON

General Instructions (Must Read)

- All projects must be in a single GitHub repository, organized into separate folders.
- The GitHub repository must follow the given naming format: `<full_name>_horizon_<semester>`. The full name should be written without spaces.

Example: If a person's name is **Athira Suresh** and they are in S4, their repository should be named `athirasuresh_horizon_s4`.

- Each project must have clear and concise documentation accompanying the code. This includes inline comments, explanations, and a README file with instructions on running the programs or simulations and setting up the environment.
- The following Software Team members must be added to your GitHub repository as contributors:
RealDev05, adarshx01 , AKA-AKN.
- Any form of plagiarism will result in the disqualification of all involved candidates.
- The use of AI or chatbots to complete the tasks will lead to disqualification if detected. Interview questions will be based on the tasks you complete.
- There is no specific order in which the tasks must be completed.
- The time allotted for completing all tasks is **10 days** from the release date. Any commits pushed after this deadline will be ignored, either partially or entirely, depending on various factors.
- After completing the tasks, candidates must submit a form to confirm completion. The Google Form link will be shared shortly.
- Candidates who submit their projects early can have their interviews conducted earlier. Interviews will be scheduled on a first-come, first-served basis.
- You are encouraged to ask any genuine doubts that do not compromise the fairness of the recruitment process. Contact details of the Software Team members will be shared soon.

1 Easy Task

Part A: User Input and Plotting

Create a Python program using Matplotlib that allows the user to input points and display them on a graph.

Part B: Connecting Points to the Nearest Neighbor

Draw lines connecting each point to its closest neighbor.

Part C: Avoiding Duplicate Lines

If a line already exists between two points, choose the next nearest neighbor instead.

Note

Any programming language may be used, but only Python-related reference materials will be provided.

Reference Material

[YouTube Video](#)

2 Medium Task

Part A: Setup and Hardware

Create a Tinkercad project using an Arduino to control a servo motor via serial input.

Part B: Multi-Servo Control

Use six servo motors, each representing a joint of a robotic arm. Control them using an array of angles received via serial input, e.g., (10, 50, 90, 20, 30, 10).

Part C: Simultaneous Motion

Instead of moving each servo one by one, implement a pseudo-simultaneous movement for smoother operation.

Note

A video demonstrating the working program must be included in the GitHub repository.

Reference Material

[YouTube Video](#)

3 Hard Task

Part A: Installing Ubuntu

Install Ubuntu 22.04 via dual boot, virtual machine, or standalone installation.

Part B: Installing ROS 2 Humble

Set up ROS 2 Humble on your system.

Part C: Implementing Publisher and Subscriber

Create a ROS 2 publisher node to publish a topic and a subscriber node to receive and print the published values.

Reference Material

[ROS 2 Humble Documentation](#)

No specific reference material for Ubuntu installation. Candidates are expected to conduct their own research.

4 Bonus Task

Part A: Project Concept and Implementation

Develop a ROS 2 project using a publisher and subscriber. The project can be a messaging app, a game, or any other creative implementation. The more complex and impressive the project, the better.

Reference Material

No specific reference material is provided. Candidates are expected to rely on their knowledge and research skills.

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