ASSESSMENT

Role Focus: Python | AI/ML | Web Development
Thank you for your interest in joining Expert Thermal. This short assessment is designed to understand your engineering fundamentals, ability to build and validate code, exposure to modern AI approaches, and comfort with owning fast-moving platform work.
Please answer the questions below clearly and concisely. You may include links to GitHub, portfolios, or relevant project work if available.

Assessment Questions

1. **Python Model + Flask**
   Using the provided reference (PDF (Thermal_reference) and spreadsheet (Heat_sink_design_ref), **develop** the Python model as per the step-by-step method. Validate your results against the spreadsheet. Once validated, convert the model into a **Flask-based API**.
2. **PINN Understanding + Application**
   Using the provided thermal Python model (governing equations, boundary conditions, and material properties) as your physics reference:
   If you have prior experience with PINNs:
   • Outline how you would formulate a PINN for this problem (inputs/outputs, loss terms, PDE and boundary condition enforcement, training data, etc.).
   • Take a first shot at implementing this approach in Python (you may reuse or adapt parts of the existing thermal model wherever helpful).
   If you are new to PINNs:
   • Briefly describe how you would get up to speed (what you would read/watch, which libraries you would consider, how much time you would budget).
   • Then propose a concrete plan for applying a PINN to this specific thermal problem, using the current Python model as your physics backbone (what the network would learn, how you'd build the loss, how you'd validate results).
   If you believe an alternative ML/AI approach would be more appropriate than a PINN for this use case, feel free to explain and justify that, and outline how you would implement it.
3. **Vertex AI Exposure / Understanding**
   Do you have any experience with **Google Vertex AI** for GenAI development?
   - If yes, briefly describe what you have built or contributed to.
   - If no, please review Vertex AI at a high level and share what you understand it can be used for, especially in the context of building engineering or product-focused GenAI tools.
4. **Motivation & Passion**
   why do you want to join the Expert Thermal team? What are you most passionate about building and learning in this role?
5. **Web Development Ownership (Node.js / React.js)**
   What experience do you have with **frontend and backend development**?
   - If you have hands-on experience with **Node.js and React.js**, briefly describe the types of projects you have worked on and your level of ownership.
   - If you do not have direct experience, please explain how you would approach taking ownership of a Node.js/React.js web application, and whether you are confident you can make necessary changes and fixes **on the fly** in a fast-moving startup environment.

Submission Guidelines
Please submit:

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Your written responses to the 5 questions
Any supporting links (GitHub/portfolio/demo)
If applicable, a brief note on your role, contributions, and outcomes in listed projects

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Deadline
Submission deadline: 3 days from the day of receipt