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The purpose of the Journal is to disseminate knowledge, experience, and best practice in engineering & manufacturing.
The articles are written by practicing professionals in the Engineering City (EC) in Yerevan. They cover issues relevant to their projects, operations, and organizations.
The articles address the challenges of the time. As such, the Journal is also a chronicle of the evolution of the EC, its companies, and its individuals.
It is the aim of the Journal to advance the engineering & manufacturing practice, to enrich the engineering & manufacturing community, and to contribute to the worldwide discourse in engineering & manufacturing.

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AI Corner

. The Engineering Prompt - Going Back to Writing Skills

by Rama, Engineering Association

Just when people thought that they can live without writing articles, the AI prompting comes and knocks on the door of "writing skills".

The only way to converse with AI and to get it do what we want it to do is through writing.

The better we write and the clearer we write, the better AI can serve.

The longer the prompt and the more complete, the better the answer.

Look for example at this engineering prompt that I saw on the internet:

"Design a complete power management system for a portable medical device, considering the following specifications: Input voltage range: 3.0V to 4.2V (Li-ion battery); Output voltage: 1.8V, 3.3V, and 5.0V; Output current: 100mA for 1.8V, 200mA for 3.3V, and 50mA for 5.0V; Operating temperature range: -20°C to 60°C; Size constraint: a maximum of 40mm x 60mm for the power management module; Performance requirements: high efficiency (above 90% for all output voltages), low quiescent current (less than 50uA), and <1% voltage ripple; Include component selection (switching regulators, LDOs, passives, etc.), circuit schematics for each output voltage, thermal management considerations (heat sinking, etc.), and a suggested PCB layout with critical component placement and routing guidelines."

This prompt is a problem statement and a comprehensive technical requirement.

It is important to point out that AI is not just an encyclopedia at our fingertips, but more importantly, a solution generator. In this case, it will generate a design solution. And, if we don't get the right solution from the first time, than we must improve our problem statement writing. We must not bet against AI. Instead, we must figure out how it can work for

us. And if we still don't get a desired solution, then we must buy the $20/month version of ChatGPT. And if we still can't get the right answer, then we must buy the $200/month version. The major difference in these versions is in the depth of research that it can do.

I would suggest for organizations to dedicate a computer with the higher versions of ChatGPT for all to use.

But going back to the above prompt, I think that it is not complete. Although it formualtes a clear objective and clear constraints, it fails in providing the context, the background information, the history of the problem.

. The Anatomy of a Good Prompt

by Rama, EA

As our prompts get more complex, it's helpful to recognize their different parts. Here's how we might structure them. I got this from the internet. Pay attention to the amount of context and background information that is being provided.

1. Task context. Assign a role to the AI and outline the general task it's expected to perform.
2. Tone context. Set the desired tone for the interaction.
3. Background information. Provide any necessary documents or data the AI needs.
4. Detailed instructions and rules. Lay out specific guidelines for how the AI should interact.
5. Examples. Offer sample solutions for the AI to learn from.
6. Conversation History. Include any prior exchanges that are relevant.
7. Immediate task description. State the specific task you want done right now.
8. Think step-by-step. If needed, encourage the AI to reason through the problem.
9. Output formatting. Tell the AI how you'd like the response formatted.
10. Prefilled response. If it helps, start the AI off with a template or partial answer.

. Examples of AI Prompts

by Rama, Engineering Association

I got these prompt examples from the internet. I am just sharing them with you.

- **Technical Documentation**
  "Generate a comprehensive user manual for a new software application. The manual should cover all aspects of the software, including installation, configuration, user interface navigation, common tasks, troubleshooting, and advanced features. The manual should be written in a clear, concise, and step-by-step manner, with plenty of screenshots and examples. The tone should be professional and informative."

- **Sales Data Analysis**
  "Analyze the provided dataset of sales transactions. Identify trends in customer purchasing behavior, including popular product categories, peak sales times, and regional sales variations. Generate a report summarizing the key findings and providing actionable insights for optimizing sales strategies. Include visualizations (charts and graphs) to illustrate the data."

- **Email Marketing**
  "Draft a promotional email for a limited-time offer on a new online course. The email should be concise, persuasive, and include a clear call to action. Highlight the value proposition of the course, address any potential objections, and create a sense of urgency with a clear expiration date for the offer."

. AI as Survival in the Marketplace

by Rama, EA

Speculative Statements:

Our customers are already using AI; our competitors are already using AI.

If we don't incorporate AI in everything that we do, then we will be eliminated from the marketplace.

And job applicants who don't have AI in their resumes will not be hired.

The competition is about "Time", and it is getting very fierce.

AI is an incredible Time saver – sometimes 10 times faster, sometimes 100 time faster.

1. It is about who can get from idea to market faster. 10 times faster.
2. It is about who can get develop the product at lesser cost. 10 times faster.
3. It is about who can identify the customer base for the product faster. 10 times faster.
4. It is about who can get the product information to the customer base faster. 10 times faster.

So, if it took previously 10 months to develop the product, it can now be developed in 1 month. This would be 10x faster.

So, if it took 1 month to get the product information to the right customer, it can now take 3 days. This would be 10x faster.

And suppose that at some point everyone is using AI. Then the competition will be about who can make AI work better. And this will be a new skill development topic.

Do you agree?

Engineering Management Corner

. Once Again About Testing

by Rama, Engineering Association

Here are the main

- **Test Cases**. The test cases are written by the product designers during the design process. They specify what must be tested and with what results.

- **Test Method.** The method is usually defined by the test engineer. It describes the approach to testing the product based on the test cases generated by the designer.

- **Testing Process.** This is usually done by the test technician. This is the actual process of testing and is based on the test method defined by the test engineer and the test cases defined by the product designer.

- **Test Report.** This is the report that comes out of from the Testing Process. This gets sent to the development teams.

- **Corrections**. These are the corrections done by the development teams and then send back to the Testing Process.

Since engineering products are the integration of hardware and software, the following elements must be tested:

- **HW Test**. The testing of the hardware modules.

- **SW Test**. The testing of the software modules.

- **Integrated Test**. The testing of the hardware with the software

- **Usability Test**. The testing of the integrated product together with the instruction and user manuals.

And finally there are different types of tests depending on the phases of the Product Life Cycle:

- **Proof of Concept (POC)**. This is done to test the conceptual solution and is done at the end of the research phase.

- **V&V Test**. The firs V stands for verification test. This is done at the end of the development process. It tests compliance of the developed product to the initial technical requirements.

  The second V stands for validation test. It tests whether the designed product complies with the initial problem statement.

- **Input Control Test**. This is done right after the procurement process. It makes sure that the suppliers have sent quality products that match their announced specifications.

- **Quality Control**. This is done during the development phase or during the production phase. These are intermediate tests done at the discretion of the developers or the producers.

- **End of Line Production (EOL) Test**. This is the final test done at the end of the production process. This is the final test done before sending the products to the customers.

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