**PROFESSOR AI**

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At the outset of our project, we selected two artificial intelligence models to interact with: **ChatGPT-4o**, which is accessible exclusively through a monthly subscription, and **DeepSeek**.   
To initiate our evaluation, we posed **three specific questions** to both models.

**First Prompt:**

*“We need to prepare a 1-hour and 30-minute lesson to discuss Encoder and Decoder by making examples in VHDL. The lesson must be clear and suitable for everyone. If possible, add small quizzes or questions within the lesson to understand if the topic has been understood*. “

Following this prompt, we were not provided with a fully developed lesson. Instead, we received a rough outline — a sketch — indicating how we should structure and design the lesson ourselves.”

**Second Prompt:**

*“Ok, write the lesson now as if they were slides directly here.”*

The main issue we encountered was that the slides provided consisted of only brief phrases or bullet points for each slide. However, our goal was to create more detailed and content-rich slides to support a clearer and more comprehensive presentation.

**Third Prompt:**

As the third and last prompt to structure the basic lesson:

*“Add more details to your slides.”*

Following this third prompt, we were finally able to obtain a complete lesson, including detailed slides covering the relevant topics, quizzes for content review, and example code to demonstrate practical implementation.

**Difference Between Models:**

* The first difference became apparent immediately after the initial prompt. While ChatGPT did not fully grasp the final product we were aiming to achieve, DeepSeek was able to generate a set of slides from the very first prompt that, although not yet fully acceptable, were already clear, concise, and showed a convincing structure.
* In terms of generation speed, ChatGPT outperformed DeepSeek by a few seconds, providing its responses slightly faster.

In the end, the final slide decks produced by both models were quite similar in terms of structure and content.

Unlike ChatGPT, DeepSeek produced clearer and more readable code, effectively highlighting different sections using distinct colors to improve visual clarity and understanding.

**DETAILS:**

After generating the written content for the slides, we requested a set of images that could be appropriately integrated into the presentation.

One of the strengths that became evident from the very beginning was the ability of both models to highlight practical, everyday examples, which helped to make abstract concepts more tangible and easier to understand.

Example generated:

*“Imagine you have a numeric keypad: when you press a key, a unique signal is generated. The encoder translates it into binary for the system to process.”*

*“For example, it is used to activate a single component among many (such as a memory or an LED), starting from a binary address.”*

*“Like pressing a button on your PlayStation controller. You hit ‘X’, but the console sees 1011. That’s an encoder working behind the scenes.”*

Regarding the quizzes, most of the questions generated at the end of each section were appropriate and well-constructed. Additionally, at the end of the lesson, a comprehensive design question was included, further reinforcing the understanding of the overall topic.

**ADDITIONS:**

As part of our exploration, I requested the generation of a Python script to create an animation illustrating the concept of an encoder. The initial animation, produced after the first prompt, showed several imperfections in both execution and visual clarity. Nonetheless, through a series of four iterative prompts and refinements, we successfully improved the output and ultimately achieved a polished and effective result. Interestingly, when we moved on to the decoder, the process was significantly more efficient: by simply requesting the same approach that had been used for the encoder, the resulting animation was accurate and fully acceptable on the first attempt, without requiring further modifications.

All prompts and related requests exchanged throughout this process have been compiled and are available in the attached PDF document containing the complete prompt history.

Before adopting the Python-based solution, we initially attempted to generate the animations using **Sora**, the animation and image generation tool integrated within ChatGPT Plus. However, this approach proved to be inadequate—the animations produced by Sora were disorganized, visually unclear, and lacked the structural coherence needed to effectively convey the intended concepts.

This experience highlighted a clear contrast between the two methods: while the animations generated through Sora fell short of expectations, the Python code-based approach delivered far better results, producing an acceptable and functional animation from the very first prompt and requiring only minimal adjustments thereafter.

**Complications:**

At this stage of the project, our primary objective was to obtain a finalized and fully presentable product, specifically in formats such as PowerPoint or PDF. Among the models tested, only ChatGPT was capable of generating outputs in these formats, as the other models lacked such functionality. Despite this advantage, the presentations produced by ChatGPT did not meet our expectations. They lacked visual appeal and presented numerous issues, particularly in terms of layout, diagram accuracy, and image integration. As a result, we concluded that, at present, it is not yet feasible to obtain a fully polished, ready-to-use presentation directly from the AI models without the need for significant manual refinement.

An additional difficulty we encountered concerned the generation of visual content for the lesson. Although the requested images were produced with all the necessary elements in appearance, the truth tables rendered as images proved to be completely inaccurate. This stood in stark contrast to the truth tables presented in textual or structured schematic form, which were consistently correct and reliable.

**HUMAN-REQUIRED INTERVENTION:**

During the development of the lesson, the human contribution mainly involved transferring the information provided by the AI into a presentation format,   
as well as requesting revisions and refinements where the initial output was not fully satisfactory.   
As previously shown, the AI was unable to generate a fully ready-to-use product in a suitable format (e.g., .pdf or .pptx).

**BEYOND:**

The ease with which this lesson was created, thanks to AI support, made us realize that it could be just as easy to expand the range of people this lesson is designed for. For example, why not ask to create a version of the same lesson specifically formatted for individuals with ADHD?

What we observed is that, by simply requesting the same lesson using the exact same prompts but with an added focus on individuals with ADHD, the system was able to highlight the specific challenges these learners face and the key features that the slides should include. As a result, it was possible to create a complete lesson—just as thorough as the original—but with a few thoughtful adjustments that made the session inclusive and accessible for people with specific cognitive needs.

Some of the features of the adapted lesson included the use of more colors to visually differentiate between components, spreading content across more slides to reduce text overload, and maintaining focus on visuals and short, digestible pieces of text. These small but impactful adjustments contributed to keeping attention levels higher and making the lesson more engaging and accessible for individuals with ADHD.

**PROFESSOR VS AI**

**AI ADVANTAGE:**

* AI often uses real-world examples to make concepts more engaging.
* AI provides fast answers and saves users from wasting time on irrelevant information.
* AI is available anytime, unlike tutors or professors who have limited schedules, maycharge fees, and can face communication barriers.
* AI is inclusive, tailoring content for learning disorders and simplifying topics with clear explanations and custom study materials.

**PROFESSOR ADVANTAGE:**

* The experience that a human being can share can never truly be replicated by a machine.
* The professor can sometimes better understand the difficulties students may face before teaching the topics and adjust the lesson accordingly.

**AI DISADVANTAGE:**

* AI doesn’t create final products on its own; human input is still needed to turn its clear, structured responses into complete presentations or notes.
* AI still struggles with complex problems and needs user guidance; final results often require user refinement.
* AI can sometimes create a false sense of possibility, suggesting unrealistic solutions and reinforcing user bias instead of offering the critical feedback found in human interaction.
* Because people often seek shortcuts, overreliance on AI can lead to misuse in contexts like exams or interviews, ultimately hindering personal growth and skill development.

**PROFESSOR DISADVANTAGE:**

* The professor may sometimes be tired, which is a human factor, and this can have a negative impact on the students.
* The professor is not available 24/7 to answer questions and resolve doubts.
* The professor is human and, therefore, more likely to make mistakes in calculations or exercises.

**PROFESSOR + AI:**

* **Spend less effort on organizing technical material**, freeing up more time to focus on discussions and interactions with students about the subject matter.
* **Prepare higher-quality, more accurate, and well-structured materials** in significantly less time.
* **Create diagrams and animations** that make the lessons more interactive and engaging for students.
* **Supports personalized learning progress tracking** through performance analytics.
* **Provides quick access to up-to-date sources** and multidisciplinary content.
* **Allows for personalized materials** tailored to the class level and interests.
* **Adapts materials for students with learning differences**, such as ADHD or dyslexia, by adjusting pacing, structure, and format (e.g., more visual content, chunked information, or reduced distractions.

**CONCLUSION:**

The research findings have proven valuable in demonstrating how remarkably easy it is today to create educational content—illustrations and videos—that can support, if not entirely replace, the time and effort a human would typically invest in producing such materials. The true conclusion is that what needs to change is not the teacher, but the teaching method. The study showed that the time traditionally spent on content creation can instead be redirected toward enhancing student interaction. The ease with which animations were generated highlights the immense power of AI tools. Currently, the goal should not be to replace teachers, but rather to transform how they teach.

**PROMPT:**

Link to lesson conversation:

<https://chatgpt.com/share/682765d4-018c-8010-87d0-762eb693c032>

Link to Animation Python code conversation:

<https://chatgpt.com/share/68276e56-8174-8010-a244-4d5b6779778f>

Link to ADHD lesson:

<https://chatgpt.com/share/68277201-d630-8010-8d20-07b6d0b42fc1>

