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Q1: What's the main difference between TensorFlow and PyTorch, and when would you use one over the other?

TensorFlow and PyTorch are both tools used to build and train AI models, especially deep learning models—but they work a bit differently.

- **PyTorch** feels more natural for beginners and researchers because it works kind of like regular Python—you can see your results step-by-step as the code runs (this is called *eager execution*).
- **TensorFlow**, on the other hand, used to be more complex because it needed you to build a whole computation graph before running your code. But it's improved a lot in recent versions and is now easier to use.

When to use what?

- If you're doing research, experimenting, or learning, PyTorch is usually the better choice—it's more flexible and beginner-friendly.
- If you're building something for production (like an app or web service), TensorFlow might be better because it has great tools for deploying models (like TensorFlow Lite and TensorFlow Serving).

Q2: Give two ways Jupyter Notebooks are useful in AI development.

1. **Testing and exploring data:** Jupyter Notebooks let you write and run small chunks of code, see the results immediately, and even plot graphs—all in one place. This makes it perfect for exploring your dataset and spotting trends or issues before training a model.
2. **Trying out AI models step-by-step:** When you're building or tweaking a machine learning model, it's helpful to test different parts of your code as you go. Jupyter Notebooks let you do that easily and keep everything organized—plus, you can mix in notes and explanations as you go.

Q3: How does spaCy help with NLP tasks compared to just using basic Python string functions?

Answer:

While Python's built-in string methods (like .split() or .lower()) are fine for simple tasks, they don't really understand the *meaning* or structure of language.

spaCy is a library built specifically for natural language processing (NLP), and it gives you way more power. For example:

- It can break sentences into words *smartly*, not just by spaces.
- It knows what part of speech each word is (like noun, verb, etc.).
- It can find names, places, and companies in a sentence automatically.
- It understands how words relate to each other in a sentence (like which word is the subject or object).