

# Artificial Intelligence & Generative AI

## Large Language Models (LLMs): PART II

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# Artificial Intelligence & Generative AI: LLMs



*AI Deep learning (Source: mindovermachines.com)*

# **3: Artificial Intelligence & Generative AI: LLMs**

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## 4: Artificial Intelligence & Generative AI: LLMs

# Artificial Intelligence: Generative AI

## What is It?



# 5: Artificial Intelligence & Generative AI: LLMs

## Artificial Intelligence: Generative AI

### What is It?

Generative AI: A category of artificial intelligence focused on using AI deep learning models to generate new contents, including text, images, audio, video, and more. The contents are novel but look realistic and may be indistinguishable from human-created ones.

# 6: Artificial Intelligence & Generative AI: LLMs

## Generative AI: Large Language Model

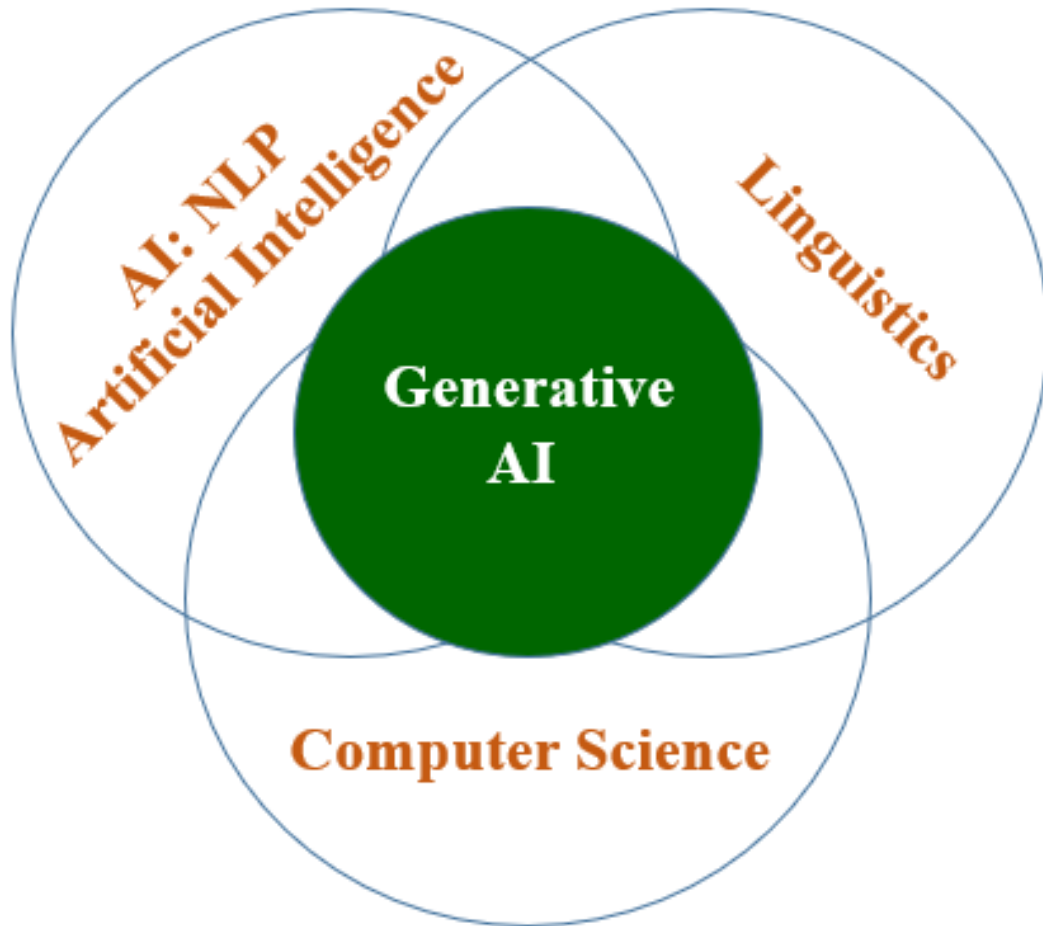
### What is It?

**Generative AI – LLM:** A virtual digital artist that meticulously studies the brushstrokes of a master, then uses the knowledge and skills to paint his/her own unique masterpiece.

# 7: Artificial Intelligence & Generative AI: LLMs

## Artificial Intelligence: Generative AI: LLM

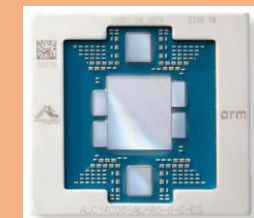
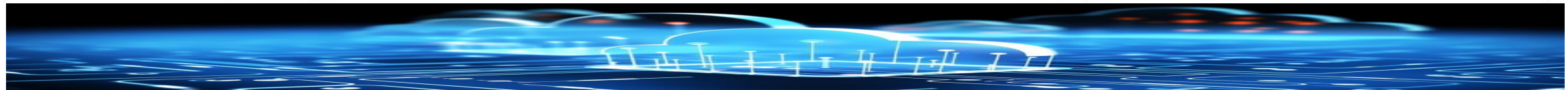
What is It?



**Generative AI** is based on the NLP technologies such as Natural Language Understanding (NLU) and Conversational AI (AI Dialogues) - Those among the most challenging tasks AI needs to solve.



# Artificial Intelligence: Generative AI: LLMs: **AI: HW – SW Stacks**

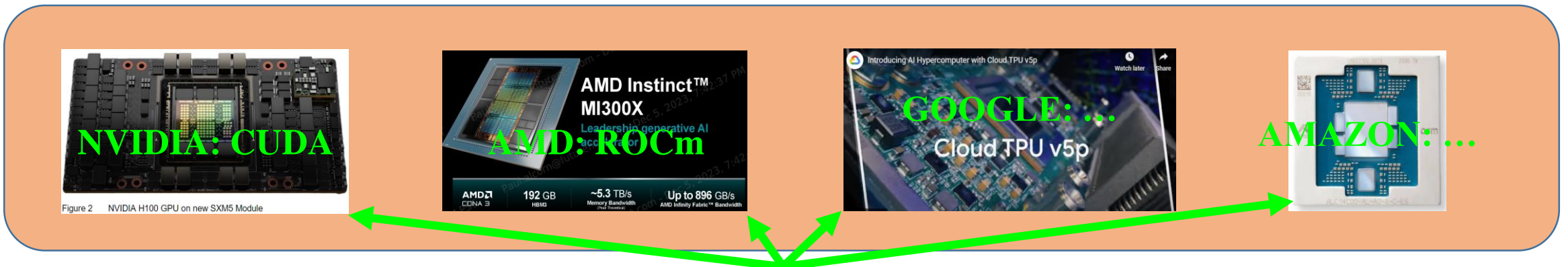




# 9: AI: Artificial Intelligence & Generative AI

Artificial Intelligence: Generative AI: LLMs: **AI: HW – SW Stacks**

**AI Chips in CLOUD: NVIDIA – AMD – GOOGLE - AMAZON**

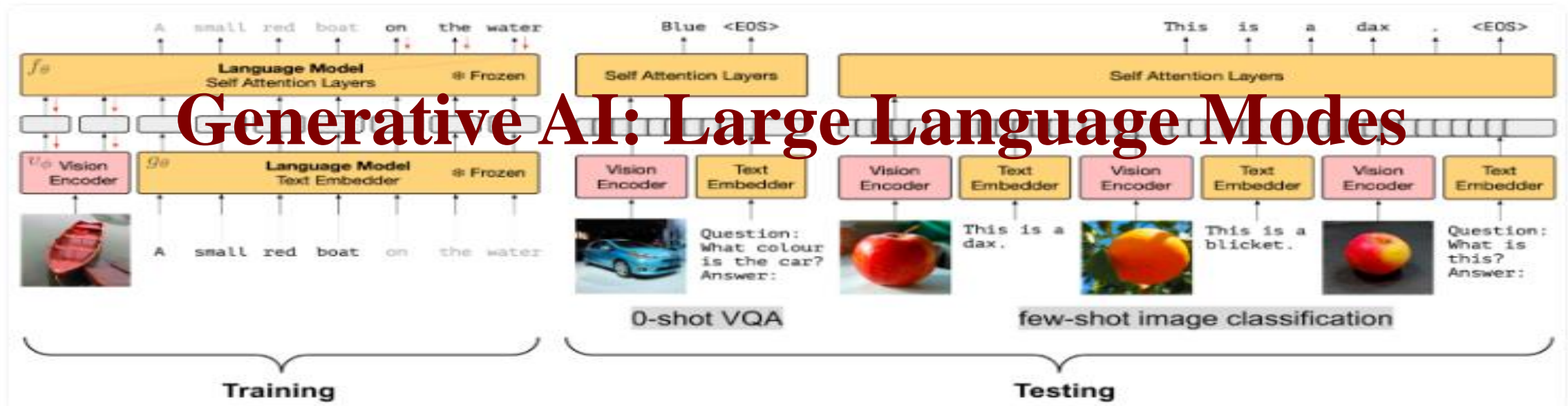


**AI CHIP + AI Embedded SW Platform**

# 10: AI: Artificial Intelligence & Generative AI

Artificial Intelligence: Generative AI: LLMs: AI: HW – SW Stacks

Generative AI LLMs: OpenAI: GPTs – Google: ... PaLM 2, Genmini



# 11: AI: Artificial Intelligence & Generative AI

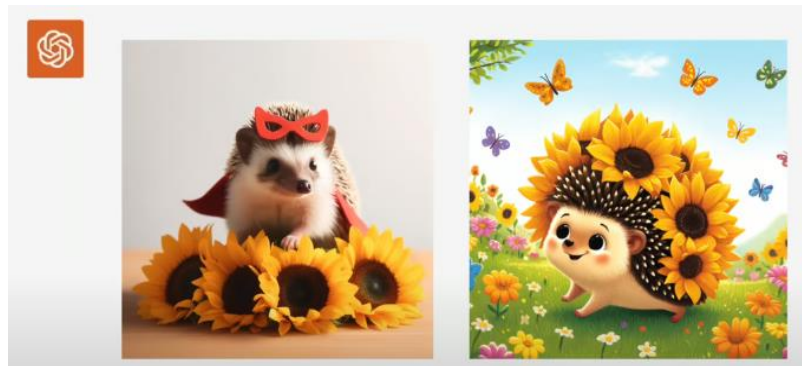
Artificial Intelligence: Generative AI: LLMs: **AI: HW – SW Stacks**

**Chatbots:** ChatGPT, Claude, BARD, ...

AI  
Chatbots

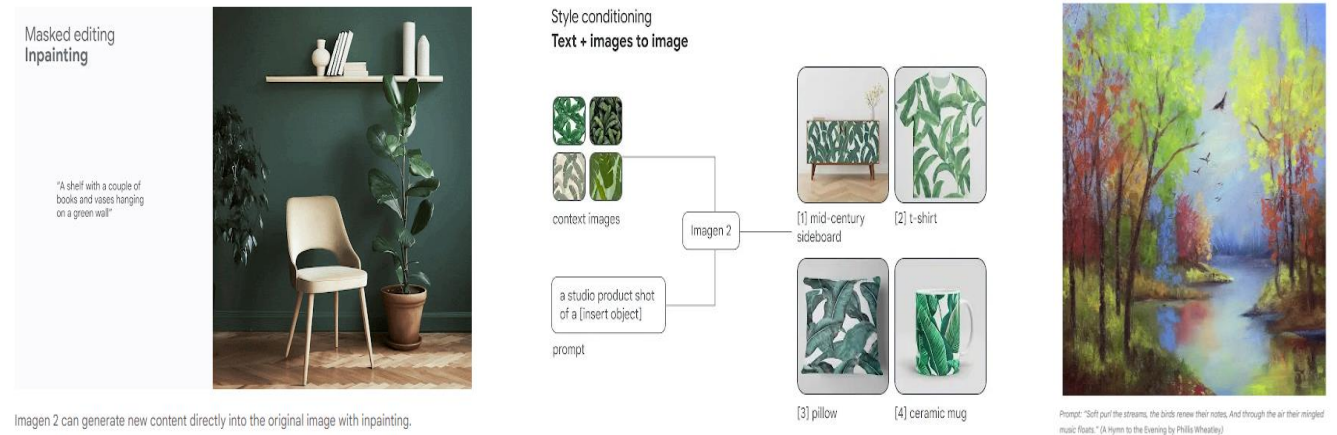


## Generative AI Software Applications

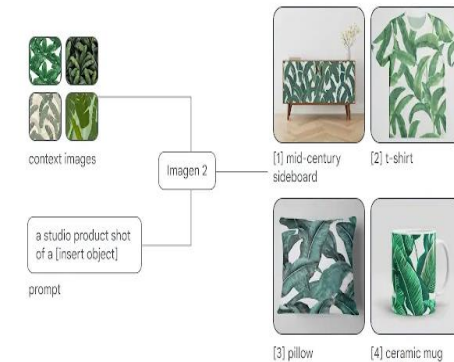


**OpenAI: DALL-E 3**

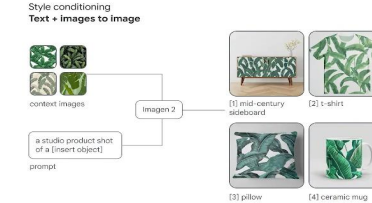
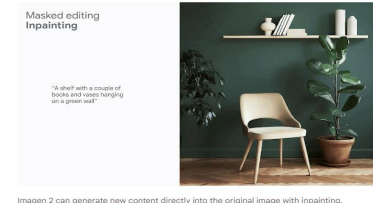
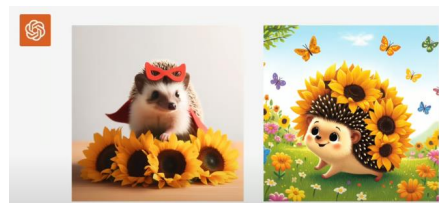
**Google Deepmind: IMAGEN 2**



Style conditioning  
Text + Images to image



AI  
Chatbots





# 12: AI: Artificial Intelligence & Generative AI

Artificial Intelligence: Generative AI: LLMs: **AI: HW – SW Stacks**



## Generative AI SOC (System on a Chip) for Smart Phones



**AI Chip: Qualcomm Snap Dragon 8 Gen 3**

**AI Chip: Google Tensor G3**



# 13: AI: Artificial Intelligence & Generative AI

Artificial Intelligence: Generative AI: LLMs: AI: HW – SW Stacks

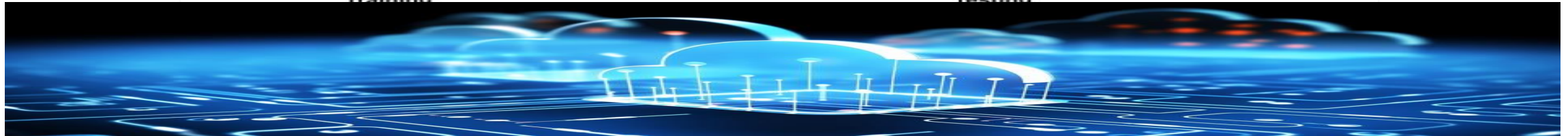
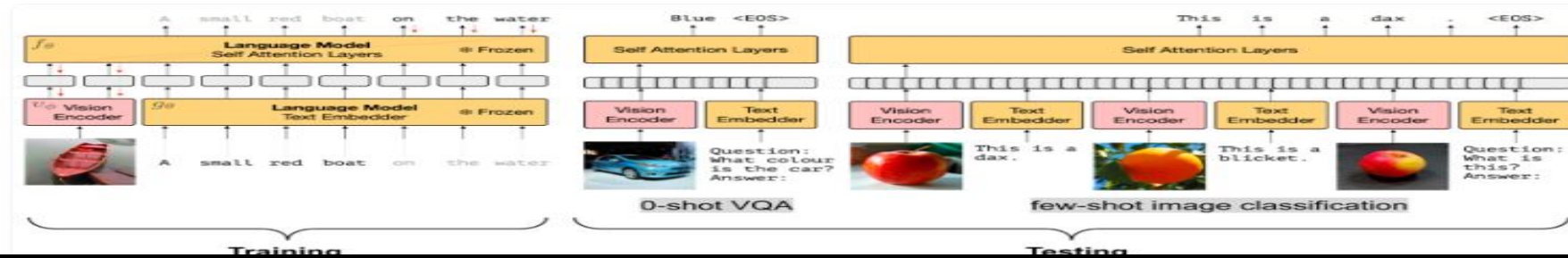
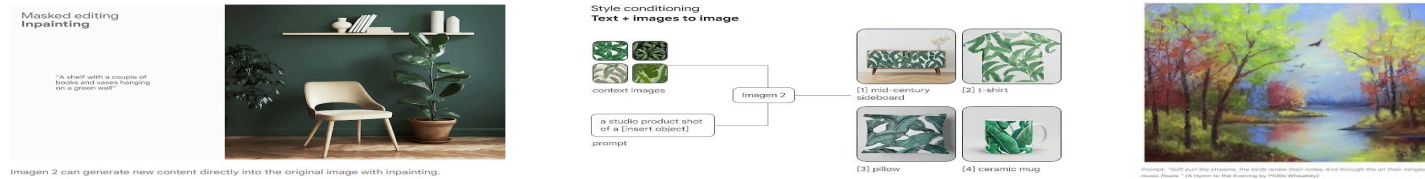


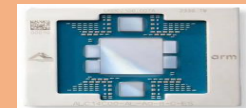
Figure 2 NVIDIA H100 GPU on new SXM5 Module



AMD Instinct™ MI300X Leadership generative AI accelerator



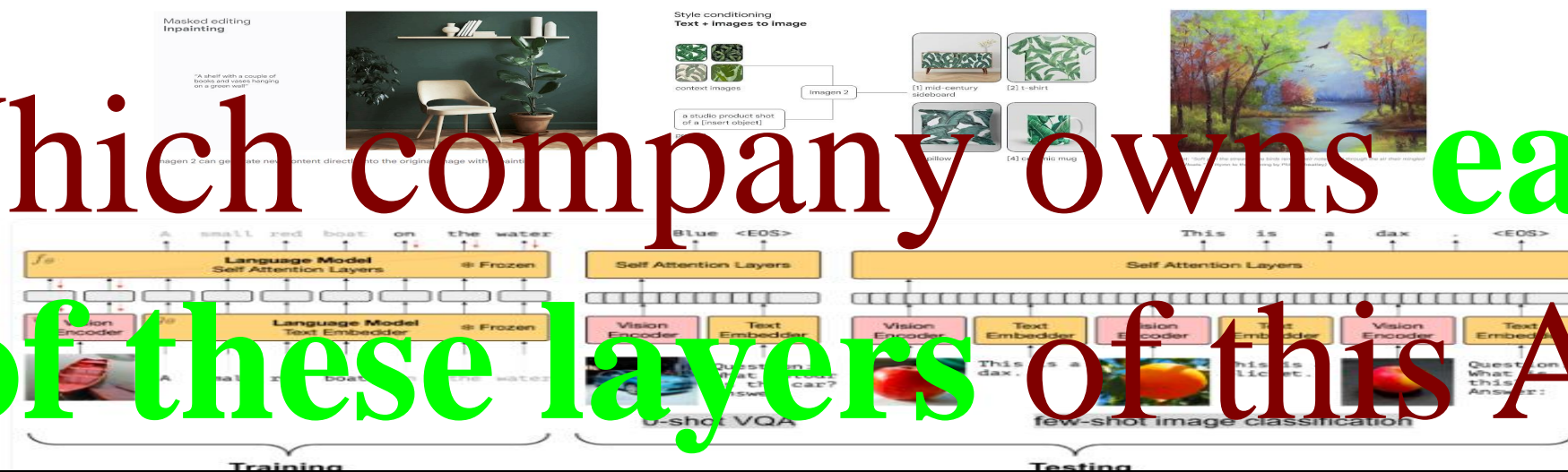
Introducing AI Hypercomputer with Cloud TPU v5p



ARM

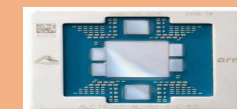
# 14: AI: Artificial Intelligence & Generative AI

# Artificial Intelligence: Generative AI: LLMs: **AI: HW – SW Stacks**



# Which company owns each of these layers of this AI

# HW-SW stack?





# 15: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI: LLMs

### Challenges – Issues – Concerns

The potential of generative AI is vast and transformative. It can revolutionize creative industries, accelerate scientific discovery, and personalize user experiences in ways we can only begin to imagine.

However, technical and ethical issues like hallucinations of generative AI models, bias, copyright, and the potential for misuse of deep fakes require careful attention as this technology matures.

# 16: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Challenges – Issues – Concerns

While the benefits are undeniable, generative AI also presents many challenges, pitfalls, risks, and ethical concerns.

- **Bias and Discrimination:** AI models trained on biased data can perpetuate harmful stereotypes and discriminatory practices. Careful data curation and algorithmic audits are essential to mitigate these risks.
- **Content Copyrights and Data Ownership:** When an AI generates creative content, who owns the intellectual property? Establishing clear legal frameworks and ethical guidelines for generative AI's outputs is paramount.

# 17: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Challenges – Issues – Concerns

While the benefits are undeniable, generative AI also presents many challenges, pitfalls, risks, and ethical concerns.

- **Deep fakes and Disinformation:** The ability to create highly realistic synthetic media raises concerns about misinformation and manipulation. Robust fact-checking mechanisms and user education are key to combatting these threats.
- **Job Displacement and the Future of Work:** As AI automates tasks, concerns about job displacement and income inequality rise. Reskilling and education initiatives are crucial to ensure a smooth transition into a new era of work.

# 18: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Challenges – Issues – Concerns

While the benefits are undeniable, generative AI also presents many challenges, pitfalls, risks, and ethical concerns.

- **Computational Resources and Environmental Impact:** Training large generative AI models requires significant computational resources, which can have environmental implications due to the energy consumption of data centers. Efforts to develop more energy-efficient algorithms and hardware are important for mitigating these environmental impacts.

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## Artificial Intelligence: Generative AI

### Responsible Generative AI

As above, the potential of generative AI is vast and transformative; the benefits are undeniable. To fully harness the potential of generative AI while mitigating its risks, we need a multi-pronged thoughtful approach:

- **Collaboration and Transparency:** Fostering open dialogue between developers, ethicists, policymakers, and the public is crucial to ensure responsible development and address concerns.
- **Focus on Human Augmentation:** Instead of viewing AI as a replacement, we should leverage its capabilities to augment human abilities and create a synergistic partnership.

# 20: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Responsible Generative AI

As above, the potential of generative AI is vast and transformative; the benefits are undeniable. To fully harness the potential of generative AI while mitigating its risks, we need a multi-pronged thoughtful approach:

- **Prioritizing Equity and Inclusion:** Generative AI applications must be developed with inclusivity in mind, ensuring all communities benefit from its advancements.
- **Continuous Learning and Adaptation:** As AI evolves, so must our understanding of its risks and benefits. Staying informed and adapting our frameworks will be crucial to navigate the ever-changing landscape.



# 21: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Responsible Generative AI

As above, the potential of generative AI is vast and transformative; the benefits are undeniable. To fully harness the potential of generative AI while mitigating its risks, we need a multi-pronged thoughtful approach:

- **More energy-efficient generative AI models and hardware systems:** Efforts to develop more energy-efficient algorithms and hardware are important for mitigating the environmental impacts of generative AI applications.

# 22: AI: Artificial Intelligence & Generative AI

## Artificial Intelligence: Generative AI

### Generative AI: Promising Future & Responsibilities

Generative AI presents a golden age of possibilities, brimming with the potential to reshape the world. The potential is vast and transformative. The benefits are undeniable. To fully harness the new technology while mitigating its risks, it is necessary to proceed with thoughtful approaches.

- By proactively addressing the challenges and fostering responsible development, it should ensure the novel technology ushers in a future of progress, creativity, and shared prosperity.
- It should also approach the new era with cautious optimism, embrace the innovations while safeguarding against the pitfalls, and ensure that generative AI becomes a force for good in the hands of an informed and responsible humanity.