



## Generative AI Foundations

This exam validates the candidate has a fundamental understanding of Generative AI, its uses in personal and professional contexts, and the responsible and ethical management of such technology.

A successful candidate will not only have the technical proficiency necessary to interact with Generative AI tools, but will also be able to demonstrate a strong ethical framework for using AI technology, including:

- Understanding privacy implications
- Recognizing bias
- Considering issues surrounding intellectual property rights

Candidates are expected to have 150 hours of a combination of instruction and hands-on experience working with Generative AI tools. They should be familiar with productivity applications, such as Microsoft 365 or Google Docs.

### 1. Generative AI Methods and Methodologies

#### 1.1 Define Generative AI.

- Compare and contrast Generative AI with predictive AI, discriminative AI, analytical AI, statistical AI.
- Compare and contrast Generative AI with search engines.
- Fundamental understanding of diffusion model, transformer model, generative adversarial networks (GANs), variational autoencoders (VAEs).

#### 1.2 Explain the basic processes Generative AI uses to produce an output.

- Understand that each model is trained differently.
  - Text models include: OpenAI GPTx, Google Gemini, Anthropic Claude, Meta LLaMA
  - Image models include: DALL-E, Adobe Firefly
- Large language models (LLMs) need a large amount of training data to perform effectively.
- LLMs are trained on such a huge dataset that there will be opinions and points of view.
- Image models are trained on text-image pairs that are manually tagged.
- Training a model consumes a large amount of energy and requires powerful GPUs.

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- vi Model Types: Diffusion, transformer, variational autoencoders (VAEs), Generative Adversarial Networks (GANs)
- vii Key terms: neural networks, convolutional neural network, tokenization, diffusion, noise generation, refinement algorithms, hyperparameters, dataset

## **1.3 Recognize the input and output types used in a Generative AI scenario.**

- i You can use multiple inputs to get an output.
  - Inputs include: text, audio, video, images
  - Output types include: generative text, generative video, generative image, generative audio
- ii Different tools allow different types of input to generate an output.

## **1.4 Recognize that Generative AI models can be customized to perform individualized tasks.**

- i Self-contained app that does a task for you.
  - Examples: Custom GPT, Google Gems, Microsoft Copilots

## **1.5 Select an appropriate tool to perform a specific task.**

- i Tools: Microsoft Copilot, Google Gemini, MetaGPT, Adobe Express, Canva, Open AI ChatGPT, Claude, Microsoft Azure AI Studio, Stable Diffusion.
- ii Considerations for selecting a tool: purpose and functionality, ease of use, cost, updates and support, data privacy, security, quality, customizability, parameters available for output control.

## **1.6 Describe the limitations of Generative AI.**

- i Output is not reliable.
- ii Output could include bias, misinformation, and hallucinations.
- iii Needs processing power and access to the data (usually internet).
- iv Conversations are used for training unless you enable privacy settings.
- v No universal standards on how it should be used.
- vi Limitations with consistency (two clocks, each show a different time).
- vii Rapid changes might make previous work obsolete.

## **2. Basic Prompt Engineering**

### **2.1 Identify appropriate prompts to elicit textual information.**

- i Content gathering.
- ii Summarization.
- iii Content creation and ideation.

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## 2.2 Identify appropriate prompts to transform content.

- i Reformatting content to meet a requirement.
- ii Editing and proofreading documents.
- iii Providing a visualization of content.
- iv Transforming content into a different media type.
- v Translating content to a different language.
- vi Personalizing and adapt content to facilitate learning and comprehension.

## 2.3 Identify appropriate prompts to elicit image creation and transformation.

- i Producing an image for a specific purpose.
- ii Exploring artistic ideas.
- iii Transforming an image.
- iv Describing the content of images.

## 2.4 Identify appropriate prompts to elicit video creation and transformation.

- i Adding motion to images.
- ii Interpolating between images.
- iii Colorizing a black and white movie.
- iv Generating video from a prompt.
- v Generating an avatar that reads a script.
- vi Adding and removing objects in a video.
- vii Automated subtitling.

## 3. Prompt Refinement

### 3.1 Given an initial prompt and its output, evaluate how the prompt can be improved to elicit more targeted output.

- i Content
  - Creating a prompt at the right level of specificity.
  - Creating prompts that are clear and not abbreviated.
  - Not making the assumption that the AI will “know” what you’re talking about.
- ii Style
  - Including information about the style and tone of the output.
  - Including a style guide.
- iii Persona
  - Giving the AI a persona or role.
- iv Context
  - The AI needs to know the context for what it is asked to do; it’s a machine, so it can’t derive it naturally.

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## 3.2 Given an initial prompt and its output, identify additional inputs you can use to elicit more targeted output.

- i Examples (few-shot prompting).
- ii Glossary for translation.
- iii Templates.
- iv Documents to use for research.
- v Earlier conversation in the same thread

## 3.3 Recognize common prompting techniques.

- i Zero-shot, few-shot, chain-of-thought, self-consistency, generate knowledge, prompt chaining.

## 3.4 Use reverse prompting techniques to achieve an outcome.

## 3.5 Given an AI output, explain how you can verify the accuracy of the output.

- i Historical facts.
- ii Current facts.
- iii Numerical data.

# 4. Ethics, Law, and Societal Impact

## 4.1 Identify the potential for bias in Generative AI output.

- i AI can reflect the biases present in its training data.
- ii Different models might have different biases.
- iii The creator of the model introduces bias by adding guardrails.
  - Some tools allow their additional guardrails to be turned on and off (Azure Open AI for example)
- iv Bias can be introduced through the prompt.
- v Common biases include gender, race, disability, age, religion, cultural, language, nationality, and economic status.
- vi Generative AI can be used to propagate bias.

## 4.2 Identify the potential legal implications of using Generative AI.

- i Honoring intellectual property rights
  - The laws are still in flux however, the best approach is to use non-AI practices and not use another person's work without permission.
  - Copyrighted data was used to train AI for some models.
- ii Identifying legal implications of inappropriate use of generated content.
- iii Transparency – documenting your process when using AI in a professional environment.

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## 4.3 Explain the importance of data privacy.

- i Personal information or a company's private data could be used for training.
- ii Identity theft might occur if personally identifiable information (PII) is used by Generative AI.
- iii Identity theft could result in civil and criminal actions.
- iv Companies are establishing internal policies to prevent employees from leaking data to public/unapproved AI models.
- v Human-generated content might be used to train the model unless you opt out.

## 4.4 Determine the risks associated with using Generative AI.

- i Necessity of human oversight to avoid spreading incorrect or harmful information that leaves you or the company vulnerable to financial and/or legal repercussions.
- ii Understanding that you are responsible for what you create.
  - Refraining from creating content that is harmful or could potentially lead to civil or criminal actions (bullying, hate crimes, fraud, stalking, cheating)
  - Generative AI can be used for dangerous purposes, including deep fakes; easier to generate harmful or illegal information that looks real; identity theft.

## 4.5 Identify the impacts of Generative AI on society.

- i Negative
  - Recognizing the implications of the reduction of human interaction
  - Recognizing that AI does not replace human contact
  - Recognizing the possible impact on human motivation due to overreliance on AI
  - Recognizing the human motivation to use AI to sway public opinion
  - Fear that AI will take over our jobs and our humanity
  - Socioeconomic factors – AI is not available to everyone equally
- ii Positive
  - Generative AI can help us do our job more efficiently.
  - Help us communicate better, particularly across languages.
  - Help us learn more effectively.
  - Generate ideas to spark creativity; brainstorming.
  - Help us do our life tasks more efficiently – menus, recipes, grocery list, summarize long messages from friends and family
  - Analyze patterns and presenting them as opportunities
  - Create jobs – they will just be different jobs