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Marks 18.00/20.00

Grade **90.00** out of 100.00

Question 1

Complete

Mark 1.00 out of 1.00

"Sparse Mixture-of-Experts" (MoE) architectures improve efficiency because:

- a. Only a subset of experts handle each token, reducing compute per forward pass
- b. They quantize weights to 4-bit precision
- c. They rely on RNN recurrence
- d. Every token activates all experts

Question 2

Complete

Mark 1.00 out of 1.00

A key difference between a static LLM and an Agentic AI pipeline is that the latter:

- a. Uses smaller models for inference.
- b. Incorporates planning, reflection, and tool-use modules enabling autonomous goal pursuit.
- c. Cannot access external APIs.
- d. Requires manual supervision for every output.

Question 3

Complete

Mark 1.00 out of 1.00

A segmentation fault (SIGSEGV) is raised when:

- a. A kernel panic occurs
- b. A process accesses an unmapped or protected memory address
- c. Stack grows beyond kernel limit
- d. The process exceeds CPU quota

Question 4

Complete

Mark 1.00 out of 1.00

Claude 3 models differ architecturally from GPT models primarily in:

- a. Using recurrent attention.
- b. Employing Constitutional AI training and retrieval-augmented fine-tuning.
- c. Relying solely on supervised learning.
- d. Removing the transformer backbone.

Question 5

Complete

Mark 1.00 out of 1.00

How does reflection improve reliability in self-correcting agentic systems?

- a. By running parallel copies of the same model.
- b. By retraining the base model after each task.
- c. By prompting the model to evaluate its own output and re-plan when errors are detected.
- d. By executing redundancy checks at hardware level.

Question 6

Complete

Mark 1.00 out of 1.00

In a Multi-Component Pipeline, the Executor module differs from the Planner because it:

- a. Decomposes goals.
- b. Performs meta-reflection.
- c. Actually performs API/tool actions specified by the Planner.
- d. Stores outcomes persistently.

Question 7

Complete

Mark 1.00 out of 1.00

In GitHub Copilot's context engine, "ghost text" refers to:

- a. Autogenerated comments for PRs.
- b. AI-generated commit messages.
- c. Pre-commit patch suggestions stored in Git hooks.
- d. Inline code completions displayed semi-transparent before acceptance.

Question 8

Complete

Mark 0.00 out of 1.00

In Linux, which kernel structure maintains a process's open-file descriptors?

- a. files_struct
- b. fs_struct
- c. task_struct
- d. mm_struct

Question 9

Complete

Mark 1.00 out of 1.00

Rotary positional embeddings (RoPE) improve transformer efficiency by:

- a. Adding learned position vectors to token embeddings
- b. Encoding relative position through rotation in complex space, enabling extrapolation beyond training context
- c. Concatenating sinusoidal encodings
- d. Reducing softmax complexity from $O(n^2)$ to $O(n)$

Question 10

Complete

Mark 1.00 out of 1.00

The 'scaling laws' for LLMs indicate:

- a. Accuracy grows logarithmically with dataset size
- b. Larger context windows reduce perplexity exponentially
- c. Model size has negligible impact beyond 1B parameters
- d. Loss decreases predictably with model, data, and compute following power-law relations

Question 11

Complete

Mark 1.00 out of 1.00

What API design principle allows OpenAI's function_calling feature to work seamlessly with external tools?

- a. Inline bash execution.
- b. JSON schema-based argument validation and structured outputs.
- c. Socket-based manual parsing.
- d. Text concatenation of tool responses.

Question 12

Complete

Mark 1.00 out of 1.00

What happens when a process executes exec() after a successful fork()?

- a. Both parent and child continue concurrently
- b. The parent process becomes orphaned
- c. The kernel spawns a new thread
- d. The child process is replaced by a new program, retaining PID

Question 13

Complete

Mark 1.00 out of 1.00

What role does "Memory Abstraction" play in Agentic AI systems?

- a. Stores system prompts only.
- b. Acts as a cache for recent LLM responses only.
- c. Integrates short-term and long-term context to maintain continuity across sessions.
- d. Handles tokenization.

Question 14

Complete

Mark 1.00 out of 1.00

When a Linux process is in a D (uninterruptible sleep) state, which of the following is true?

- a. It is waiting for I/O and cannot be interrupted until it completes
- b. It is swapped out of memory
- c. It is a zombie process
- d. It can be killed with kill -9

Question 15

Complete

Mark 0.00 out of 1.00

Which Linux command combination best isolates CPU usage per thread for profiling a multithreaded program?

- a. pidstat -t 1
- b. All of the above
- c. ps -L p
- d. top -H

Question 16

Complete

Mark 1.00 out of 1.00

Which optimizer is most likely to produce stable training when using large batch sizes?

- a. AdamW
- b. SGD with momentum
- c. RMSProp
- d. Adagrad

Question 17

Complete

Mark 1.00 out of 1.00

Which property differentiates OpenAI's GPT-4o from previous GPT-4 variants?

- a. It uses separate encoders for vision and text.
- b. It cannot perform streaming inference.
- c. It has no context memory.
- d. It is multimodal (text + image + audio) in a single unified model.

Question 18

Complete

Mark 1.00 out of 1.00

Which scheduling pattern allows multiple specialized agents to cooperate efficiently under an orchestrator?

- a. Synchronous blocking RPC.
- b. Round-robin message passing.
- c. Hierarchical task delegation with shared blackboard memory.
- d. Randomized routing.

Question 19

Complete

Mark 1.00 out of 1.00

Why do instruction-tuned LLMs like GPT-4 and Claude 3 outperform base models on dialogue?

- a. They use more layers
- b. They're trained on purely code data
- c. They add reinforcement without labeled data
- d. They undergo supervised fine-tuning (SFT) and RLHF on task-formatted prompts

Question 20

Complete

Mark 1.00 out of 1.00

Why does Copilot sometimes suggest insecure code patterns (e.g., eval(input()))?

- a. Code is executed in sandbox mode.
- b. Training data contained insecure examples from public repos.
- c. Temperature = 0 causes hallucinations.
- d. Model has rule-based filtering only.