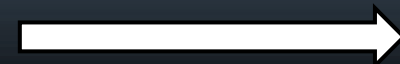# Chain of Thought vs Tree of Thought & Fundamental Prompting Techniques

Exploring how AI reasons, responds, and creates through guided prompting.

Chain of Thought (CoT)

Tree of Thought (ToT)

AI reasons step-by-step like a human writing down thoughts in sequence. Thinking Straight.

Examples:

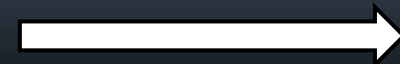**Prompt:** "If Ali has 3 apples and buys 2 more, how many apples does he have?"

AI (Chain of Thought):

- ✓ **Step 1:** Ali starts with 3 apples.
- ✓ **Step 2:** He buys 2 more.
- ✓ **Step 3:** Total = 3 + 2 = 5 apples.

Tone Control: Use temperature = 0.3. Keeps reasoning focused and logical.

Tree of Thought (ToT)

Chain of Thought (CoT)

AI reasons step-by-step like a human writing down thoughts in sequence. Thinking Straight.

Examples:

Prompt: "If Ali has 3 apples and buys 2 more, how many apples does he have?"

AI (Chain of Thought):
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Chain of Thought (CoT)

AI explores multiple reasoning paths and evaluates which branch leads to the best outcome. Thinking Wide.

Examples:

Prompt: "What's the best strategy for launching a new AI startup?"

AI (Tree of Thought):
- ✓ **Idea A:** Focus on product first
- ✓ **Idea B:** Focus on community
- ✓ **Idea C:** Focus on partnerships => Evaluates each => chooses the most viable branch.

Tone Control: Use temperature = 0.7, top-p = 0.9 => encourages creative exploration.

Tree of Thought (ToT)

Difference between Chain of Thought and Tree of Thought

Aspect	Chain of Thoughts (CoT)	Tree of Thought (ToT)
Reasoning style	Linear – one step after another	Branching – explores multiple paths
Approach	Sequential reasoning	Exploratory reasoning
Goal	Reach a single, logical conclusion	Evaluate multiple possibilities to find the best outcome
Use Case	Step-by-step problem solving (math, logic, factual reasoning)	Creative or strategic decisions (planning, brainstorming, strategy)
Example	"2 + 3 = 5 => next step => final answer."	"Option A => B => C => Evaluate => Choose best path."
Parameters (typical)	Temperature = 0.3 (focused), top-p = 0.8	Temperature = 0.7 (diverse), top-p = 0.9
AI Behavior	Deterministic and stable	Exploratory and dynamic
Analogy	Like following one straight road	Like exploring a forest of possible paths

Zero-Shot Prompting

- You give no examples, only the task.
- Example:
- "Summarize this article in one paragraph."
- How to fine-tune output:
- Use temperature = 0.5 for balanced answers.
- Tip:
- Zero-shot works best when the task is common or clearly defined.

One-Shot Prompting

- You give one example to guide the pattern.
- Example:
- Q: What's 3 x 3? A: 9
- Now, Q: What's 8 x 7?
- Parameters:
- Use temperature = 0.3, top-p = 0.8 to keep consistency with the example.

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Few-Shot Prompting

- You provide a few examples to teach the pattern or style.
- Example:
- Example 1: Translate "Hello" => "Bonjour"
- Example 2: Translate "Good Morning" => "Bon Matin"
- Parameters:
- Temperature = 0.2, top-k = 50 to stay consistent and focused.

System Prompting

- Define the AI's identity, goals, and tone at the system level.

- Example:

- "You are an experienced business mentor. Answer concisely with strategic clarity."

- Parameters:

- Temperature = 0.4, top-p = 0.85 – ensures confident but stable output.

Role Prompting

- Assigns a specific persona or role within the user prompt.
- Example:
- "Act as a content strategist and draft a social post for an AI course."
- Parameters:
- Temperature = 0.6, top-p = 0.9 – makes tone natural and creative.

Contextual Prompting

- Adds background info, history, or additional context to shape the output.

- Example:

- "Considering last week's discussion about Agentic AI, summarize how prompting improves reasoning."

- Parameters:

- Temperature = 0.5, top-k = 80, top-p = 0.85 – keeps balance between context relevance and fluency.

Wrap-Up

- **Prompting isn't just about asking AI – it's about guiding how it thinks.**

- **Summary bullets:**

- **CoT = Linear reasoning**

- **ToT = Branching exploration**

- **Prompting techniques = How we shape those thoughts**

- **Parameters (temp, top-p, top-k) = How we fine-tune creativity vs control**