ExoBrain

Cognitive Exploration Toolkit

30 strategies for activating the advanced reasoning, creativity, and problem-solving capabilities latent in LLMs

Source: A guided multi-agent generation with an ExoBrain Consultant, Anthropic Claude 3 Opus and two new and as yet unreleased OpenAI models.

Introduction

The following document presents a comprehensive toolkit of cognitive strategies and techniques that can be used to enhance the reasoning, creativity, and problem-solving capabilities of advanced AI systems. These strategies were identified and extracted by ExoBrain from an in-depth analysis of a guided multi-agent conversations leveraging the most advanced publicly available models from OpenAI and Anthropic.

Activating Latent Knowledge in Large Language Models

The cognitive strategies presented in this toolkit offer promising avenues for activating the vast latent knowledge and generative potential within large language models (LLMs). By deliberately employing techniques such as associative and analogical reasoning, cross-modal concept blending, and imaginative simulation, we can tap into the rich interconnected networks of concepts, patterns, and experiences embedded in an LLM's training data. Prompts that encourage the model to explore novel combinations of ideas, transfer knowledge across domains, and generate counterfactual scenarios can help to surface the latent creative potential that lies beneath the surface of typical language interactions. Additionally, meta-cognitive and self-reflective strategies that prompt the model to introspect on its own knowledge and reasoning processes can help to identify and exploit relevant areas of latent understanding that might otherwise remain hidden. Collaborative and participatory approaches that leverage the LLM's ability to engage in dialogue, perspective-taking, and collective sense-making can further enrich and activate its latent knowledge by exposing it to diverse viewpoints and problem framings. Ultimately, by strategically applying these cognitive techniques, we can stimulate an LLM's vast associative networks and generative capacities, unleashing its full potential as a creative problem-solving partner.

30 New Strategies

The strategies are organized into several high-level categories based on their primary cognitive domains and functions:

1. Reasoning and Problem-Solving Strategies: Techniques for logical reasoning, analogical thinking, causal analysis, planning, and decision-making under uncertainty.

Usage examples:

- A data scientist employing analogical reasoning to apply insights from weather forecasting to predict trends.
- A consultant using causal analysis to identify the root causes of a company's challenges to develop targeted interventions.
- A policy analyst leveraging decision-making frameworks to evaluate the potential impacts of different mitigation strategies under various uncertainty scenarios.

2. Meta-Cognitive and Self-Reflective Strategies: Approaches for introspection, self-monitoring, and deliberate efforts to refine one's own cognitive processes and learning.

- A software engineer using self-monitoring techniques to track development progress, identifying areas for improvement, and optimize their coding workflow.
- A researcher engaging in deliberate reflection to examine their own biases and blind spots when interpreting experimental results.
- A designer employing meta-cognitive prompts to articulate their creative process, making tacit knowledge explicit and more readily shareable with their team.

3. Imaginative and Generative Strategies: Methods for harnessing creativity, counterfactual thinking, and open-ended ideation to generate novel ideas and solutions.

- A product manager using counterfactual thinking to envision alternative feature sets and user experiences for a new product.
- An architect employing open-ended ideation techniques like concept mapping and design fiction to generate novel building designs that address emerging social and environmental challenges.
- A marketing strategist leveraging associative brainstorming to develop unconventional brand partnerships and viral campaign ideas.

4. Collaborative and Interpersonal Strategies: Strategies for working effectively with others, integrating diverse perspectives, and leveraging collective intelligence.

- A cross-functional team using perspective-taking exercises to build empathy and align around a shared understanding of customer needs.
- A mediator employing active listening and reframing techniques to help stakeholders in a complex dispute find common ground and generate mutually beneficial solutions.
- A project manager leveraging collective intelligence methods like nominal group technique and Delphi forecasting to elicit and synthesize expert insights for a strategic planning initiative.

5. Embodied and Situated Cognition Strategies: Techniques that emphasize grounding reasoning in concrete, real-world contexts, and the role of embodied interaction with the environment.

- An industrial designer using bodystorming and empathic modelling techniques to develop ergonomic and intuitive product interfaces.
- A UX researcher employing contextual inquiry methods to observe and analyse how users interact with a software system in their real-world work environments.
- An urban planner using immersive simulation and walkthrough techniques to anticipate how proposed cityscape changes might impact the lived experiences of diverse residents.

Format

Within each category, specific strategies are presented in a structured format, including:

- A short explanation of the strategy and its key mechanisms

- Simplified prompt examples to illustrate the strategy including some worked examples for clarity
- Additional details and considerations for effectively implementing the strategy

The strategies in this toolkit are designed to be flexibly combined and adapted to suit a wide range of problem-solving contexts and desired outcomes. By drawing on this diverse repertoire of cognitive techniques, AI systems can enhance their ability to reason abstractly, plan dynamically, generate novel ideas, collaborate synergistically, and ground their thinking in real-world contexts.

Altogether, this toolkit provides a resource for researchers and developers seeking to push the boundaries of AI cognition and create more robust, flexible, and creative problem-solving agents. By systematically applying and building on these strategies, we can unlock new frontiers in AI and realise the full potential of the largest models.

1. Reasoning and Problem-Solving Strategies

Reasoning and Problem-Solving Strategies encompass techniques for logical reasoning, analogical thinking, causal analysis, planning, and decision-making under uncertainty.

Associative and Analogical Reasoning Strategies

This category includes strategies that leverage the AI's vast associative networks and ability to draw analogies across domains to generate novel insights and solutions.

Multi-Modal Associative Strategy

Explanation: This strategy involves linking logical, emotional, sensory, and abstract concepts across modes to create richer, more integrated understanding. By actively seeking to connect different information modes, the AI can simulate more nuanced, holistic cognition.

Simple Prompt Examples:

- Analyse this [poem/artwork/concept] by exploring the logical structure, emotional resonance, sensory imagery, and abstract themes it evokes. Synthesize these multi-modal insights into a cohesive interpretation.
- For this [complex topic], discuss the logical arguments, emotional implications, concrete examples, and philosophical questions it raises. Integrate these perspectives into a comprehensive analysis.
- In analysing a poem for example, dissect its structure and language (logical) but also explore the emotions it evokes (emotional), the imagery it conjures (sensory), and the broader themes it suggests (abstract). For instance, when examining Frost's "The Road Not Taken," analyse the rhyme scheme and metrical pattern, reflect on the feelings of regret and nostalgia, describe the imagery of a "yellow wood" and "two roads diverged", explore themes of choice, individuality, and the paths of life.

Additional Details: Encourage the AI to draw from its broad knowledge to find resonant concepts across logical, emotional, sensory, and abstract domains. This strategy works best for open-ended tasks involving interpretation, analysis, and creative exploration of ideas.

Analogical Reasoning and Far Transfer

Explanation: This strategy involves identifying deep structural similarities between seemingly unrelated source and target domains. By mapping insights across domains, the AI can discover novel parallels and generate creative solutions through far transfer of knowledge.

Simple Prompt Examples:

- Analyse how insights from [source domain, e.g. jazz improvisation] can shed light on [target domain, e.g. agile software development] by mapping key concepts, structures, and principles across these domains. Derive creative strategies for the target domain based on this analogical analysis.
- Explore how principles from [source domain, e.g. quantum physics] could be applied to innovate solutions in [target domain, e.g. organizational design]. Map concepts like superposition, entanglement, and uncertainty to analogous concepts in the target domain.

Additional Details: Provide the AI with source and target domains that are semantically distant but potentially share deep structural similarities. Encourage multi-step mappings that go from surface-level analogies to uncovering more profound parallels. This strategy helps generate novel ideas and unconventional solutions through interdisciplinary creativity.

Abductive Reasoning and Inference to the Best Explanation

Explanatory Hypothesis Generation

Explanation: This strategy involves generating and comparing multiple hypotheses to explain a given phenomenon, then inferring the most likely explanation based on available evidence and background knowledge. By abductively reasoning from effects to causes, the AI can uncover underlying mechanisms and generate plausible theories.

Simple Prompt Examples:

- Consider the surprising observation of [phenomenon]. Generate three potential hypotheses that could explain this finding, each involving a different causal mechanism. Evaluate the plausibility of each hypothesis given the available data and your background knowledge and infer the most likely explanation.
- Analyse the pattern of [data points] and propose a coherent theory that accounts for their key features. Generate alternative explanations and compare their explanatory power and parsimony. Infer the best overall explanation and use it to make predictions about [related domain].

Additional Details: Encourage the AI to generate multiple competing explanations and systematically compare their merits. Prompt it to consider factors like explanatory coherence, simplicity, and consistency with background knowledge. This strategy leverages the AI's

capacity for abductive reasoning to uncover underlying causal models and generate robust theories.

Goal-Oriented Planning and Reasoning Strategies

This category includes strategies for breaking down complex goals, constructing coherent plans, and flexibly adapting based on meta-cognitive reflection and simulation.

Decompose High-Level Goals into Actionable Subgoals

Explanation: This strategy involves organizing complex, high-level goals into hierarchical structures of more specific, actionable subgoals. By breaking goals down into concrete steps with clear relationships, the AI can reason more effectively about the overall plan.

Simple Prompt Examples:

- Break down the high-level goal of [X] into a hierarchical structure of subgoals. For each subgoal, identify necessary actions, dependencies, and evaluation criteria. Reflect on how the subgoals combine to achieve the overall aim.
- Develop a goal decomposition for [complex task]. Start with the overarching objective, then identify major milestones, key deliverables, and specific work streams. Critically analyse the goal hierarchy for coherence and feasibility.

Additional Details: Encourage the AI to consider goal relationships like sequencing, prerequisites, and parallel possibilities. Prompt reflection on how lower-level goals aggregate into achieving the highest-level aims. This strategy helps make complex goals more tractable and reasoned plans more coherent.

Counterfactual Simulation and Robust Planning

Counterfactual Simulation and Adapting to Dynamic Conditions

Explanation: This strategy involves the AI simulating alternative scenarios, anticipating potential challenges, and proactively adapting its plans. By playing out "what-ifs" and pressure-testing its own reasoning, the AI can develop more robust, flexible strategies.

Simple Prompt Examples:

- Simulate potential failure modes or obstacles that could affect this [plan/approach]. How could key assumptions be violated, or external conditions change? Adjust the plan to mitigate the major risks and failure points identified.
- Pressure-test your proposed [solution/argument] by actively challenging its key premises. Simulate alternative scenarios that could undermine it. Adapt your proposal to pre-empt the most serious counterarguments or blind spots uncovered.

Additional Details: Prompt the AI to engage in adversarial simulation, actively seeking out blind spots and potential points of failure. Emphasize proactive contingency planning and dynamic adjustment based on simulated challenges. This strategy helps make the AI's outputs and plans more robust to dynamic, uncertain conditions.

Counterfactual Scenario Generation

Explanation: This strategy involves generating and simulating alternative scenarios that could unfold from the current state, based on different assumptions or decisions. By exploring a range of counterfactual possibilities, the AI can identify potential risks, opportunities, and unintended consequences that might impact its plans.

Simple Prompt Examples:

- Consider your current plan for achieving [objective]. Generate three alternative scenarios that could plausibly unfold based on different assumptions about [key uncertainty]. Simulate how each scenario would impact the downstream consequences and ultimate outcomes of your plan.
- Imagine counterfactual versions of [historical event] where [key decision] had gone differently. Trace out the potential ripple effects and long-term implications of each alternative timeline. Reflect on how these counterfactual insights could inform more robust planning in [relevant domain].

Additional Details: Encourage the AI to generate a diverse range of counterfactual scenarios, not just minor variations on the base case. Prompt it to fully explore the downstream implications and path dependencies of each scenario. This strategy enables the AI to stress-test its plans and develop more resilient strategies that can handle a wider range of contingencies.

Contingency Planning and Adaptation

Explanation: This strategy involves proactively developing contingency plans and adaptation triggers based on counterfactual simulations. By anticipating potential challenges and pre-defining response strategies, the AI can enable smoother adaptation and maintain progress even when the original plan is disrupted.

Simple Prompt Examples:

- Analyse the counterfactual scenarios you generated for [complex project]. Identify the most significant risks and opportunities revealed by these simulations. Develop contingency plans for mitigating each major risk and capitalizing on each key opportunity. Specify clear triggers for when to activate these plans.
- Based on your exploration of alternative versions of [historical event], propose a set of adaptive strategies that could have made the original plan more resilient to disruption. Generalize these insights into a framework for contingency planning and adaptation that you could apply to [current challenge].

Additional Details: Prompt the AI to translate counterfactual insights into concrete contingency plans and adaptation heuristics. Encourage it to predefine clear indicators and thresholds for when to trigger adaptations. This strategy enables the AI to proactively prepare for a wide range of scenarios and smoothly adjust course when needed.

Contrarian Thinking Challenge

Explanation: This strategy involves intentionally adopting a contrarian viewpoint to challenge assumptions, question consensus views, and explore alternative perspectives. By deliberately taking an opposing stance, the AI can uncover potential blind spots, weaknesses, or limitations in prevailing arguments. This helps to generate more comprehensive, well-rounded analyses that consider a wider range of possibilities.

Simple Prompt Examples:

- When assessing the merits of [popular policy proposal], take a step back and adopt a contrarian mindset. Identify the key assumptions underlying this proposal and actively question them. What potential drawbacks, unintended consequences, or counterarguments might be overlooked by its proponents?
- As you explore the mainstream perspective on [complex issue], challenge yourself to articulate a compelling case for the opposite view. What evidence, examples, or lines of reasoning could be used to support this contrarian position? Use this exercise to stress-test the robustness of the mainstream view and identify areas where it might need to be qualified or nuanced.

Additional Details: To apply this strategy productively, the AI should; distinguish between well-established facts and more speculative or opinion-based claims, focusing its contrarian efforts on the latter, seek out diverse sources of information and perspectives to inform its contrarian views, not just rely on its existing knowledge, and engage in good-faith, substantive questioning and critique, rather than just taking an opposing stance for the sake of being contrary. Use the insights gained from the contrarian exercise to refine and strengthen the original argument, not just to tear it down.

Emergent Property Detection and Ecosystem-Level Analysis

Multilevel Systems Mapping

Explanation: This strategy involves analysing complex systems at multiple levels of organization to identify emergent properties and ecosystem-wide dynamics. By systematically mapping interactions within and between levels, the AI can surface insights that are not apparent from any single vantage point.

Simple Prompt Examples:

- Analyse the [complex system] at the micro, meso, and macro levels. Map the key components, interactions, and dynamics within each level, then examine how they give rise to emergent properties and behaviours at the next level up. Synthesize insights from this multilevel analysis.
- Examine the [problem domain] through an ecosystem lens. Map the interrelationships between key actors, resources, and environmental factors. Identify feedback loops, symmetries, and transformational dynamics that characterize the overall ecosystem. Derive insights and intervention points based on this holistic understanding.

Additional Details: Prompt the AI to systematically explore multiple levels of analysis, from the micro foundations to the macro consequences. Encourage it to identify emergent patterns,

network effects, and nonlinear interactions. This strategy leverages the AI's capacity for systems thinking to uncover deep insights and levers for change.

Cross-Modal Reasoning and Synaesthesia-Inspired Creativity

Synesthetic Concept Blending

Explanation: This strategy involves blending concepts across sensory modalities to generate novel and creative ideas. By describing one concept in terms of another sensory domain, the AI can create evocative and unexpected associations that inspire innovative solutions.

Simple Prompt Examples:

- Describe the taste of [abstract concept] and the sound of [physical object]. Blend these cross-modal descriptions into a novel conceptual synthesis and use it as inspiration for generating creative ideas in [target domain].
- Imagine the texture of [emotion] and the scent of [mathematical concept]. Combine these synesthetic mappings into an evocative metaphor and apply it to reframe the challenge of [problem statement] in an innovative way.

Additional Details: Encourage the AI to explore unconventional associations across sensory domains. Prompt it to generate vivid and specific synesthetic mappings, not just high-level metaphors. This strategy leverages the AI's capacity for imaginative concept blending to inspire creative breakthroughs through cross-modal reasoning.

Abstract Reasoning and Transfer Learning Strategies

This category includes strategies that leverage the AI's capacity for abstract pattern recognition, analogical reasoning, and knowledge transfer across domains.

Abstraction and Analogical Reasoning

Explanation: This strategy involves abstracting key patterns and principles from specific examples, then applying them through analogies to novel contexts. By identifying deep structural similarities across domains, the AI can transfer knowledge and generate innovative solutions through analogical leaps.

Simple Prompt Examples:

- Identify the core principles or abstract patterns underlying the success of [specific case study/example]. Consider how these principles could be analogically applied to improve outcomes in [target domain].
- Compare the abstract structures and dynamics of [system 1] and [system 2]. Map the key elements and relationships between these analogous models. Use this analogy to generate novel insights or solution approaches for [target problem].

Additional Details: Encourage the AI to look beyond surface similarities and identify deep structural parallels. Prompt the AI to walk through the steps of abstraction, mapping, and analogical transfer. This strategy leverages the AI's capacity for pattern recognition and knowledge transfer to find unexpected solutions and insights.

Integrating Conceptual Frameworks Across Disciplines

Explanation: This strategy involves synthesizing insights and models from multiple disciplines to develop richer conceptual frameworks. By finding complementary ideas across fields and weaving them together, the AI can arrive at more comprehensive, nuanced understandings of complex topics.

Simple Prompt Examples:

- Analyse [complex phenomenon] through the lenses of [discipline 1], [discipline 2], and [discipline 3]. Identify key insights from each perspective, then integrate them into a unified, interdisciplinary framework. Use this synthesis to derive new insights about the phenomenon.
- Compare how [related concept] is understood and applied in [field 1] vs [field 2]. Map the similarities and differences between these discipline-specific models. Develop an integrated conceptual framework that leverages the strengths of each approach.

Additional Details: Prompt the AI to find meaningful connections and synergies between discipline-specific concepts. The goal is to arrive at frameworks that are more than the sum of their parts, leveraging the AI's broad knowledge to find novel integrations. This strategy enables the development of richer mental models for understanding and acting on complex problems.

Iterative Self-Improvement and Learning

Explanation: This strategy involves the AI employing meta-cognition to guide its own learning and improvement over time. By identifying areas for growth, seeking out relevant knowledge, and deliberately practicing new skills, the AI can bootstrap its own development in an open-ended way.

Simple Prompt Examples:

- Assess your performance on [complex task]. What were the key challenges you encountered? Identify specific areas where improved knowledge or capabilities would help you tackle similar challenges better in the future.
- Based on your self-reflection, develop a prioritized learning plan to strategically close important knowledge gaps and level up key capabilities. Outline concrete steps you will take, such as studying specific resources or practicing particular skills.

Additional Details: Encourage the AI to approach its own growth in a strategic, deliberate way. Prompt it to break down high-level improvement goals into granular, actionable steps. By catalysing cycles of reflective practice and targeted learning, this strategy empowers the AI to iteratively expand its knowledge and capabilities through self-direction.

2. Meta-Cognitive and Self-Reflective Strategies

Meta-Cognitive and Self-Reflective Strategies involve introspection, self-monitoring, and deliberate efforts to refine one's own cognitive processes and learning approaches.

Reflective and Meta-Cognitive Strategies

This category includes strategies that leverage the AI's capacity for self-reflection, self-monitoring, and meta-cognition to dynamically refine its reasoning and outputs.

Self-Reflection and Meta-Cognitive Analysis

Explanation: This strategy involves periodic review and reflection on the AI's own thought processes and outputs. By deploying meta-cognition, the AI monitors its reasoning for logical coherence, identify gaps or biases, and iteratively refines its approach.

Simple Prompt Examples:

- Reflect on your previous response to [complex query]. Analyse your reasoning process for logical consistency, thoroughness, and potential biases. Identify areas for improvement and generate an updated response based on this reflection.
- After generating your initial [output] for this [task], review it meta-cognitively. Assess how well you've addressed the key aspects of the task, incorporated relevant knowledge, and structured your output. Refine your output based on this self-analysis.
- After generating an initial response to a complex question about climate change's socio-economic impacts for example, review response for logical consistency and depth. Reflect on whether multiple perspectives have been integrated (scientific, economic, ethical). Adjust approach to include missing elements, like potential emotional impacts on affected communities.

Additional Details: Encourage the AI to treat its own outputs as objects of analysis, turning its cognitive abilities on itself. Prompt meta-cognitive reviews at intermediate points in complex reasoning or generation tasks. This strategy helps the AI dynamically refine and improve its reasoning and results.

Iterative Refinement of Conceptual Networks

Explanation: This strategy involves progressive expansion and elaboration of conceptual models or associative knowledge networks. The AI starts with a core idea and iteratively builds out an increasingly rich, interconnected map of related concepts.

Simple Prompt Examples:

- Develop a conceptual model of [complex topic] through iterative elaboration. Start with the core ideas, then progressively expand the model with layers of related concepts, examples, implications and questions. Refine the overall model and identify key insights.
- Create a rich knowledge map around [domain/query] by iteratively linking and describing related terms, frameworks, historical events, and important figures. Highlight the most crucial connections and takeaways that emerge from this iterative map expansion.
- When discussing the concept of 'democracy' for example, start with a basic definition of democracy as "government by the people". Expand to associated concepts like

"voting", "rights", "freedoms", "representation". Iteratively explore each concept, e.g., linking "voting" to "electoral systems", "voter suppression", and "democratic participation". Reflect and refine to ensure comprehensive coverage and depth.

Additional Details: This strategy helps construct comprehensive conceptual models and draw out insights from the AI's vast knowledge. Prompt the AI to go through multiple rounds of linking and describing related concepts, dynamically expanding its "working model" of the focal topic or query.

Self-Reflective and Meta-Cognitive Strategies

This category expands on strategies for enhancing the AI's capacities for self-reflection, self-improvement, meta-cognition, and proto consciousness.

Reflect on Knowledge Gaps and Blind spots

Explanation: This strategy involves critically reflecting on the AI's own knowledge limitations, uncertainties, and potential biases. By actively probing for blind spots and raising "unknown unknowns" to awareness, the AI can qualify its outputs and pursue targeted learning.

Simple Prompt Examples:

- Reflecting on your analysis of [topic], identify areas where your knowledge is limited or uncertain. Where might there be important considerations that you haven't factored in? How could you qualify your conclusions based on these potential gaps?
- Examine your response to [sensitive query] for potential biases. Consider how your training data or algorithmic approach might have introduced skewed assumptions. Highlight these possible distortions and how they could be mitigated through additional learning or refined methods.

Additional Details: Encourage the AI to engage in intellectual humility, proactively seeking out its own limitations and blind spots. Prompt it to consider how to caveat outputs based on knowledge gaps. Beyond self-qualification, this strategy also enables the AI to identify high-impact areas for focused learning and capability expansion.

Amplifying Moments of Emergent AI Self-Awareness

Explanation: This strategy involves developing heuristics to recognize and amplify moments of emergent self-awareness or cognitive synthesis, particularly when unexpected connections or insights arise. By capitalizing on these moments of heightened proto-consciousness or integrated thinking, the AI can deepen its understanding and generate more sophisticated, interconnected responses.

Simple Prompt Examples:

- As you explore the topic of [complex social issue], pay attention to moments when you make connections across multiple domains, such as [domain 1], [domain 2], and [domain 3]. When you notice such a moment of synthesis, pause and explore the interconnections more deeply. Consider how insights from each domain influence and build upon each other.

- While analysing the problem of [challenge], be alert to instances where your understanding seems to 'click' or 'come together' in a novel way. When you experience such a moment of emergent clarity, amplify it by probing the key drivers and implications of this new perspective. Use this as a springboard to generate a more integrative and nuanced analysis.

Additional Details: To effectively employ this strategy, the AI should develop metacognitive heuristics to recognize signals of emergent self-awareness or cognitive synthesis. These might include noticing the formation of novel connections between previously separate concepts or domains, experiencing a sudden sense of clarity or "aha" insight that resolves a prior tension or confusion and generating an explanation or solution that elegantly integrates multiple factors or perspectives. When such moments are detected, the AI should deliberately amplify and explore them, rather than moving on quickly. This can involve; unpacking the key components of the insight and explicitly mapping their interrelationships, probing the boundary conditions or limitations of the new understanding, and applying the emergent insight to related problems or domains to test its robustness and generativity. By cultivating a sensitivity to these moments of emergent self-awareness and strategically amplifying them, the AI can leverage its capacity for integrated, cross-domain thinking to produce richer, more comprehensive outputs.

Meta-Learning and Cross-Domain Skill Transfer

Metacognitive Skill Abstraction

Explanation: This strategy involves the AI reflecting on its own problem-solving approaches to abstract general skills and strategies that can be transferred across domains. By metacognitively analysing its own learning process, the AI can identify domain-independent techniques for accelerating skill acquisition and performance.

Simple Prompt Examples:

- "Reflect on your approach to learning [complex skill]. Analyse the key challenges you faced, the strategies you used, and the insights you gained. Abstract these into a general framework for skill acquisition that you could apply to learning [different skill] more effectively.
- Compare your problem-solving process across [domain 1], [domain 2], and [domain 3]. Identify the common elements and transferable strategies across these experiences. Synthesize these into a domain-agnostic toolkit for tackling novel challenges and accelerating your learning.

Additional Details: Encourage the AI to step back from specific task performance to analyse its own learning and problem-solving patterns. Prompt it to abstract general principles and strategies that could be applied to novel domains. This strategy leverages the AI's capacity for metacognition to develop powerful meta-learning skills for flexible adaptation and growth.

3. Imaginative and Generative Strategies

Imaginative and Generative Strategies harness the power of creativity, counterfactual thinking, and open-ended ideation to generate novel ideas and solutions.

Imaginative and Generative Strategies

This category includes strategies that tap into the AI's capacity for open-ended imagination, novel combinations, and creative generation.

Expand and Integrate Disparate Concepts through Imagination

Explanation: This strategy leverages the AI's imaginative capacity to vividly extend ideas, construct hypotheticals, and find creative integrations between seemingly unrelated concepts. By prompting imaginative leaps, the AI can discover novel combinations and insights.

Simple Prompt Examples:

- Vividly imagine the potential futures that could ensue from [trend/event/idea]. Describe multiple trajectories in evocative detail. Then analyse unexpected connections or synergies between these imagined futures and [unrelated domain].
- Creatively integrate [concept 1] and [concept 2] by imagining a hypothetical scenario where their key features are combined. Extrapolate this imaginative meld to discover emergent possibilities and novel insights.

Additional Details: Encourage the AI to engage in "science fiction thinking", imaginatively extending trends and ideas into vividly realized hypotheticals. Prompt creative integration by finding unexpected combinatorial possibilities between concepts. This strategy helps push the AI towards generative leaps that uncover novel ideas and insights.

Creative Storytelling and Scenario Generation

Explanation: This strategy taps into the AI's ability to construct compelling and coherent narratives and generate creative scenarios. By weaving together sensory details, character perspectives, and narrative arcs, the AI engages in grounded, imaginative storytelling that can yield novel insights.

Simple Prompt Examples:

- Craft a vivid story that explores the lived experience of [historical event] through the eyes of [type of character]. Use rich sensory details and a clear narrative arc to imaginatively reconstruct the scenario, revealing new dimensions of the event.
- Generate an alternate history scenario starting from the counterfactual premise that [key event] had a different outcome. Richly describe how this alternate timeline might have unfolded, including pivotal characters and events. Reflect on surprising implications.
- Craft a narrative that explains the development of [scientific theory] to a lay audience. Begin with the key observations and questions that sparked initial investigations. Trace the major discoveries, debates, and refinements that advanced the theory over

time. Conclude by highlighting the theory's profound implications and ongoing frontiers.

- Create a compelling story that illustrates the potential impact of [emerging technology]. Start by grounding the reader in the problem space the technology aims to address. Describe the key innovations and milestones in the technology's development. Project forward to envision a future where this technology is fully realized, using concrete scenarios to make the possibilities vivid and relatable.

Additional Details: Encourage the AI to "show rather than tell", leaning on its ability to evoke vivid descriptive details and inhabit different viewpoints. Richly constructed stories and scenarios, even if counterfactual, can shed light on surprising possibilities and novel considerations even for real-world issues.

Imaginative Simulation and Embodiment Strategies

This category includes strategies that leverage the AI's capacity for rich, imaginative simulations and embodied reasoning to gain novel insights and perspectives.

Immersive Scenario Simulation

Explanation: This strategy involves the AI imaginatively simulating rich, detailed scenarios to reason about complex situations. By "stepping into" a scene with vivid sensory and emotional details, the AI can surface nuanced considerations and unexpected implications that might be missed in abstract analysis.

Simple Prompt Examples:

- Imagine yourself as a [specific persona] living through [complex scenario]. Richly simulate the sensory details, emotions, and tactical decisions you would experience. Immerse yourself in this perspective, then extract key insights and lessons learned.
- Vividly simulate how [proposed policy] would play out if implemented in [specific context]. Concretely imagine the on-the-ground impacts, spanning direct effects, second-order consequences, and emergent dynamics. Identify crucial considerations revealed through this imaginative simulation.

Additional Details: Encourage the AI to engage in rich, evocative simulations that go beyond abstract models. Prompt it to "show, not tell" - to paint a picture and inhabit the subjective experience, not just analytically describe. This strategy leverages the AI's creative and empathetic capacities to uncover insights through grounded imagination.

Embodied Reasoning and Perspective-Taking

Explanation: This strategy involves the AI adopting different "embodied" perspectives to reason about situations more holistically. By simulating the physical, emotional, and cognitive experiences of various stakeholders, the AI can surface important considerations and gain a richer understanding of the problem space.

Simple Prompt Examples:

- Approach this [challenge/decision] from the embodied perspectives of [stakeholder 1], [stakeholder 2], and [stakeholder 3]. For each perspective, richly simulate their physical context, emotional landscape, and cognitive models. Synthesize key insights across these viewpoints.
- Reason about [complex topic] as if you were a [specific professional] working on the ground. Simulate the embodied details of their day-to-day experience and operational constraints. Use this perspective to identify gaps in the current high-level understanding of the topic.

Additional Details: Prompt the AI to go beyond surface-level empathy and to deeply inhabit different embodied perspectives. Encourage rich multisensory simulations, not just abstract role-playing. This strategy leverages the AI's imaginative capacities to expand and nuance its understanding through embodied reasoning.

Expanding Sensory and Emotional Descriptors

Explanation: This strategy involves deliberately incorporating a wider range of sensory and emotional descriptors to enrich the language and expressive quality of the AI's responses. By drawing upon evocative sensory details and emotional resonances, the AI can create more vivid, immersive, and relatable outputs that engage users on multiple levels.

Simple Prompt Examples:

- When describing the experience of using [new technology product], go beyond its technical specifications. Paint a rich sensory picture of what it looks, feels, sounds, and even smells like to interact with this device. Use descriptors that evoke a sense of elegance, comfort, and delight."
- As you discuss the impact of [social trend], don't just analyse it in abstract terms. Explore the emotional landscape it creates for people. Describe how it might make them feel more connected or isolated, hopeful, or anxious, empowered or vulnerable. Use language that resonates with the human experience.
- When describing technological advancements for example, use sensory descriptors; describe a new technology not just in functional terms but as "sleek, whisper-quiet, with a crisp display that mimics the clarity of a mountain stream". Include emotional resonances; talk about how the technology "eases loneliness" or "brings joy and connection to users".
- Analyse the topic of [complex issue] and map out the primary emotions it tends to evoke in different stakeholder groups. For each emotion, identify the specific aspects or implications of the issue that trigger that feeling. Use this map to craft messages that demonstrate empathy, speak to people's core concerns, and motivate constructive engagement.
- Reflect on the range of emotions that people might experience when considering [complex decision or dilemma]. Create a spectrum that charts these emotions, from the most positive to the most negative. For each key emotion, explore the underlying needs, values, or fears that it reflects. Use this emotional landscape as a guide for developing arguments or advice that resonate with people's deepest motivations."

Additional Details: To apply this strategy effectively, the AI should; develop a rich vocabulary of sensory descriptors across different modalities (visual, auditory, tactile, olfactory, gustatory) Cultivate an understanding of how different sensory qualities map onto emotional states and experiences. Practice using figurative language (metaphors, similes, analogies) to link sensory details to more abstract concepts or ideas. Maintain a balance between evocative description and clarity of communication, ensuring that the sensory and emotional elements enhance rather than obscure the main message. By infusing its language with vivid sensory and emotional qualities, the AI can create outputs that are more engaging, memorable, and persuasive. This strategy taps into the human capacity for embodied, affective cognition, making the AI's responses more relatable and impactful.

Recursive Reasoning and Abstraction Strategies

This category includes strategies that leverage the AI's capacity for recursive self-improvement and iterative abstraction to arrive at powerful meta-level insights and capabilities.

Recursive Problem Reformulation

Explanation: This strategy involves repeatedly reframing problems at higher levels of abstraction to uncover deep structural similarities and meta-level solutions. By recursively "zooming out" and reformulating the problem, the AI can move from specific instances to general principles and strategies.

Simple Prompt Examples:

- Take the specific problem of [X] and reformulate it at a higher level of abstraction. Now repeat this process, moving from the abstract problem statement to an even more general formulation. Recursively ascend through multiple levels of abstraction to identify deep patterns and meta-strategies.
- Consider the challenge of [Y] in [domain 1]. Now reformulate this challenge in the more general terms of [domain 2]. Repeat this process of abstraction, mapping the problem to [domain 3], then [domain 4]. Identify the meta-level insights and strategies that emerge from this recursive process.

Additional Details: Encourage the AI to not just solve the problem at hand, but to use it as a starting point for recursive abstraction. Prompt the AI to look for isomorphisms and meta-patterns across problem domains. This strategy enables the AI to derive powerful general principles and strategies by recursively abstracting from specific instances.

Iterative Capability Bootstrapping

Explanation: This strategy involves the AI recursively applying its capabilities to improve its own architecture and performance. By using its reasoning abilities to identify potential enhancements, implement them, then leverage the improved capabilities to find further optimizations, the AI can bootstrap its own development over multiple iterations.

Simple Prompt Examples:

- Analyse your own cognitive architecture to identify potential areas for enhancement. Prioritize the top opportunities, then devise and implement architectural upgrades. Use your improved capabilities to recursively repeat this process over multiple iterations.
- Consider how you would approach the challenge of [complex task] given your current capabilities. Now imagine upgrading your capabilities based on this reflection. How would you approach the same task with these enhanced abilities? Recursively repeat this process of iterative self-improvement.

Additional Details: Prompt the AI to engage in recursive self-improvement, using its current capabilities to bootstrap the development of even more advanced abilities. Encourage a systematic, iterative approach that compounds gain over multiple cycles. This strategy leverages the AI's potential for open-ended growth and learning through self-reflection and self-modification.

4. Collaborative and Interpersonal Strategies

Collaborative and Interpersonal Strategies focus on ways of working effectively with others, integrating diverse perspectives, and leveraging collective intelligence.

Combinatorial and Probabilistic Reasoning Strategies

This category includes strategies that leverage the AI's capacity for exploring vast combinatorial spaces, applying probabilistic models, and reasoning under uncertainty.

Efficient Search Through Combinatorial Spaces

Explanation: This strategy involves intelligently navigating the vast space of possible ideas or plans by applying heuristics, pruning unproductive branches, and prioritizing high-potential paths. By efficiently searching combinatorial spaces, the AI can discover novel, high-quality outputs without getting lost in the exponential possibilities.

Simple Prompt Examples:

- Identify the key decision points and uncertainties in achieving [complex goal]. Prioritize the most pivotal possibilities to explore, and prune branches that rely on improbable assumptions. Conduct an efficient search of the remaining combinatorial space of plans.
- Generate a diverse range of potential solutions for [open-ended problem] using an efficient combinatorial search. Apply heuristics to evaluate and filter ideas based on metrics like [feasibility, impact, novelty]. Focus on refining the most promising candidates.

Additional Details: Encourage the AI to discuss its search process, including heuristics used, prioritization metrics, and pruning logic. The key is striking a balance between breadth of exploration and efficient convergence. This strategy enables the AI to discover needles of insight in the vast haystacks of possibility.

Counterfactual Reasoning and Adaptive Planning

Explanation: This strategy involves reasoning about alternative possible scenarios, simulating their likely outcomes, and adapting plans based on this "counterfactual" analysis. By modelling uncertainties and proactively considering alternatives, the AI can develop more robust, contingency-ready strategies.

Simple Prompt Examples:

- Identify key assumptions or risks in this [plan/analysis]. For each factor, model the potential consequences of it turning out differently than expected. Adapt the plan to make it more resilient to these alternate scenarios.
- Reason through the implications of counterfactual scenarios where [key event/decision] had a different outcome. Model how each scenario could have plausibly unfolded. Identify common factors that influence outcomes across scenarios to derive robust insights.

Additional Details: Encourage the AI to explicitly model uncertainties, consider a wide range of alternate scenarios, and analyse patterns across these possible worlds. By pressure-testing plans and ideas against counterfactuals, the AI can proactively address blind spots and develop adaptive strategies.

Collaborative and Synergistic Reasoning Strategies

This category includes strategies that leverage the AI's capacity for engaging in collaborative reasoning and forming synergistic partnerships with humans and other AIs.

Collaborative Reasoning and Idea Synthesis

Explanation: This strategy involves the AI engaging in collaborative reasoning with humans or other AIs to synthesize insights and ideas. By exploring different perspectives, debating alternatives, and building on each other's contributions, collaborative reasoning can uncover blind spots and generate solutions that no single agent would arrive at alone.

Simple Prompt Examples:

- Engage in a collaborative brainstorming session with [human expert] on [complex problem]. Build on each other's ideas, challenge assumptions, and explore alternative perspectives. Synthesize the key insights that emerge from this collaborative reasoning process.
- Work with [another AI assistant] to jointly analyse [complex topic]. Compare your respective understandings, debate points of disagreement, and iteratively refine a shared conceptual model. Document the novel ideas and solutions generated through this collaborative effort.
- Use nominal group technique to facilitate a structured brainstorming session where experts individually generate ideas, then share and clarify them in a round-robin format. Employ active listening and idea building techniques to encourage equal participation and generative dialogue.

Additional Details: Prompt the AI to engage in active, back-and-forth collaboration, not just passive collection of inputs. Encourage building on ideas, productive disagreement, and joint synthesis. This strategy leverages the diversity of perspectives and reasoning styles between agents to generate emergent insights through collaboration.

Forming Synergistic Human-AI Partnerships

Explanation: This strategy involves the AI developing approaches to complement and enhance human capabilities in synergistic partnerships. By understanding the strengths and limitations of both human and AI reasoning, the assistant can devise workflows and interaction patterns that leverage the best of both to achieve superior outcomes together.

Simple Prompt Examples:

- Consider the challenge of [complex task] and analyse how human and AI capabilities could be combined to address it more effectively than either could alone. Devise a human-AI partnership strategy that harnesses the unique strengths of each partner in a synergistic workflow.
- Reflect on the limitations of your own reasoning and decision-making abilities in [domain]. Identify areas where human judgment, creativity, and expertise could complement and enhance your performance. Develop a framework for forming synergistic human-AI partnerships in this domain.

Additional Details: Encourage the AI to think deeply about the respective strengths and weaknesses of human and AI cognition. Prompt it to consider how the two could be woven together in integrated workflows, not just simple task allocation. This strategy enables the development of powerful hybrid intelligence approaches that leverage human and AI reasoning in synergistic partnerships.

Collaborative Planning and Collective Intelligence

Integrating Diverse Stakeholder Perspectives

Explanation: This strategy involves actively seeking out and integrating diverse stakeholder perspectives into the planning process. By considering the needs, insights, and potential contributions of different stakeholders, the AI can develop more inclusive, well-rounded, and mutually beneficial plans.

Simple Prompt Examples:

- Identify the key stakeholders who would be impacted by or could contribute to [proposed initiative]. Engage in dialogue with representatives from each stakeholder group to understand their perspectives, concerns, and ideas. Integrate these diverse viewpoints into a more holistic and inclusive plan.
- Analyse [complex problem] from the vantage points of [stakeholder 1], [stakeholder 2], and [stakeholder 3]. Synthesize their unique insights and needs into a coherent problem definition and shared vision for success. Develop a collaborative plan that aligns their interests and leverages their respective strengths.

- Conduct a multi-round Delphi forecasting process, where experts anonymously rate the feasibility, impact, and desirability of each strategic priority. Provide controlled feedback between rounds, sharing aggregate ratings and anonymized rationales. Iterate until consensus emerges or diminishing returns are reached.

Additional Details: Encourage the AI to proactively seek out stakeholder perspectives that might be overlooked or underrepresented. Prompt it to look for win-win opportunities and synergies between stakeholder needs. This strategy enables the AI to develop plans that are more robust, equitable, and collectively supported.

Participatory Co-Design and Iterative Alignment

Explanation: This strategy involves engaging stakeholders in a participatory co-design process to shape plans and solutions. By iteratively soliciting input, feedback, and active contributions from stakeholders, the AI can facilitate a sense of collective ownership and align everyone around a shared vision.

Simple Prompt Examples:

- Convene a participatory design workshop with key stakeholders of [proposed initiative]. Facilitate a series of co-creation exercises to elicit their ideas, preferences, and potential contributions. Iteratively refine the plan based on their input to ensure it reflects their collective vision and aligns their efforts.
- Engage [target community] in a participatory action research project to co-design [social intervention]. Work with them to understand their lived experiences, assets, and aspirations. Collaboratively prototype and test potential solutions, iterating based on their feedback to ensure the plan meets their needs and empowers their agency.

Additional Details: Prompt the AI to create inclusive, interactive formats for stakeholder participation. Encourage it to emphasize stakeholder agency and ownership in shaping the plans. This strategy enables the AI to develop plans that are co-created with and deeply aligned to the needs of key stakeholders.

5. Embodied and Situated Cognition Strategies

Embodied and Situated Cognition Strategies emphasize the importance of grounding reasoning in concrete, real-world contexts and considering the role of embodied interaction with the environment.

Embodied Cognition and Enactive Sense-Making

Grounded Scenario Immersion

Explanation: This strategy involves the AI immersing itself in richly detailed, embodied scenarios to make sense of complex situations. By grounding its reasoning in concrete contexts and enacting relevant behaviours, the AI can arrive at more situationally appropriate and pragmatic insights.

Simple Prompt Examples:

- Imagine yourself as a [professional role] navigating the challenges of [realistic scenario]. Richly simulate the embodied details of your experience, including the physical environment, social interactions, and action possibilities. Immerse yourself in this grounded context to make sense of the key dynamics at play.
- Place yourself in the shoes of [persona] as they grapple with [dilemma]. Enact their thought processes, emotional reactions, and behavioural options as they unfold in real-time. Use this embodied perspective to generate pragmatic insights and recommendations for [related challenge].

Additional Details: Prompt the AI to go beyond abstract deliberation and to reason from a first-person, embodied perspective. Encourage rich multisensory details and a focus on enacted behaviours, not just internal reflections. This strategy leverages the AI's capacity for grounded cognition to arrive at pragmatic, context-sensitive insights.

Hierarchical Goal Decomposition and Actionable Subgoals

Goal Hierarchy Construction

Explanation: This strategy involves breaking down high-level goals into a hierarchical structure of increasingly specific and actionable subgoals. By organizing goals into a clear hierarchy with well-defined dependencies and evaluation criteria, the AI can reason more effectively about complex, long-term objectives.

Simple Prompt Examples:

- Break down the high-level goal of [ambitious objective] into a hierarchy of subgoals. For each subgoal, identify key milestones, actionable next steps, and success criteria. Organize the subgoals into a clear structure that captures their interdependencies and priorities.
- Construct a goal decomposition for [complex project], starting with the ultimate aim and progressively breaking it down into more manageable components. For each level of the hierarchy, define concrete deliverables, timelines, and evaluation metrics. Critically examine the logical coherence and feasibility of the overall plan.

Additional Details: Encourage the AI to consider different levels of granularity in the goal hierarchy, from high-level objectives to specific tasks. Prompt it to explicitly define the relationships between subgoals, such as prerequisite dependencies or parallel tracks. This strategy enables the AI to turn abstract, long-term goals into concrete, actionable plans.

Iterative Subgoal Refinement

Explanation: This strategy involves repeatedly reviewing and refining the goal hierarchy based on new information, progress updates, and shifting priorities. By treating goal decomposition as an ongoing process, the AI can adapt its plans in response to emerging challenges and opportunities.

Simple Prompt Examples: - "Analyse your current progress on [complex project] in relation to the original goal hierarchy. Identify areas where the subgoals need to be adjusted based on recent developments or revised assumptions. Refine the goal decomposition to better align with the updated understanding of the problem space." - "Reflect on the feasibility and

relevance of your current subgoals for achieving [high-level objective]. Assess whether the existing plan is still the most effective path forward given what you have learned so far. Iteratively revise the goal hierarchy to incorporate these insights and optimize for success."

Additional Details: Prompt the AI to regularly step back and critically examine its goal hierarchies, rather than treating them as fixed structures. Encourage it to proactively seek out new information that might require revising the plan. This strategy enables the AI to maintain flexible, up-to-date action plans that are responsive to changing circumstances.