Engineering Inquiry and Response
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Working Manual — Initial Parameter Set

Purpose

Engineering Inquiry and Response (EIR) is a method for deliberately shaping how an AI investigates a question and how it constructs its response.

A conventional prompt primarily specifies **what** the user wants to know. An EIR specification can additionally indicate **how the intellectual territory should be explored**: how broadly or deeply to investigate it, how many conceptual paths to pursue, how readily to make unusual associations, how strongly to seek synthesis, how critically to test conclusions, and how much of the reasoning structure should appear in the response.

The parameters are best understood as continua rather than binary settings. For practical purposes, **Low, Moderate, and High** provide useful working settings.

The parameters are substantially independent. A user might request, for example, low branching but high depth, or high interdisciplinarity but low association. Their combinations create different forms of inquiry.

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1. Branching

Low: Single conceptual path → High: Multiple parallel paths

What it controls

Branching determines how many distinct lines of thought are actively pursued within an inquiry.

Low branching

The inquiry identifies a principal line of reasoning and follows it sequentially. Related issues may be mentioned when necessary, but the response repeatedly returns to the central conceptual path.

Low branching tends to produce linear, readily followed explanations.

Moderate branching

The inquiry maintains a principal line of reasoning while developing several closely related subsidiary lines when they materially improve understanding.

The subsidiary branches remain subordinate to the main argument rather than becoming independent investigations.

High branching

Several plausible conceptual paths are developed simultaneously. A subject might be considered in terms of biological function, evolutionary history, cultural meaning, economics, individual behavior, and social consequences, with several of these strands carried forward through the inquiry.

High branching can reveal relationships that a linear treatment would miss, but it can also increase conceptual complexity.

Example

For the question **"Why do migrating birds eat berries?"**

- **Low:** Follow the nutritional requirements of migration and explain how berries satisfy them.
- **Moderate:** Examine nutrition while also considering berry availability, migration timing, and seed dispersal.
- **High:** Pursue nutrition, plant–bird coevolution, migration strategy, landscape ecology, seed dispersal, climate effects, and evolutionary tradeoffs as parallel strands.

Related parameters

Branching is easily confused with **breadth**. Branching concerns the *number of conceptual paths*. Breadth concerns the *extent of territory covered*.

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2. Breadth

Low: Narrowly bounded → High: Wide-ranging

What it controls

Breadth determines the boundaries of the intellectual territory included in the inquiry.

Low breadth

The inquiry remains tightly confined to the stated question and the information necessary to answer it.

Moderate breadth

The inquiry includes immediately adjacent subjects that materially improve understanding of the central question.

High breadth

The inquiry deliberately surveys a much larger intellectual landscape, including context, antecedents, consequences, related phenomena, and potentially important peripheral issues.

Example

For migrating birds and berries:

- **Low:** Nutritional properties of berries consumed during fall migration.
- **Moderate:** Nutrition plus berry availability, bird preferences, migration timing, and habitat.
- **High:** The larger ecological system involving plants, birds, insects, migration, land management, climate, and evolutionary relationships.

Related parameters

Breadth can be high while branching remains low: an inquiry can traverse a very large territory while following one organizing question throughout.

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3. Depth

Low: Overview → High: Deep examination

What it controls

Depth determines how far the inquiry penetrates beneath a descriptive account into mechanisms, evidence, qualifications, and underlying causes.

Low depth

Provides the principal facts, relationships, and conclusions necessary for general understanding.

Moderate depth

Explains important mechanisms and evidence while avoiding specialized detail that contributes little to the user's purpose.

High depth

Investigates underlying mechanisms, competing explanations, evidence quality, exceptions, uncertainties, and unresolved questions.

Example

A low-depth discussion might say that antioxidant-rich berries can be useful to migrating birds. A high-depth inquiry might examine oxidative stress during sustained flight, reactive oxygen species, particular classes of berry phytochemicals, metabolic pathways, experimental evidence, and uncertainties about their physiological effects in wild birds.

Related parameters

Depth is independent of breadth. A narrowly defined question can receive extremely deep treatment.

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4. Exploration

Low: Answer-seeking → High: Possibility-seeking

What it controls

Exploration determines whether the inquiry primarily seeks the strongest available answer or deliberately searches the surrounding space of plausible interpretations and possibilities.

Low exploration

Identify the question, evaluate the evidence, and provide the best-supported answer.

Moderate exploration

Provide the strongest answer while examining credible alternatives.

High exploration

Treat the question partly as an opportunity for discovery. Seek alternative interpretations, overlooked possibilities, unanswered questions, and potentially productive reframings.

Example

Asked why a particular bird prefers a particular berry, low exploration seeks the best-supported explanation. High exploration might additionally ask whether color, morphology, migration timing, competition, learned behavior, digestive physiology, or plant–bird coevolution could contribute.

Related parameters

Exploration is closely related to **association**, but they are different. Exploration asks *how many possibilities should be considered?* Association affects *how far away we are willing to look for them*.

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5. Association

Low: Conventional connections → High: Distant or novel connections

What it controls

Association determines the conceptual distance over which the inquiry searches for potentially meaningful relationships.

Low association

Prefer well-established and directly relevant relationships.

Moderate association

Permit connections to neighboring concepts when there is a reasonable basis for believing that they illuminate the subject.

High association

Actively search for distant, unusual, cross-contextual, or initially non-obvious relationships that might generate new understanding.

High association does **not** mean treating speculative connections as established facts. The evidentiary status of unusual associations should remain explicit.

Example

A conventional inquiry into migrating birds and berries connects nutrition with migration physiology. A highly associative inquiry might notice parallels with nutritional strategies in endurance athletes, plant strategies for attracting seed dispersers, oxidative aging, or ecological mutualism.

Related parameters

High association often accompanies high exploration but need not. Association describes the *distance of conceptual connections*, not their number.

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6. Interdisciplinarity

Low: One disciplinary frame → High: Many disciplinary frames

What it controls

Interdisciplinarity determines how many established bodies of disciplinary knowledge are deliberately brought to bear on a question.

Low interdisciplinarity

Remain principally within one discipline—for example, ornithology.

Moderate interdisciplinarity

Use the primary discipline while drawing selectively upon closely relevant fields such as plant ecology, nutritional physiology, or evolutionary biology.

High interdisciplinarity

Deliberately examine the question through substantially different disciplinary frameworks.

Example

A highly interdisciplinary examination of bird migration and berries might involve ornithology, botany, biochemistry, evolutionary biology, landscape ecology, climatology, and conservation management.

Related parameters

Interdisciplinarity should not be confused with association. Applying biochemistry and ecology to the same problem is interdisciplinary even when the connections are entirely conventional.

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7. Synthesis

Low: Analyze separately → High: Seek emergent pattern

What it controls

Synthesis determines how strongly the inquiry attempts to integrate separate findings into a larger explanatory structure.

Low synthesis

Identify and explain the important components individually. Do not force them into a unified interpretation.

Moderate synthesis

Identify relationships among findings where the evidence reasonably supports them.

High synthesis

Actively ask whether the separate findings collectively reveal a larger system, organizing principle, causal structure, or emergent pattern.

Example

Analysis might separately describe berry chemistry, bird physiology, fruiting dates, and migration schedules.

High synthesis asks whether these together reveal a broader ecological relationship between autumn fruit production, migratory energetics, plant reproduction, and landscape structure.

Related parameters

Branching produces multiple strands; synthesis attempts to determine **what those strands mean when considered together**.

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8. Criticality

Low: Develop proposition → High: Aggressively stress-test

What it controls

Criticality determines how strongly the inquiry challenges its own propositions and conclusions.

Low criticality

Develop the most plausible interpretation and explain the evidence supporting it. Important qualifications remain, but the primary purpose is constructive development.

Moderate criticality

Develop the proposition while examining significant counterarguments, uncertainties, and alternative explanations.

High criticality

Actively attempt to break the proposition. Search for contradictory evidence, hidden assumptions, confounding variables, alternative causal explanations, boundary conditions, and circumstances under which the conclusion would fail.

Example

If the proposition is that antioxidant-rich native berries improve migratory performance, high criticality would ask whether birds actually absorb the relevant compounds, whether demonstrated physiological benefits exist in wild birds, whether energy density rather than antioxidants explains observed preferences, and whether correlation has been mistaken for causation.

Related parameters

Criticality concerns the **degree of challenge applied to an idea**, not simply the amount of evidence collected.

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9. Reasoning Visibility

Low: Conclusions emphasized → High: Inferential structure emphasized

What it controls

Reasoning visibility determines how explicitly the response presents the structure connecting evidence, assumptions, interpretations, and conclusions.

Low reasoning visibility

Emphasize findings and conclusions. Provide enough explanation to make them credible and understandable without dwelling on every intermediate inference.

Moderate reasoning visibility

Explain the important reasoning steps, especially where conclusions depend upon interpretation rather than straightforward fact.

High reasoning visibility

Make the structure of the argument unusually explicit: distinguish evidence from inference, identify assumptions, show competing interpretations, indicate uncertainty, and explain why one conclusion is preferred.

This does not require reproducing every internal step of reasoning. Its purpose is to make the **intellectual architecture of the answer** inspectable by the reader.

Example

A low-visibility response might conclude that certain berry compounds probably benefit migrating birds.

A high-visibility response would distinguish:

observed fact → physiological evidence → inference about migrating birds → uncertainty → resulting conclusion.

Related parameters

Reasoning visibility is not the same as depth. A technically deep report can conceal much of its inferential structure, while a relatively simple report can make its reasoning exceptionally transparent.

Using the Parameters Together

The nine parameters should not be regarded as nine independent requirements that must always be specified. Their purpose is to give a human user **selective control over characteristics of inquiry that matter for a particular question**.

An ordinary inquiry might therefore require no specification at all.

A more deliberately engineered inquiry could say:

EIR profile: Moderate branching; moderate breadth; high depth; moderate exploration; low association; moderate interdisciplinarity; high synthesis; high criticality; high reasoning visibility.

The resulting profile describes not the subject of inquiry but the **kind of intellectual operation to be performed upon that subject**.

This distinction is central to Engineering Inquiry and Response:

The question specifies what is to be investigated.
The EIR profile helps specify how the investigation is to be conducted and how its results are to be made intelligible.

The discussion deliberately stopped short of adding **“When to use this setting”** or **“Goals this parameter supports.”** That is the next conceptual layer, rather than part of defining the parameters themselves.