AHP Studio

User Guide

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1. Introduction

AHP Studio is a web-based decision support application that implements the Analytic Hierarchy Process (AHP), the multi-criteria decision-making methodology developed by Dr. Thomas L. Saaty. This User Guide walks you through every feature of the application, from creating your first decision problem to interpreting sensitivity analysis results.

AHP Studio is designed for graduate-level coursework in competitive strategy. It provides a structured environment for defining decision problems, building criteria hierarchies, performing pairwise comparisons, computing priority weights, and synthesizing global rankings of alternatives.

1.1 Who This Guide Is For

This guide is intended for students enrolled in the Competitive Strategy course who will use AHP Studio to complete decision analysis assignments. No prior experience with AHP or decision analysis software is required. The guide assumes basic familiarity with web browsers and standard form-based interfaces.

1.2 System Requirements

Requirement	Details
Browser	Chrome 100+, Firefox 100+, Safari 16+, or Edge 100+
Internet	Stable broadband connection required
Screen	Minimum 1024px width (laptop or desktop recommended)
Account	Username and password provided by your instructor

2. Getting Started

2.1 Logging In

Open your web browser and navigate to the AHP Studio URL provided by your instructor. You will see the login page displaying the AHP Studio logo and a sign-in form.

Enter your **username** and **password**, then click the **Sign In** button. If your credentials are correct, you will be taken to the Dashboard.

Account Lockout

For security purposes, your account will be locked after three consecutive failed login attempts. A locked account displays the message: "Your account has been locked due to multiple failed login attempts. Please contact your administrator." Only the course administrator can unlock your account. Contact your instructor if this occurs.

2.2 Changing Your Password

It is recommended that you change the temporary password assigned by the administrator after your first login.

1. Click your username in the top-right corner of the navigation bar.
2. Select Account Settings from the dropdown menu.
3. Enter your current password, then your new password twice to confirm.
4. Click Save. Your new password takes effect immediately.

Password requirements: minimum 8 characters, at least one uppercase letter, one lowercase letter, one digit, and one special character.

2.3 The Dashboard

The Dashboard is your home screen after logging in. It provides an overview of your current work and quick access to all major actions.

From the Dashboard you can create a new decision problem, load a previously saved problem, upload an .AHP file from your local machine, download or delete existing saved files, and access your account settings.

The top navigation bar displays the AHP Studio title on the left and your username with a logout button on the right. This navigation bar is present on every page of the application.

3. Creating a Decision Problem

AHP Studio supports one active decision problem at a time. To begin a new analysis, click the New Problem button on the Dashboard. You will be taken to the Problem Editor, a step-by-step workspace organized by a sidebar navigation on the left side of the screen.

3.1 Problem Definition

The first step is to define your decision. This screen has three input fields:

- **Title** — A concise name for your decision problem (e.g., "Best Cloud Provider for Enterprise Migration").
- **Description** — Optional context, background, assumptions, or scope boundaries that frame the analysis.
- **Goal** — The objective of the decision, phrased as an action (e.g., "Select the cloud provider that best balances cost, security, and scalability").

A clear, specific goal is essential. It anchors every subsequent comparison and ensures that all participants in the analysis share the same understanding of what is being decided.

3.2 Defining Criteria

Click Criteria in the sidebar to open the Criteria Manager. Criteria are the factors that matter in your decision — the dimensions along which you will evaluate your alternatives.

Click Add Criterion to create a new criterion. Enter a short, descriptive name (e.g., "Cost," "Security," "Scalability") and an optional description. Each criterion appears as a node in the interactive hierarchy tree displayed on the page.

You can add sub-criteria beneath any criterion to decompose it into more specific dimensions. For example, under "Cost" you might add "Initial Investment" and "Annual Operating Cost." Click the expand icon next to a criterion to add sub-criteria.

Criteria Limits

Parameter	Maximum
First-level criteria	10
Sub-criteria per criterion	7
Hierarchy depth	3 levels (Goal → Criteria → Sub-criteria)

Tip: Saaty recommended keeping comparison groups to seven or fewer elements. Beyond that, human judgment becomes less reliable. If you find yourself with more than seven criteria at a single level, consider grouping related criteria under a common parent using sub-criteria.

3.3 Defining Alternatives

Click Alternatives in the sidebar to open the Alternatives Manager. Alternatives are the options you are evaluating — the choices you are deciding among.

Click Add Alternative to create a new alternative. Enter a name and an optional description. A counter at the top of the page shows your current count relative to the maximum of 12 (e.g., "4 / 12 alternatives").

Choose alternatives that are genuinely viable and distinct. Including too many similar options increases the number of comparisons without adding analytical value. Three to six alternatives is typical for most academic exercises.

Comparison Count Reference

Each additional alternative increases the workload. The number of pairwise comparisons per criterion follows the formula $n(n-1)/2$, where n is the number of alternatives:

Alternatives	Comparisons per Criterion
3	3
4	6
5	10
6	15
7	21
8	28
9	36
10	45
11	55
12	66

4. Pairwise Comparisons

Pairwise comparison is the analytical core of AHP. Click Comparisons in the sidebar to begin. This step is where you express your judgments about the relative importance of criteria and the relative preference among alternatives.

4.1 How Comparisons Are Organized

Comparisons are organized into groups based on the hierarchy you defined:

- **Criteria vs. Criteria** — Compare each pair of criteria with respect to the goal. Question: "Which criterion is more important for achieving the goal, and by how much?"
- **Sub-criteria vs. Sub-criteria** — For each criterion with sub-criteria, compare the sub-criteria with respect to their parent.
- **Alternatives vs. Alternatives** — For each lowest-level criterion, compare all alternatives. Question: "With respect to this criterion, which alternative is preferred, and by how much?"

A progress indicator shows how many comparison groups you have completed and how many remain.

4.2 Saaty's Fundamental Scale

All comparisons use Dr. Saaty's 1–9 fundamental scale of absolute numbers. The scale is displayed on the comparison slider to guide your judgment:

Value	Definition	Explanation
1	Equal importance	Two elements contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one over the other
5	Strong importance	Experience and judgment strongly favor one over the other
7	Very strong importance	One element is very strongly favored; dominance demonstrated in practice
9	Extreme importance	The highest possible order of affirmation of one over another
2, 4, 6, 8	Intermediate values	Used to represent compromise between the judgments above
Reciprocals	Inverse comparison	If element i has value a vs. element j, then j has value 1/a vs. i

4.3 Using the Comparison Slider

Each pairwise comparison is presented as a question at the top of the screen, for example: "With respect to Cost, which is more important: Initial Investment or Ongoing Operating Costs, and by how much?"

Below the question is a horizontal slider that ranges from 9 on the left to 9 on the right, with 1 (Equal) at the center. Dragging the slider to the left favors the left element; dragging it to the right favors the right element. The farther you drag, the stronger the preference.

After positioning the slider, click Next to proceed to the following comparison, or click Previous to revisit an earlier one. You can also click directly on any cell in the comparison matrix to jump to that specific comparison.

4.4 The Comparison Matrix

As you enter judgments, the full comparison matrix is displayed in a table below the slider. It updates in real time. The diagonal cells always show 1. Values greater than 1 mean the row element is favored over the column element. Values less than 1 (fractions) mean the column element is favored. You can click any cell in the upper triangle to edit that comparison directly.

4.5 Consistency Ratio

Below the comparison matrix, the Consistency Ratio (CR) is displayed with color-coded feedback:

- **Green (CR ≤ 0.10)** — Your comparisons are acceptably consistent. You may proceed confidently.
- **Red (CR > 0.10)** — Your comparisons contain logical contradictions. Review your judgments and look for pairs that seem out of proportion with the others.

You are not blocked from continuing when the CR exceeds 0.10, but the resulting priorities may not be reliable. Common causes of inconsistency include circular preferences and overuse of extreme values (7, 8, 9).

Tip: If you are struggling with consistency, make your comparisons less extreme. Most real-world comparisons land between 1 and 5. Also ensure your judgments are transitive: if A > B and B > C, then A should be greater than C.

5. Viewing Results

Click Results in the sidebar to see the synthesized outcome of your analysis. This page presents the global ranking of alternatives computed from all of your pairwise comparisons.

5.1 Global Rankings

The main results view shows a bar chart with all alternatives ranked by their global priority score. The highest-scoring alternative is the one that best satisfies your criteria based on the judgments you entered.

Two scoring modes are available:

- **Normalized** — Scores sum to 1.00 (or 100%). Each alternative's score represents its share of the total priority.
- **Idealized** — The top-ranked alternative is set to 1.00, and all others are expressed as proportions of the best.

5.2 Ranking Table

Below the chart, a table presents the full numerical results: rank, alternative name, normalized score, and idealized score. You can sort the table by any column.

5.3 Criterion Breakdown

A breakdown view shows how each alternative performs on each individual criterion. This helps you understand why the top alternative ranked first — whether it dominates across all criteria or is strong in one area and acceptable in others.

6. Sensitivity Analysis

Click Sensitivity in the sidebar to explore the robustness of your results. Sensitivity analysis answers the question: "If the criteria weights were different, would my decision change?"

AHP Studio provides four modes of sensitivity analysis, selectable via tabs at the top of the page.

6.1 Performance View

Displays a grouped bar chart showing how each alternative performs across every criterion and overall. This gives you a comprehensive snapshot — you can immediately see which alternative leads on which criteria and where there are close contests.

6.2 Dynamic View

Horizontal bars on the left represent the current criteria weights. On the right, the resulting alternative priorities are shown. Drag any criteria bar to increase or decrease its weight — the other criteria rebalance proportionally, and the alternative rankings update instantly.

Use this view to ask "what if" questions: What if cost mattered twice as much? What if we cared less about speed? Watch how the alternative bars shift as you experiment.

6.3 Gradient View

Select a single criterion from the dropdown. The chart shows a set of lines — one per alternative — plotting how each alternative’s global score changes as the selected criterion’s weight varies from 0% to 100%, with all other criteria rebalancing proportionally.

A vertical dashed line marks the current weight. Look for crossing points — places where one line overtakes another. These are the tipping points where a change in criteria weight would reverse the ranking. If the crossing point is far from the current weight, the ranking is robust.

6.4 Head-to-Head View

Select two alternatives from the dropdowns. A side-by-side comparison shows which criteria favor each alternative and by how much. This is especially useful when the top two alternatives are very close and you want to understand exactly where they differ.

7. Managing Your Files

7.1 Saving Your Work

Click the Save button in the editor toolbar to save your current problem state. Your work is stored as an .AHP file in the cloud under your account. Save frequently — especially after completing each comparison group. Your work is not saved automatically.

7.2 Downloading Files

Click Download in the toolbar to export the .AHP file to your local machine. This is recommended as a backup before making significant changes to your hierarchy. Downloaded files can also be submitted as course deliverables.

7.3 Uploading Files

From the Dashboard, click Upload and select an .AHP file from your local machine. The file is validated against the expected schema before loading. If the file is invalid, an error message will explain what went wrong.

7.4 Deleting a Problem

From the Dashboard, click the Delete icon next to the problem you want to remove. A confirmation dialog will appear. Once confirmed, the file is permanently deleted from the cloud and cannot be recovered. Maintain local backups of important work.

7.5 The .AHP File Format

Decision problems are stored as .AHP files. These are JSON-formatted text files with the .AHP extension. They contain the complete problem definition, hierarchy, all pairwise comparisons, and computed results. While you can open them in any text editor, manual editing is not recommended as it may corrupt the file structure.

8. Keyboard Shortcuts

Shortcut	Action
Ctrl + S (Cmd + S on Mac)	Save the current problem
Ctrl + Z (Cmd + Z on Mac)	Undo the last comparison entry
← / → Arrow Keys	Adjust the comparison slider by one increment
Enter	Confirm comparison and advance to next
Tab	Move to next input field
Esc	Close any open dialog or modal

9. Tips for a Better Analysis

1. **Start with a clear goal.** A vague goal leads to vague criteria and unreliable comparisons. Make the goal specific enough that someone unfamiliar with the project could understand what you are deciding.
2. **Keep criteria independent.** Each criterion should measure a distinct dimension. If two criteria overlap substantially (e.g., "Cost" and "Budget Impact"), they double-count that factor and distort results.
3. **Use the full scale thoughtfully.** Most real-world comparisons land between 1 and 5. Reserve 7 and 9 for cases where dominance is genuinely dramatic. Overusing extreme values inflates inconsistency.
4. **Think in ratios, not ranks.** AHP asks "how many times more important is A than B?" — not "which is first?" A value of 3 means A is three times as important as B. Make sure that ratio feels right.
5. **Check consistency early and often.** Do not wait until all comparisons are complete to look at the CR. Watch it in real time as you enter each judgment. If it spikes, revisit your most recent comparison.
6. **Save frequently.** Click Save after completing each comparison group. Your work is not auto-saved, and a browser crash will lose unsaved progress.
7. **Download a backup.** Before major milestones — finishing all comparisons, modifying the hierarchy — download the .AHP file to your local machine.
8. **Use sensitivity analysis to stress-test.** Before committing to a recommendation, use the Dynamic and Gradient views to explore whether reasonable changes in criteria weights would change the outcome.

10. Frequently Asked Questions

How many alternatives should I include?

Include only alternatives that are genuinely viable and distinct. Three to six is typical. The maximum is 12, but more alternatives means more comparisons and more risk of inconsistency.

Can I change criteria or alternatives after entering comparisons?

Yes, but adding or removing elements will delete any comparisons that referenced them. Finalize your hierarchy structure before beginning pairwise comparisons.

What if I cannot decide between two elements?

Set the slider to 1 (Equal). This is a valid judgment meaning both elements contribute equally with respect to the parent criterion.

What does a high Consistency Ratio mean?

A CR above 0.10 means your judgments contain logical contradictions. Review the comparison matrix and look for values that seem disproportionate. Adjusting one or two judgments is usually enough to bring the CR below 0.10.

Can I work on more than one problem at a time?

AHP Studio supports one active problem at a time. To switch, save your current work, return to the Dashboard, and load a different .AHP file.

Can I share my .AHP file with a classmate?

Yes. Download the file and share it. They can upload it to their own account. Each upload creates an independent copy.

I forgot my password. What do I do?

Contact your instructor or course administrator. They can reset your password from the User Management page. There is no self-service password recovery.

My account is locked. What happened?

Three consecutive failed login attempts lock the account. Contact your instructor to have it unlocked.

11. Getting Help

If you encounter a technical issue, an unexpected error, or need assistance with your analysis, please contact:

Dr. Jose Mendoza
New York University
Email: jose.mendoza@nyu.edu

When reporting a problem, please include: a description of what you were doing when the issue occurred, the text of any error message displayed, your browser name and version, and if possible, a downloaded copy of your current .AHP file so the issue can be reproduced.