GOOGLE LABS ARCHIVE & MIGRATION HANDBOOK • NOV 2026 (V1.1)

Mastering Google Opal

The complete visual handbook to Google Opal's node-graph AI mini-app architecture—plus exact instructions for recovering your `My Drive > Opal` prompts and migrating workflows to **Gemini Skills** and **Google AI Studio** after Opal's November 17, 2026 graduation.

- Visual Node-Graph Blueprint
- @Variable Step Chaining
- Gemini + Imagen + Veo + Lyria
- My Drive > Opal Recovery
- Migrate to Gemini Skills (/)
- Scale in AI Studio & Antigravity



Graduated Nov 17, 2026
Opal's interactive app runtime retired on November 17, 2026—its workflow lessons now power Gemini Skills.

Zero Data Lost in Drive
Original workflow files remain intact inside My Drive > Opal so you can recover every prompt in plain text.

Clear Migration Paths
Port focused prompts to Gemini Skills (/skill-name), or rebuild multi-step apps in Google AI Studio & Antigravity.

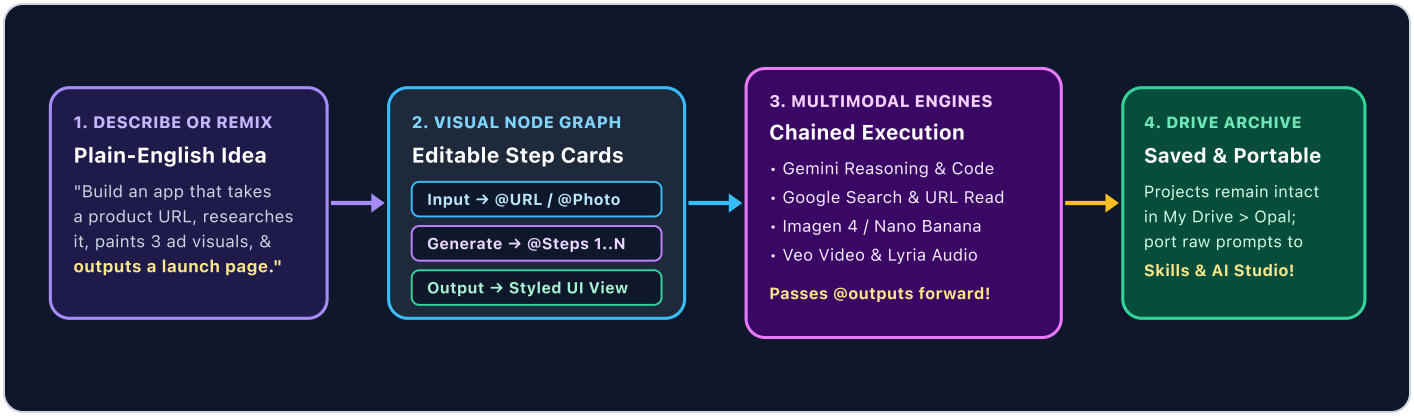
What Google Opal Was (And How Its Architecture Lives On)

Standard chat prompts crumble when a task needs five distinct stages—like researching a live URL, writing a script, painting four matching scenes, and formatting a clean webpage. Launched by Google Labs in July 2025, **Google Opal** (`opal.google`) pioneered visual no-code **AI mini-apps** before officially graduating and shutting down on **November 17, 2026**.

Quick Navigation

1. Opal Architecture & Nov 2026 Status p. 2
2. Drive Recovery & Tool Matrix p. 3
3. Reference Opal Studio UI Tour (Map) p. 4
4. Input, Model, Search & Output Nodes p. 5
5. Chaining Steps & `@Variables` p. 6
6. Migration FAQ & Pre-Flight Sheet p. 12
7. Opal UX Patterns & Template Craft p. 7
8. Console Debugging & Parallel Speed p. 8
9. 5 Multi-Step Blueprints to Port p. 9
10. Drive Backup & Gemini Skills Guide p. 10
11. Rebuilding in AI Studio & Antigravity p. 11

Architecture: From Plain-English Idea to Interactive Multimodal Mini-App



Graduation Notice (November 17, 2026): Runtime Retired, Drive Files Preserved

On **November 17, 2026**, Google officially turned down `opal.google` and *Gems made by Labs*; shared links now redirect to developer guidance and interactive graphs no longer execute. Your original project files stay safe inside `My Drive > Opal`, and Opal's workflow DNA lives on in **Gemini Skills** (`/skill-name`) and **Google AI Studio**.

Drive Recovery & Where Opal Workflows Live Today

Following Opal's **November 17, 2026** graduation, active workflows no longer execute at `opal.google`—but Google preserved all user files inside Drive so you can recover prompts in minutes.

3 Steps to Recover & Port Any Opal Project (Under 3 Minutes)

1 Open My Drive > Opal

Open Google Drive and navigate to `My Drive > Opal`. All saved projects (including *Gems made by Labs*) remain intact and untouched.

2 Extract Raw Prompts

Download any project file and open it in Notepad, TextEdit, or VS Code. Although wrapped in code-like structure, your original prompts appear as plain text.

3 Rebuild in Skills / Studio

Paste modular instructions into a new **Gemini Skill** (triggered via `/skill-name`), or rebuild multi-step apps in **Google AI Studio**.

Decision Matrix: Legacy Opal vs. Gemini Skills vs. AI Studio vs. Antigravity

Google Tool	Core Format	Status (Nov 2026)	Best Use Case
Google Opal	Visual Node Graph + Form Mini-App	**Graduated / Retired** (Nov 17, 2026)	Historical reference blueprint; original files stored in `My Drive > Opal` for plain-text prompt extraction.
Gemini Skills & Gems	Reusable `/skill-name` Instructions	**Active** (Zero Code)	Official successor for Opal's reusable prompt workflows—invoke directly in Gemini chat with `/skill-name`.
Google AI Studio	Prompt Lab & Build Vibe-Coding	**Active** (Web / API)	Recommended destination for prototyping complex chains, testing JSON schemas, and shipping Cloud Run apps.
Google Antigravity	Agentic Full-Stack IDE	**Active** (Agentic Code)	Turning recovered multi-step Opal DAGs into full-stack Next.js/Python production SaaS apps with DBs & auth.

Why Multi-Step Opals Need Manual Porting

Gems Migrated Automatically; Opal DAGs Did Not

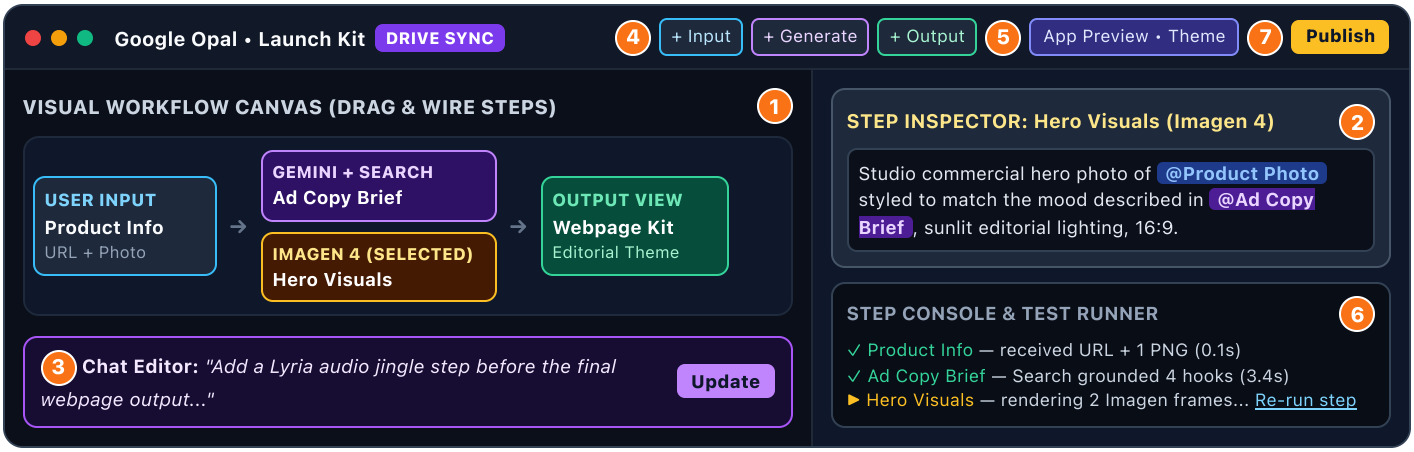
Simple single-prompt **Gemini Gems** carried over automatically for personal accounts, whereas Opal apps chained multiple prompts, web searches, and media steps—so extract prompts manually from Drive.

Choosing Your Destination: Skills vs. AI Studio

Port single-stage text/research helpers to **Gemini Skills** (`/name`). Port multi-node pipelines mixing Search, Imagen, Veo, and custom UIs to **Google AI Studio Build** or **Antigravity**!

The Google Opal Studio: Reference Interface Map

When reading exported project files from `My Drive > Opal`, knowing how Opal's canvas worked makes every saved node clear: Opal kept its chat builder and visual cards in **bi-directional sync**.



Numbered Interface Reference

1 **Visual Node-Graph Canvas:** Every stage of your app lives as a movable card connected by directional wires showing exact data flow.

2 **Step Inspector & `@` Prompt Editor:** Click any node to pick its AI model/tool and type `@` to inject dynamic outputs from earlier steps.

3 **Conversational Chat Builder:** Describe new features or fixes in plain English—Opal rewires or inserts nodes on the canvas automatically.

4 **Manual Add-Node Toolbar:** Drop fresh **User Input**, **Generate**, **Add Asset**, or **Output** blocks onto the canvas anytime.

5 **App Preview & Theme Switcher:** Flip between the wiring canvas and the clean end-user interface, and apply visual UI themes in one click.

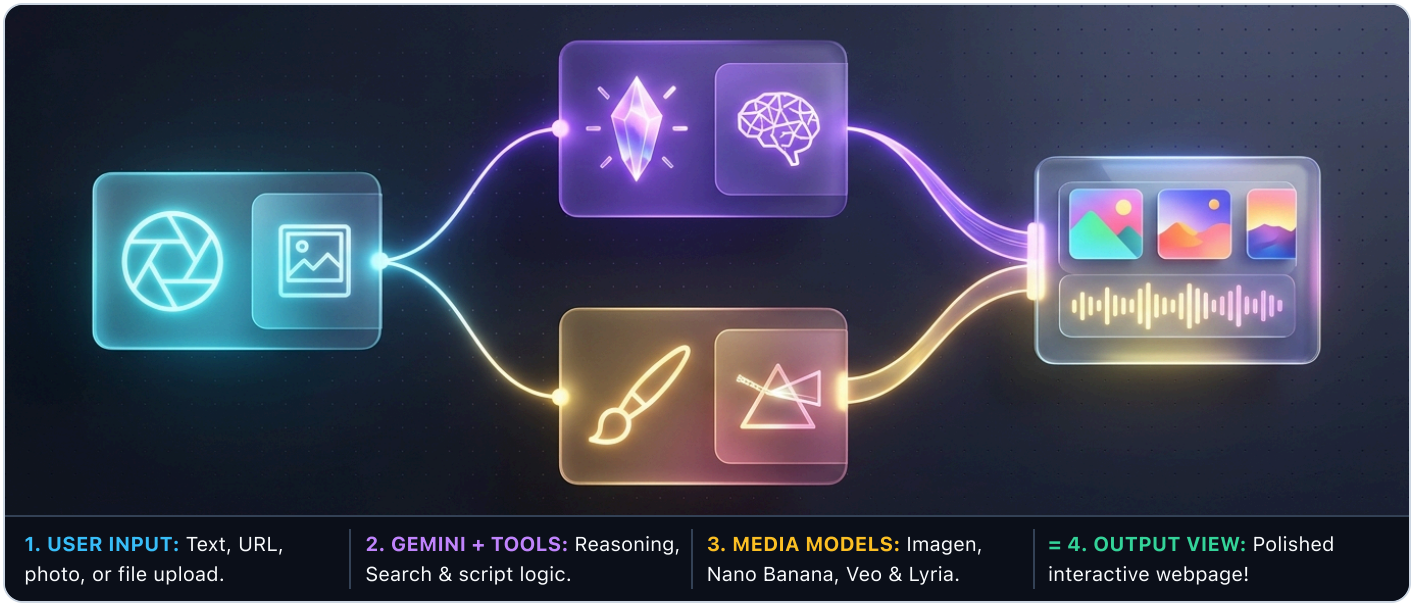
6 **Step-by-Step Console:** Watch each node execute live, inspect intermediate text/media outputs, and re-run a single step while debugging.

7 **Publish & Share Button:** Generates a hosted link so teammates, clients, or followers can use your mini-app without seeing messy internals.

> **Golden Workflow Rhythm: Chat for Big Strokes, Canvas for Surgical Edits**
> Use the **Chat Editor (3)** to scaffold your initial 4-node app or add a brand-new branch in seconds; then click individual cards in the **Step Inspector (2)** whenever you want to tweak one specific prompt word without touching the rest of your graph.

Opal's Building Blocks: Every Node Type Explained

Every Opal mini-app—from a two-step summarizer to a ten-node multimedia studio—is assembled from four foundational node families working together in sequence or in parallel.



1. USER INPUT: Text, URL, photo, or file upload.

2. GEMINI + TOOLS: Reasoning, Search & script logic.

3. MEDIA MODELS: Imagen, Nano Banana, Veo & Lyria.

= 4. OUTPUT VIEW: Polished interactive webpage!

Complete Reference: Opal Node Types & Native Google Models

Node Category	Available Engines / Options	What It Does & Best Practical Tip
1. User Input	Text box, Dropdown, Photo/Image upload, PDF/Doc/Audio file, URL	Builds the front-door form your users fill out. Add clear placeholder hints so users know exactly what to type or upload.
2. Generate (Text & Logic)	**Gemini Flash** (fast) • **Gemini Pro** (deep reasoning & coding)	Plans, summarizes, writes scripts, formats structured tables, or writes custom interactive HTML layouts. Use Flash for speed, Pro for nuance.
3. Generate (Visual & Video)	**Imagen 4** • **Nano Banana** (image edit) • **Veo** (video clips)	Creates crisp illustrations, restyles uploaded user photos in context, or renders short cinematic MP4 motion clips inside your workflow.
4. Generate (Voice & Music)	**AudioLM / Speech TTS** • **Lyria** (instrumental music)	Turns upstream story text into natural spoken narration or composes custom background soundtracks structured by genre and mood.
5. Tools & Assets	**Google Search** • **URL / YouTube Reader** • **Add Asset**	Grounds steps in live web facts, extracts webpage/video content, or attaches permanent brand PDFs/style guides from Google Drive.
6. Output	**Dynamic Webpage** • **Google Docs / Sheets / Slides**	Presents your finished text, galleries, and players in a styled UI—or exports structured reports straight into the user's Workspace.

Mastering Multi-Step Chains & `@Variable` Chips

The magic of Opal happens when Step 2 automatically builds on Step 1's output—for example, letting Gemini write an ultra-detailed visual art prompt first, then feeding that exact prompt into Imagen 4 via an `@` tag.

How `@` Dynamic References Work Inside Any Node

Inside any **Generate** or **Output** prompt box, press the `@` key on your keyboard. Opal opens a live menu listing every upstream **User Input**, **Asset**, **Tool**, and completed **Step**—inserting a colored dynamic chip that updates automatically on every run.

Anatomy of a Bulletproof Node Prompt (Color-Coded Formula)

Example: Step 2 ("Visual Director") Preparing Prompts for Step 3 ("Imagen Renderer")

Act as a senior editorial art director. Read the product positioning in `@Brand Summary` and inspect the uploaded `@Product Photo`. Use `@Google Search` to verify seasonal color trends for this category. Write one vivid, photographic scene description placing the product in a sunlit lifestyle setting with natural props and 85mm depth of field. Output ONLY the raw image-generation prompt (under 65 words), with zero intro commentary or bullet points.

1. Role & Voice
2. Upstream @Variables
3. Grounding Tool
4. Core Transformation
5. Strict Output Contract

3 Golden Rules of Clean Node Architecture

1 One Job Per Node

Never cram research, copywriting, and formatting into one giant prompt. Split them into three focused nodes so each step succeeds reliably and is effortless to debug.

2 Strict Output Contracts

When Node A feeds Node B (like Gemini feeding Imagen or Lyria), end Node A with `"Output ONLY the prompt text—no conversational filler"` so clean text flows forward.

3 Rename Nodes Early

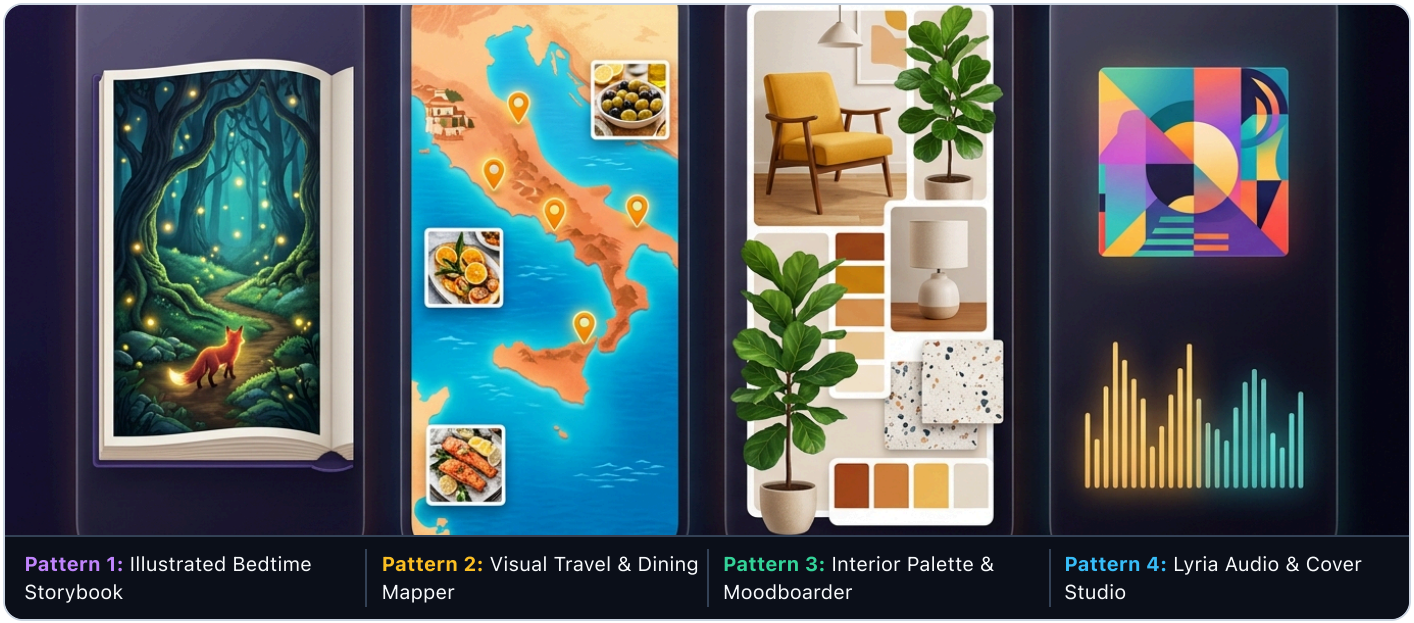
Rename generic labels like *Generate 3* to clear titles like `Competitor Table` or `Cover Art` so your `@` menu stays self-explanatory as graphs grow.

Pro Chaining Pattern: The "Prompt Upgrader" Bridge

End-users type lazy 3-word inputs like *"cozy jazz cafe."* Always place a fast **Gemini Flash** node right after `@User Input` to expand their 3 words into a rich, structured brief—then feed *that* upgraded brief into Imagen, Veo, and Lyria so every output looks studio-crafted!

Opal App UX Patterns (And Porting Them to AI Studio)

When Opal ran live, end-users never saw the node graph—they saw a clean **interactive web mini-app**. Use these four UX lessons from Opal when rebuilding recovered prompts inside **Google AI Studio Build** or **Gemini Skills**.



Pattern 1: Illustrated Bedtime Storybook | **Pattern 2:** Visual Travel & Dining Mapper | **Pattern 3:** Interior Palette & Moodboarder | **Pattern 4:** Lyria Audio & Cover Studio

4 Proven Opal UX Habits Worth Preserving

1 Keep Inputs Under 3 Fields

Apps with 8 required boxes scare users off. Ask for 1–3 high-leverage inputs (e.g., *Topic*, *Tone Dropdown*, and optional *Reference Image*) and let Gemini infer the rest.

2 Structure Webpage Output Rules

In AI Studio Build or React, carry over Opal's clear layout contracts—such as *"two-column magazine hero card, summary callout pills, and a downloadable checklist table."*

3 Keep a Cohesive Visual Theme

Preserve your saved Opal theme cues (like *"warm editorial cream with forest-green serif headers"*) inside a `DESIGN.md` or System Instruction when migrating.

4 Hide Messy "Scratchpad" Steps

Route only polished final outputs to the user view so intermediate JSON drafts, raw search snippets, and prompt-upgrader notes stay behind the scenes.

Migrating Old Opal Templates Cleanly

Check your saved file in `My Drive > Opal` for the original `@User Input` fields, system tone rules, and Output layout description. Keeping those three sections intact when pasting into **AI Studio Build** recreates your mini-app's exact feel in minutes.

Debugging in the Console & Cutting Wait Time in Half

Nothing kills mini-app magic faster than a 45-second loading spinner or one broken step derailing the final screen. Use Opal's **Step Console** and **Parallel Fan-Out** wiring to keep apps fast and resilient.

Speed Secret: Wire Independent Nodes in Parallel, Not Single-File!

✕ SLOW DAISY-CHAIN (~28 SECONDS TOTAL): STEPS WAIT UNNECESSARILY ON ONE ANOTHER

```
Input → Story Outline (4s) → Scene 1 Art (8s) → Scene 2 Art (8s) → Voiceover (8s) → Output
```

✓ FAST PARALLEL FAN-OUT (~12 SECONDS TOTAL): ALL MEDIA NODES FIRE AT THE EXACT SAME TIME!

```
Input → Story Outline (4s) ⇒ [ Scene 1 Art (8s) || Scene 2 Art (8s) || Voiceover (7s) ] ⇒ Output
```

Tip: Reference @Story Outline inside all three media nodes—without chaining Scene 2 after Scene 1!

4-Step Debugging & Hardening Workflow

1 Inspect Raw Node Outputs

When your final webpage looks wrong, open the **Console** panel and click each step from left to right. You will spot the exact node where a hallucination or empty string started.

2 Re-Run Only the Edited Node

Tweaking your final layout prompt? Run just that downstream node in the Step Inspector using cached upstream values instead of re-generating every image and video from scratch.

3 Guard Against Weird User Inputs

Test your app with a 1-word input, a broken URL, and an unrelated selfie. Add a fallback line in Step 1: `"If @User Input lacks detail, assume sensible creative defaults."`

4 Right-Size Models Per Step

Use **Gemini Flash** for quick input cleanup, routing, and formatting; save heavier **Gemini Pro** reasoning solely for your core analytical or creative centerpiece node.

Watch Out for Hidden Circular or Orphaned Wires

If you ask the Conversational Chat Builder to overhaul your app three times in a row, glance at the visual canvas afterward and delete any disconnected grey "orphan" nodes that are no longer wired into your **Output** card so they don't waste run time.

5 Classic Opal Multi-Step Blueprints (Ready to Port)

Whether recovering old workflows from `My Drive > Opal` or rebuilding these architectures in **Google AI Studio** / **Gemini Skills**, each pattern below maps directly to async prompts and tools.

Mini-App Recipe	User Input Fields	Chained Node Graph (Middle Steps)	Styled Output View
1. URL-to-Social Launch Kit	`@Product URL` + `@Brand Tone` dropdown	**Step 1 (URL Reader + Gemini):** Extract key value props. **Step 2A (Gemini):** LinkedIn, X & IG posts. **Step 2B (Imagen 4):** `1:1` & `16:9` hero visuals.	Tabbed campaign webpage with copy-paste post cards and downloadable visuals.
2. Illustrated Storybook + Voiceover	`@Child Name`, `@Hero Animal`, `@Lesson`	**Step 1 (Gemini Pro):** 4-page rhyming story + character visual sheet. **Steps 2A–2D (Imagen 4):** 4 watercolor spreads. **Step 2E (AudioLM):** Warm narrated audio.	Interactive picture-book webpage with embedded audio player at the top.
3. Live Competitor & Topic Brief	`@Company / Topic` + `@Focus Question`	**Step 1 (Google Search + Gemini):** Pull recent news, pricing & launches. **Step 2 (Gemini Pro):** SWOT matrix + strategic takeaways.	Executive dashboard page + one-click export to **Google Docs**.
4. Room Photo Restyler & Shopper	`@Room Photo` upload + `@Design Style`	**Step 1 (Gemini Vision):** Analyze room geometry & lighting. **Step 2A (Nano Banana):** Restyle photo preserving walls. **Step 2B (Search):** 5 matching decor categories.	Before/After visual comparison card + curated shopping checklist.
5. YouTube Hook & Thumbnail Lab	`@Video Idea` + optional `@Host Selfie`	**Step 1 (Gemini):** 5 high-CTR titles + 20-second spoken cold open. **Step 2 (Imagen 4 / Nano Banana):** High-contrast `16:9` thumbnail concept.	Creator pre-production sheet pairing each title next to the thumbnail preview.

Copy-Paste Starter Prompt for AI Studio Build or Gemini Skills

Try rebuilding this classic Opal pattern in AI Studio: `"Build an app that takes a Topic and Audience Level, uses Google Search for fresh 2026 facts, runs two parallel calls—Gemini writing a 5-bullet brief and Imagen 4 creating a header graphic—and displays both cleanly."`

Recovering Drive Files & Migrating to Gemini Skills

Even though `opal.google` interactive execution and shared links shut down on **November 17, 2026**, Google kept your data untouched inside Google Drive. Follow this guide to extract your prompts and recreate them cleanly.

3-Step Prompt Recovery From `My Drive > Opal`

1 Locate Drive Folder

Sign in to Google Drive and open `My Drive > Opal`. Every Opal app and *Gem made by Labs* you created or remixed remains stored safely here.

2 Open as Plain Text

Download the workflow file and open it in Notepad, TextEdit, or a code editor. Search (`Cmd/Ctrl+F`) for key phrases to copy your raw node prompts.

3 Create a Gemini Skill

In the Gemini app, create a new **Skill**, paste your recovered instructions, and invoke it anytime inside chat by typing `/skill-name`!

Post-Sunset Reference: What Happened to Every Opal Asset

Asset / Scenario	Status After Nov 17, 2026 & Exact Action to Take
Your Own Opal Workflows	Safe inside `My Drive > Opal`. Download the files, extract your text prompts via TextEdit/Notepad, and paste into **Gemini Skills** or **Google AI Studio**.
Shared Public or Team Links	Shared `opal.google` URLs redirect to developer guidance and no longer run. Collaborators cannot view your private files automatically.
Someone Else's Shared Opal	Ask the original creator to open their personal `My Drive > Opal` folder, extract the raw prompt text from the file, and share it with you directly.
Standard Gemini Gems vs. Opals	Simple **Gemini Gems** transitioned automatically for personal accounts; multi-step Opals require manual extraction and porting to Skills or AI Studio.

Security Reminder When Sharing Recovered Prompts

If you originally attached reference text or rules inside an Opal project file, inspect the extracted file carefully before pasting it into a public **Gemini Skill** or GitHub repository so private business instructions stay safe.

Power Pipeline: Porting Opal DAGs to AI Studio & Antigravity

Because multi-step Opal workflows combining search, reasoning, and media don't translate automatically into a single Gemini Skill, rebuilding them with **Google AI Studio** and **Google Antigravity** unlocks full production scale.



Creative Studio Bonus: Pairing With Google Flow & Gemini Skills

- **Custom Brand Style Assets via Google Flow:** Mint signature art-direction frames inside **Google Flow** (`flow.google`, incorporating Whisk remixing) whenever rebuilding visual mini-apps in AI Studio Build mode!
- **Pre-Production Storyboard Skills:** Paste recovered Opal film-pitch prompts into a Gemini Skill (e.g., `/storyboard`) to output structured shot prompts, dialogue, and `16:9` briefs for Google Flow.
- **Know Where to Rebuild:** Single-step helpers belong in **Gemini Skills**; interactive multi-step web apps with search, JSON schemas, and media belong in **Google AI Studio Build** or **Antigravity**!

Graduation Handoff: What Transfers Directly From Opal to Antigravity

1 Your Proven Prompt & DAG Spec

Every Opal node maps 1-to-1 to an async API function in TypeScript or Python! Copy your tested node prompts, model choices, and parallel branching diagram straight into an **Antigravity** agent brief so it builds the exact architecture you already validated.

2 Real User Input & Edge-Case Logs

Watching five friends use your Opal link reveals every confusing form label and surprising upload before you write a single line of React—saving days of wasted frontend refactoring.

Migration Troubleshooting & Pre-Flight Cheat Sheet

Keep this final page handy while recovering files from `My Drive > Opal` and porting workflows into **Gemini Skills**, **Google AI Studio**, or **Antigravity**.

7 Common Opal Migration Questions & 10-Second Fixes

Symptom / Question	Root Cause & Exact Action to Take
`opal.google` link redirects to a guidance page	Expected after the **November 17, 2026** graduation. Interactive Opal apps no longer run online; open `My Drive > Opal` in Google Drive to retrieve your saved source files.
Downloaded Drive file looks like raw JSON/code	Opal stores workflows as structured text files. Open the file in Notepad, TextEdit, or VS Code and search (`Cmd/Ctrl+F`) for familiar words to copy your clean prompts.
My Opal workflow didn't auto-appear in Gemini Skills	Only simple *Gems* transitioned automatically. Multi-step Opals chaining Search/media require copying extracted prompts into a new Gemini Skill (`/skill-name`).
Collaborator's shared Opal link stopped working	Shared links retired with the runtime. Ask the original author to grab the prompt text from their own `My Drive > Opal` folder and send it to you directly.
Where do I rebuild a multi-step Imagen + Search app?	Paste your extracted Opal node steps into **Google AI Studio Build** (`aistudio.google.com`) or **Google Antigravity** using `google-genai` Interactions API calls.
2-word inputs give generic results in my migrated Skill	Missing Opal's Prompt Upgrader step. Add an initial instruction inside your Gemini Skill or AI Studio System Prompt telling Gemini to expand brief inputs first.
Rebuilt app runs slowly step-by-step in code	Media steps chained sequentially instead of in parallel. Run independent Gemini, Imagen, and Veo calls concurrently with `asyncio.gather` / `Promise.all`!

Opal Migration Pre-Flight Checklist: 6 Steps to Preserve Every Workflow

- ☐ **1. Audit** `My Drive > Opal` and download key workflow files.
- ☐ **2. Open Files in Plain Text** to copy raw node prompts & rules.
- ☐ **3. Note Original** `@Variables` so chained data contracts stay intact.
- ☐ **4. Port Single Flows to Skills** invoked via `/skill-name`.
- ☐ **5. Rebuild Multi-Modal DAGs** in **AI Studio Build** or code.
- ☐ **6. Strip Sensitive Data** before sharing new Skills or repos!

Ready to Migrate Your Opal Creations?

Open `drive.google.com` (`My Drive > Opal`), download your saved workflow files, extract your proven prompts in a text editor, and bring them back to life inside **Gemini Skills** or `aistudio.google.com`!