CS-639 — Interaction Design Studio

# Flow Design & Intelligent Intervention*

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# Week 5: How Intelligence Intervenes

— **Last week:** Color, grids, spacing, alignment — and how intelligence adapts (P3, P4, P5)

— **This week:** Flow design — and how intelligence intervenes (P6, P7, P8)

**Three new principles. When should a system act? How should it explain itself?**

# Slide Color Guide

Today's lecture weaves together two threads. The slide colors tell you which one you're in:

— **Orange slides** — Intelligence Principles (P6, P7, P8)

— **Dark slides** — Design Fundamentals (flow design)

— **Light gray slides** — Bridges connecting the two

**Same structure every week. Principles first, then fundamentals, then synthesis.**

# P6 — Contextual Awareness

**Sense and respond appropriately to user context.**

Use environmental, behavioral, and personal signals to provide timely, relevant assistance — but only sense what's necessary.[2]

[2] Dey (2001), Context-aware computing · Amershi et al. (2019), G3-G7

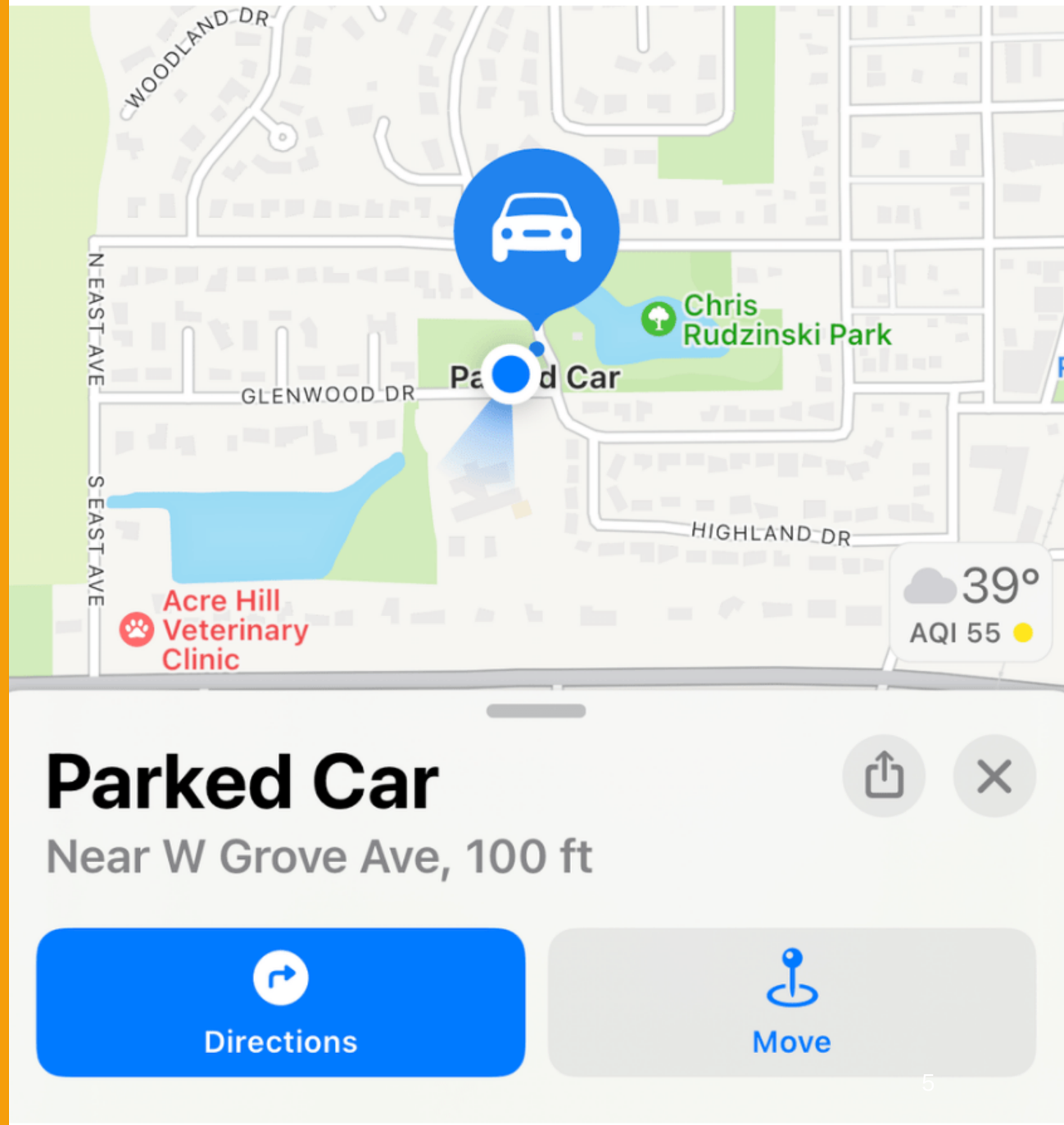
# P6 in Practice: Apple Maps — Parked Car

— Detects Bluetooth disconnect from your car

— Drops a pin at your parking location

— Two signals only: Bluetooth state + GPS

— No camera, no microphone, no extra tracking



# P6: Dey's Context Framework — What to Sense

What is context? Dey (2001) defines four primary types:

| Type | What It Means | Example |
|---|---|---|
| **Identity** | Who is the user? | User profile, preferences, history |
| **Location** | Where are they? | GPS, room, proximity to others |
| **Activity** | What are they doing? | Driving, typing, exercising |
| **Time** | When is it? | Time of day, day of week, duration |

**Design question: Which context dimensions does your system actually need?**

# P7 — Explain When Needed

**When the system acts, help users understand why.**

Provide explanations that help users build accurate mental models — especially when actions are unexpected or consequential.[3]

[3] Bellotti & Edwards (2001), Intelligibility · Amershi et al. (2019), G11

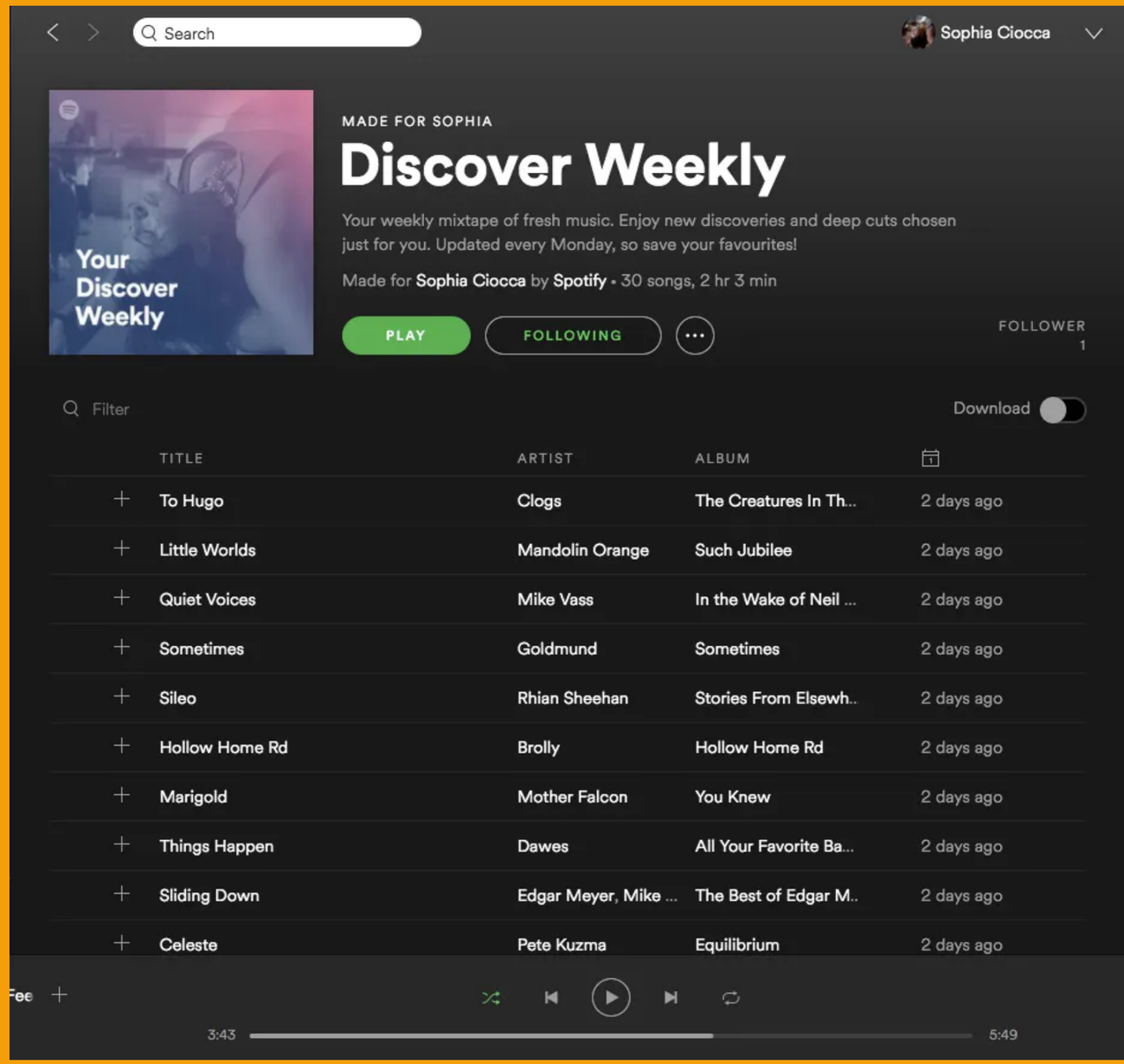
# P7 in Practice: Spotify Discover Weekly

— "Made for you based on your listening"

— Tap any song → "Because you listened to..."

— Explanation available but not forced

— Helps users understand and improve recommendations



# **P7: Bellotti & Edwards' Five Questions — What to** Explain

Users should be able to answer these about any intelligent system:

1. **Who** is in control right now?
2. **What** just happened? What can happen?
3. **When** will/did the system act?
4. **Where** does this action apply?
5. **Why** did the system do that?

**If users can't answer "why," they can't trust or correct the system.**

# P8 — Timely Intervention

**Act at the right moment — not too early, not too late.**

Proactive assistance should arrive when users need it, not when it's convenient for the system.[4]

[4] Horvitz (1999), P3 · Amershi et al. (2019), G5-G6

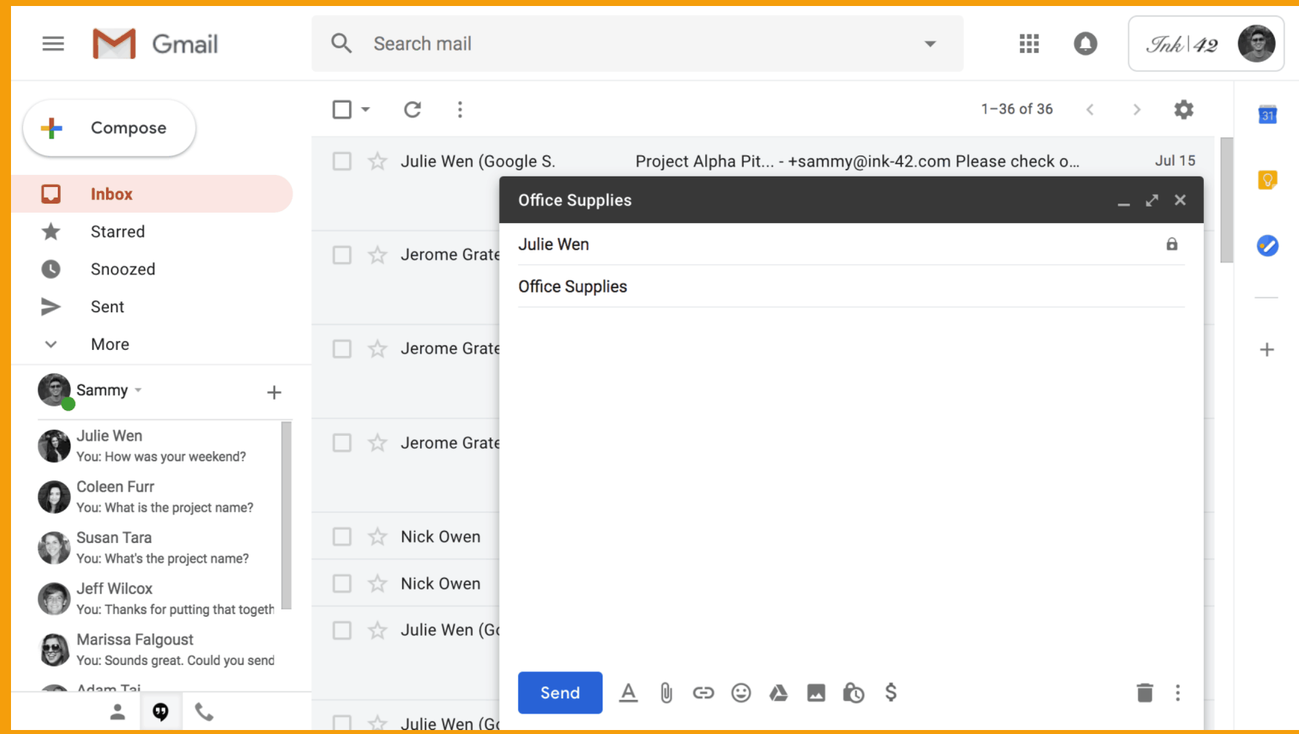
# P8 in Practice: Google Smart Compose

— Suggests completions while you're typing

— Waits until you pause — not mid-keystroke

— Shows suggestions inline, in gray

— Single keystroke to accept (Tab)



# P8: The Attention–Urgency Tradeoff

**Example: iPhone Focus Mode**

| | **Low Urgency** | **High Urgency** |
|---|---|---|
| **High Attention** (studying) | Text about weekend plans → silenced, delivered later | Repeated call from parent → breaks through Focus |
| **Low Attention** (scrolling) | App update available → badge on icon | Uber arriving in 2 min → full notification with sound |

**Never interrupt high-focus work with low-urgency suggestions.**

# From Principles to Fundamentals

Now we'll learn **flow design** — how to map interactions over time.

Notice how flow design connects directly to P6–P8:

— **Entry points** → Where does the user arrive with different context? (P6)

— **Decision points** → Where might users need explanations? (P7)

— **Intervention points** → Where should intelligence act at the right time? (P8)

# Flow Design

## Mapping interactions over time

# Why Flow Design?

**Week 2 taught you how to organize a single screen. Flow design organizes sequences of screens.**

— How do users move through your product?
— What decisions do they face?
— Where might they get stuck?
— Where might intelligence help?

# Three Ways to Map a Flow

Different tools for different purposes:

| Type | What It Shows | When to Use |
|---|---|---|
| **Storyboard** | User's experience, emotions, context | Early research, building empathy |
| **User flow** | All possible paths through product | IA planning, comprehensive mapping |
| **Task flow** | One goal, one path with branches | Feature design, intervention planning |

**Today we focus on task flows**
— the right level for designing intelligent interventions.

# Storyboard

**Visual narrative** of a user's experience — like a comic strip.

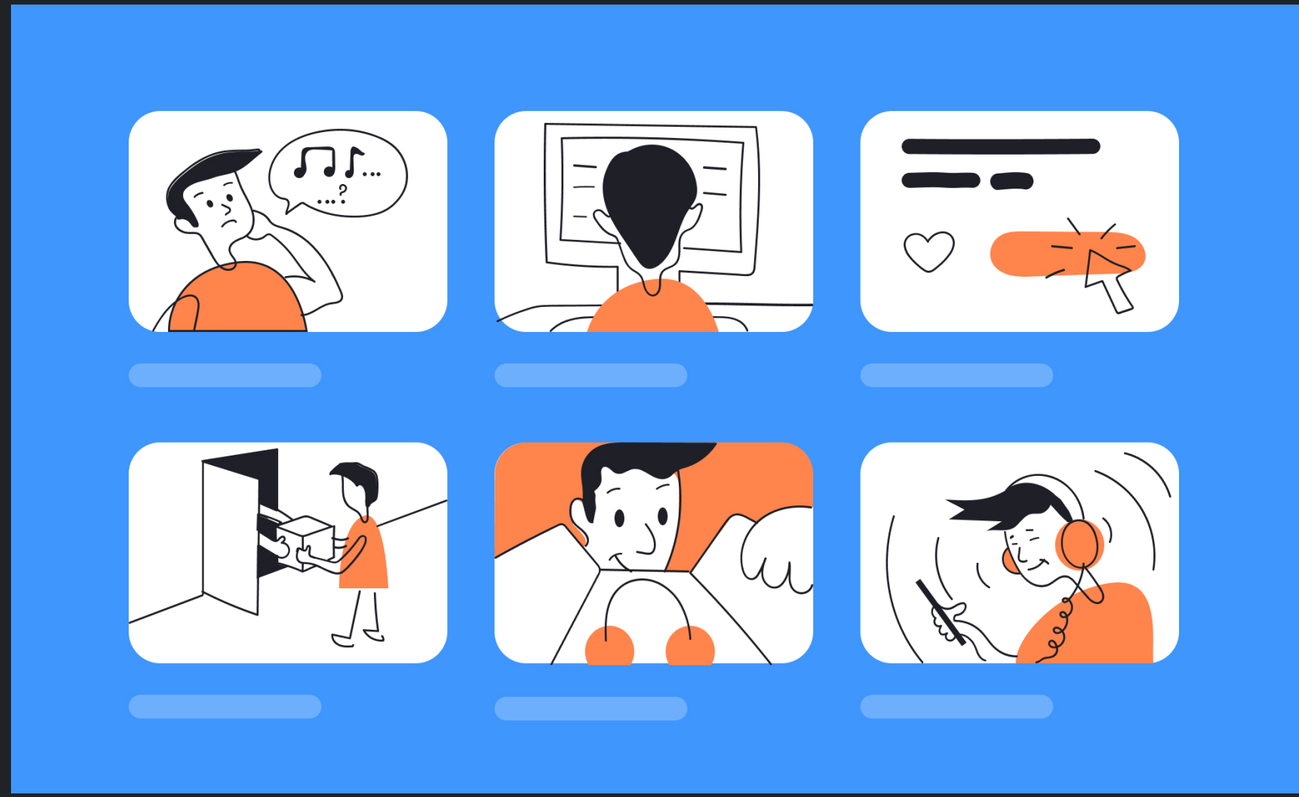
— Shows the **context**: Where is the user? What's happening?

— Shows the **emotion**: How do they feel at each moment?

— Shows the **motivation**: Why do they need this?

— Shows the **outcome**: How does the experience end?

**Great for building empathy early in design. Not detailed enough for implementation.**

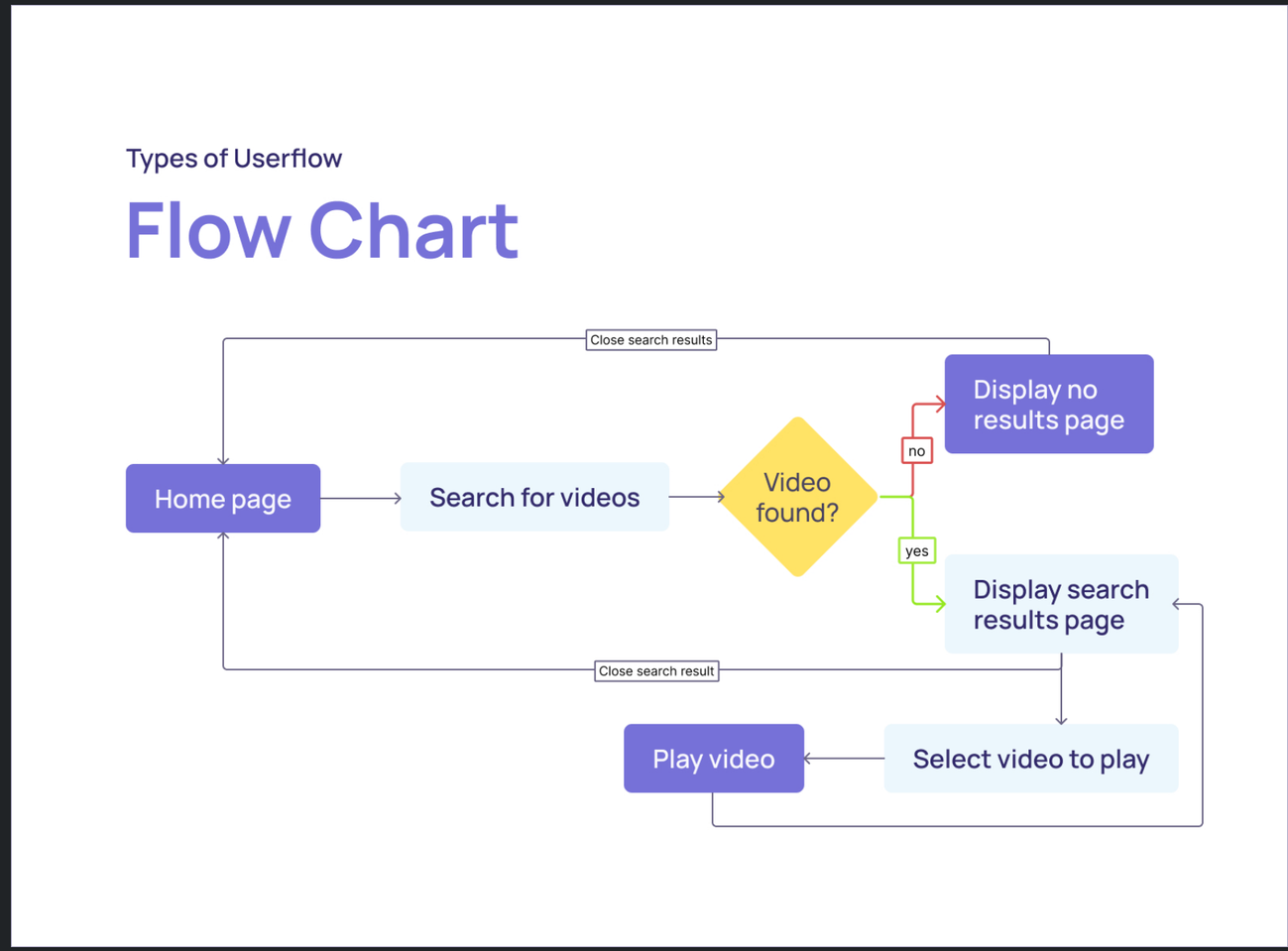


# User Flow

**Complete map** of all possible paths through a product.

— Shows **every screen** in the product
— Shows **all navigation** options between them
— Shows the **full information architecture**
— Can become very complex for large products

**Great for IA planning and comprehensive documentation. Too complex for feature design.**

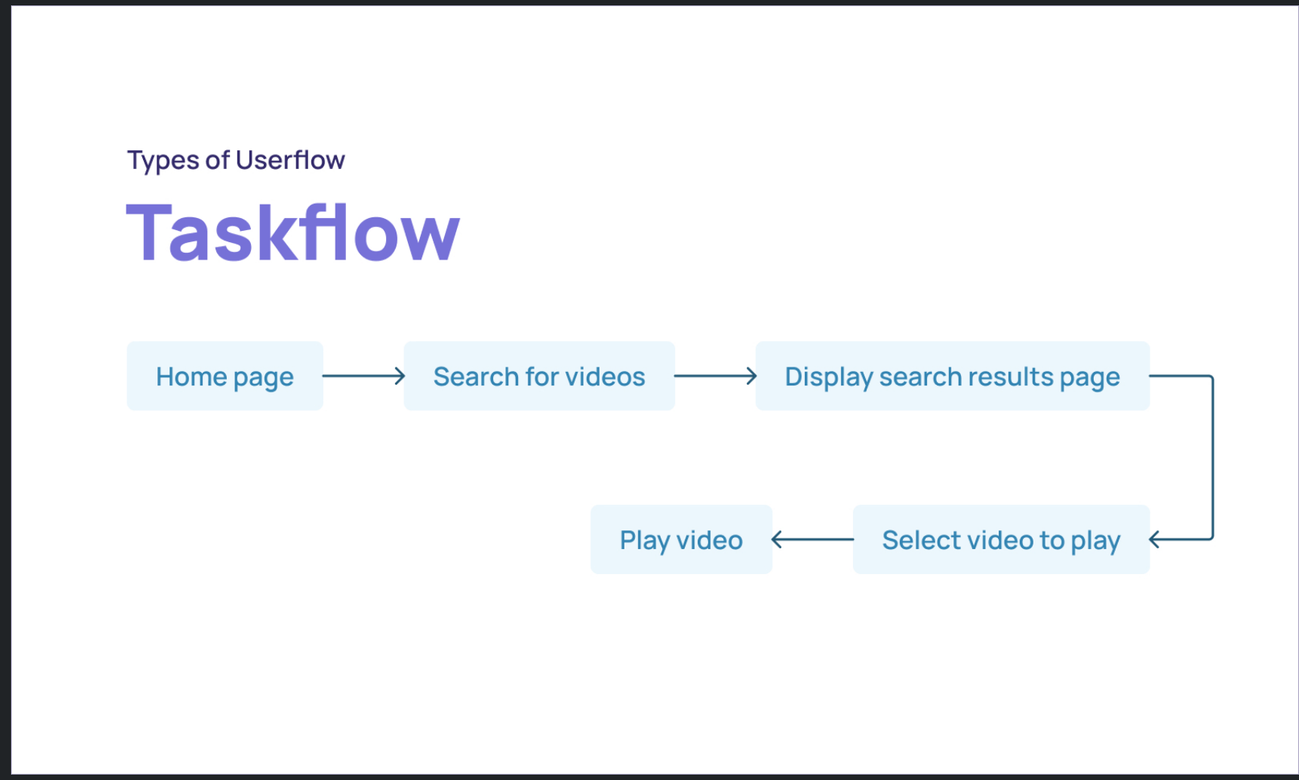


# Task Flow

**Focused path** for completing one specific goal.

— Shows screens for **one task only**
— Shows **decision points** where paths branch
— Shows **entry and exit** points
— Simple enough to reason about

**The right level for designing intelligent interventions. This is what we'll use.**



# Comparing Flow Types

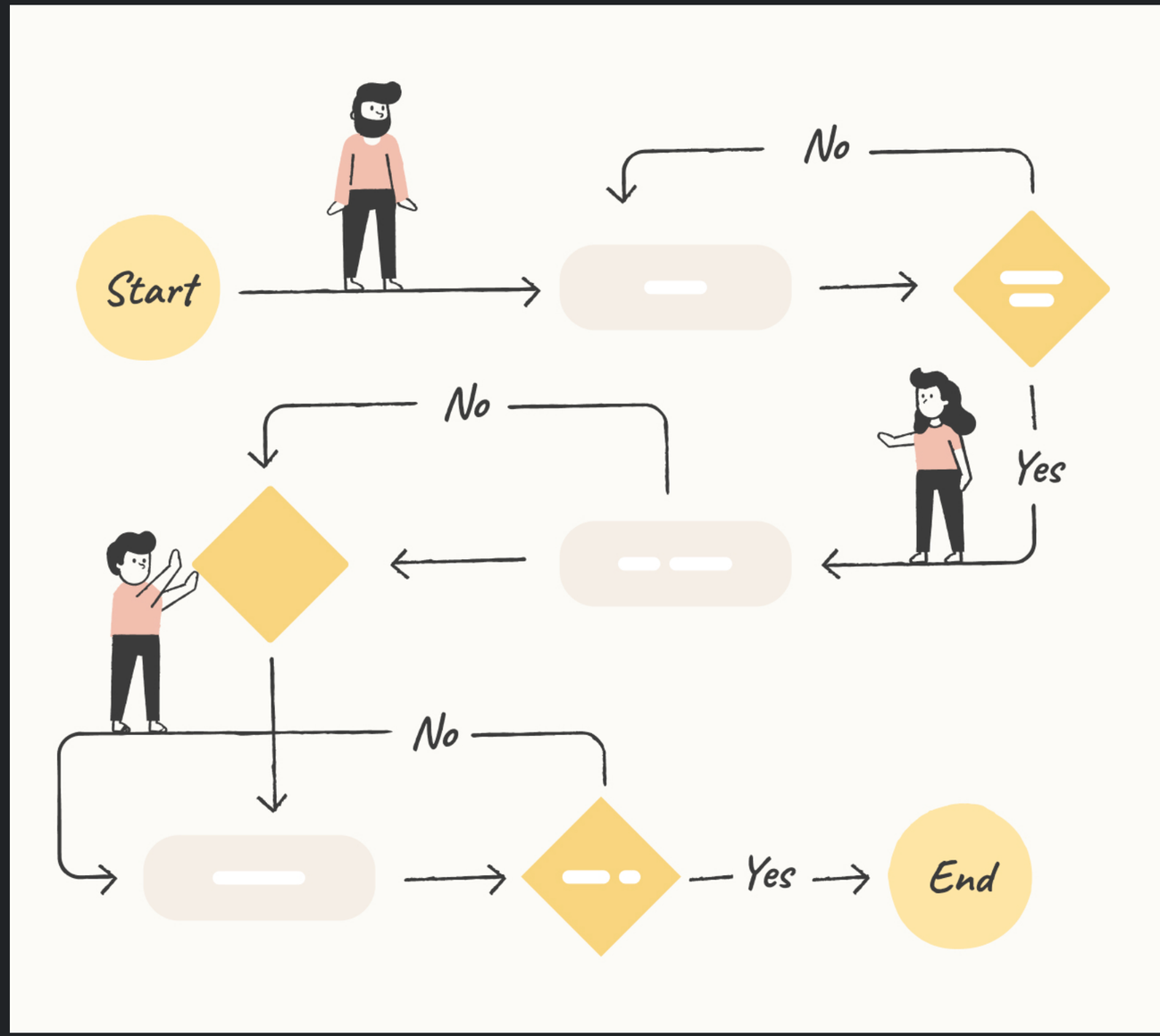
| | Storyboard | User Flow | Task Flow |
|---|---|---|---|
| **Shows** | Experience & emotion | All possible paths | One goal's path |
| **Scope** | One scenario | Entire product | Single task |
| **Detail** | Context, motivation | Screens, navigation | Screens, decisions |
| **Best for** | Empathy, research | IA planning | Feature design |
| **For AI design?** | Background context | Too broad | ✓ **Ideal** |

**Task flows let us pinpoint exactly where intelligence should intervene.**

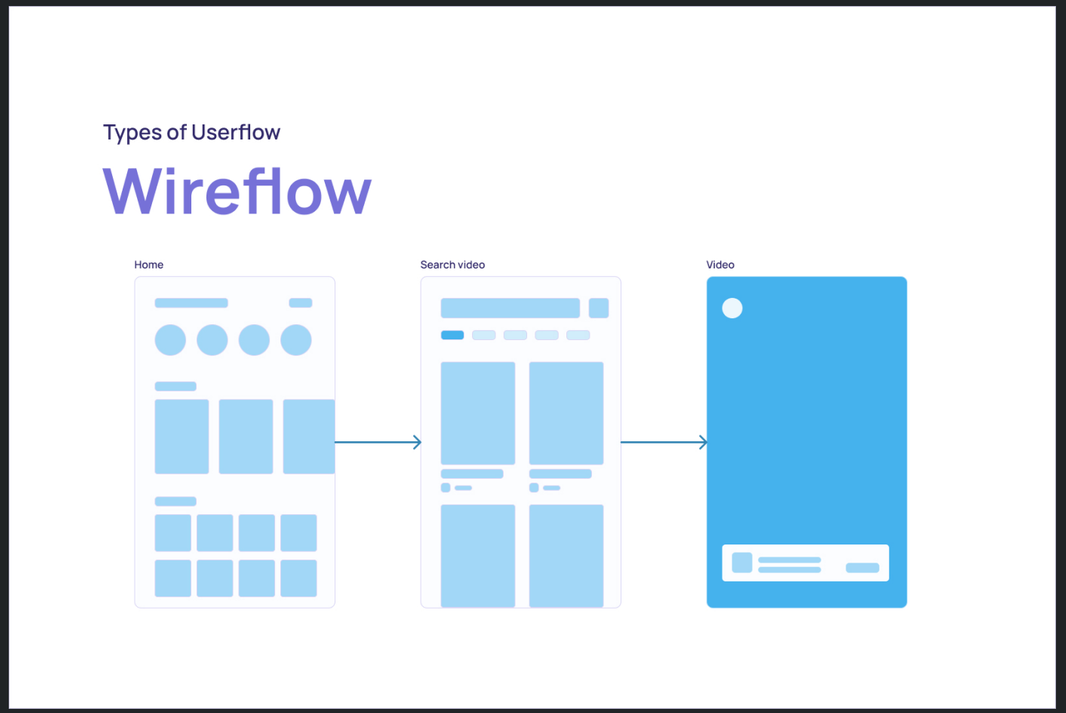
# Flow Notation

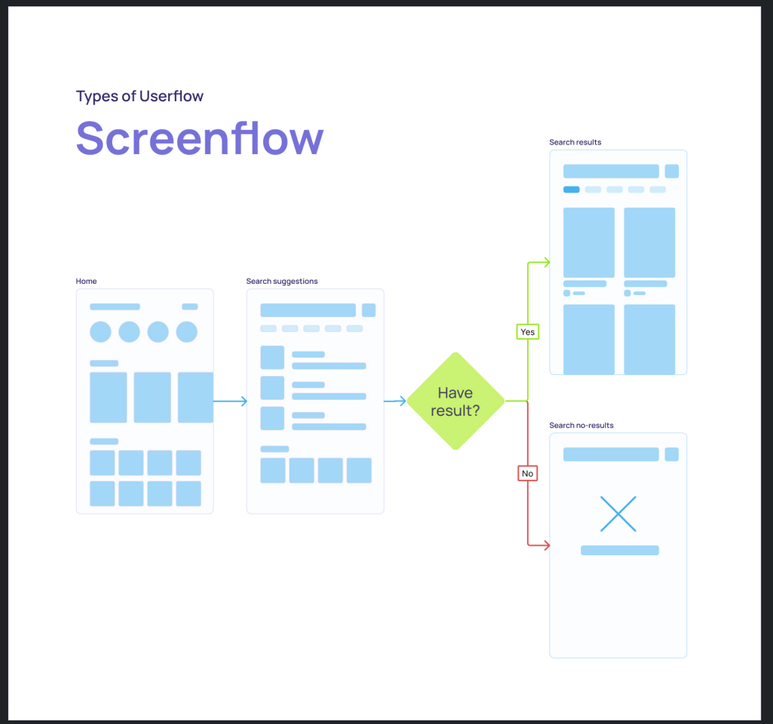
## Basic elements:

— **Rectangle** → Screen or state
— **Rounded rectangle** → Start/ end point
— **Diamond** → Decision point
— **Arrow** → Transition/action
— **Annotation** → What happens



# Wireflow & Screenflow




**Wireflow** — lo-fi wireframes + flow

**Screenflow** — hi-fi screens + flow

# Entry Points

**Entry point: Where users begin a task.**

**Common entry points:**

— App launch (cold start)
— Deep link (URL, notification)
— Search result
— Handoff from another app
— Resuming interrupted session

**Design consideration:**

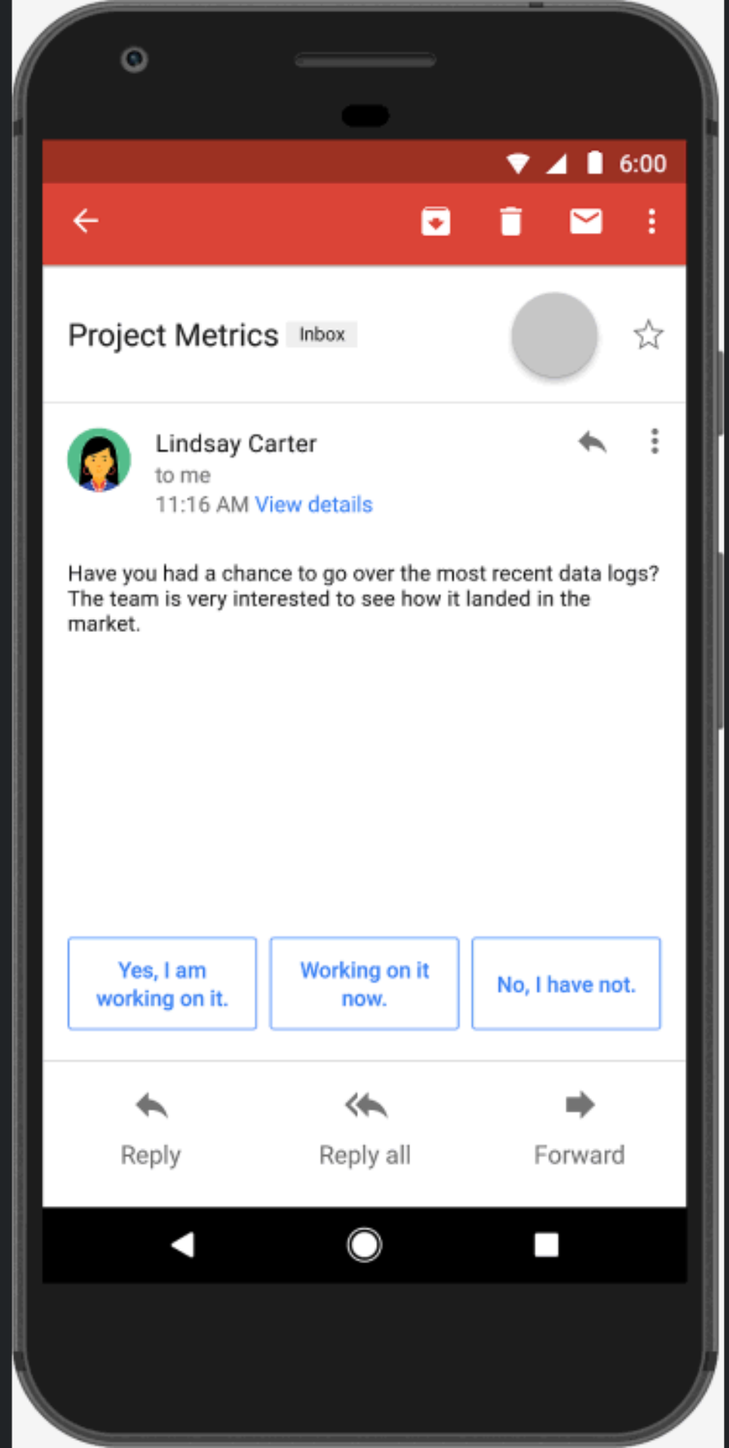
— Multiple entry points = different context
— User from notification already has context
— User from search is hunting
— Cold start user needs orientation
— Design for all entries, not just the "front door"

# Decision Points

**Decision point: Where the flow branches.**

**Three types:**

1. **User decision:** User explicitly chooses (click A or B)
2. **System decision:** System determines path (valid/invalid input)
3. **Intelligent decision:** AI suggests or takes a path



# Exit Points

**Exit point: Where the task completes (or fails).**
**Every exit needs design attention. Where do users go next?**

**Success exits:**

— Task completed (confirmation)
— User saved progress
— Handoff to next task

**Failure exits:**

— Error that blocks progress
— User abandonment
— System timeout

# Happy Path vs. Edge Cases

**Happy path:**

— Everything goes right
— User completes task smoothly
— Design this first

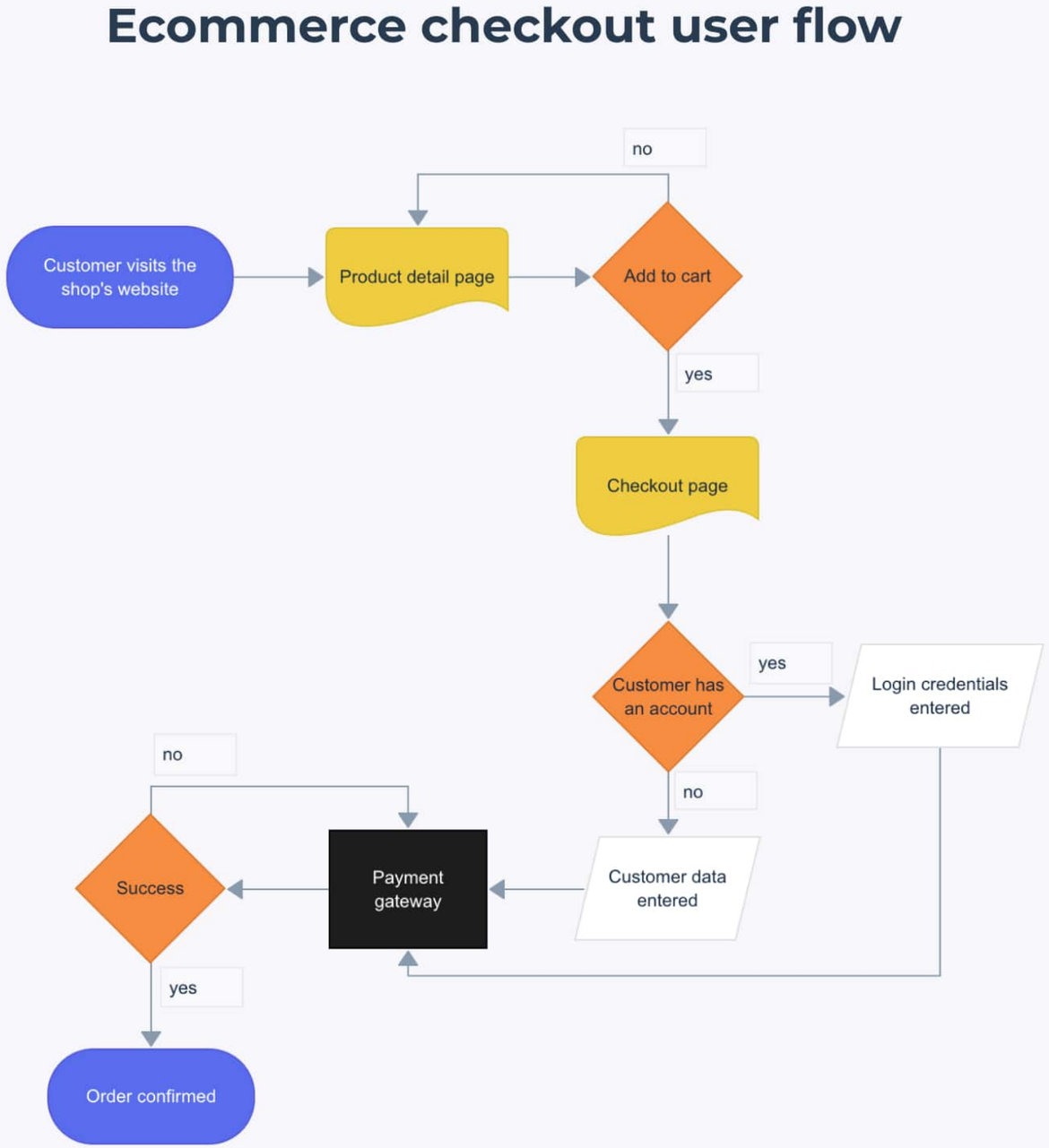
**Example:**
Browse → Add to cart → Checkout → Confirmation

**Edge cases:**

— Errors and failures
— Empty states
— First-time use
— Interrupted sessions
— Permission denied

**Example:**
Cart empty, payment fails, user abandons, offline

# Flow Example: Checkout



# Flows in Intelligent Systems

**Traditional flow:** User does each step. | **Intelligent flow:** Human + AI collaborate.

| Traditional | Intelligent |
|---|---|
| User fills form | AI pre-fills from context (P6) |
| User validates | System validates + explains issues (P7) |
| User submits | AI suggests optimal timing (P8) |
| System confirms | System explains what it did (P7) |

**The flow becomes a conversation, not a checklist.**

# Intervention Points

## Where in the flow should intelligence appear?

### Good intervention points:

— Before tedious manual steps
— When user seems stuck (hesitation)
— At decision points with clear better option
— After errors (suggest fix)
— At transitions between steps

### Bad intervention points:

— During focused creative work
— When user is moving quickly
— For trivial decisions
— Without sufficient context
— When it would break flow state

# Notation for Intelligent Flows

Extend standard flow notation with three additions:

— **Dashed diamond** → AI decision point (vs. solid diamond for user/system decisions)

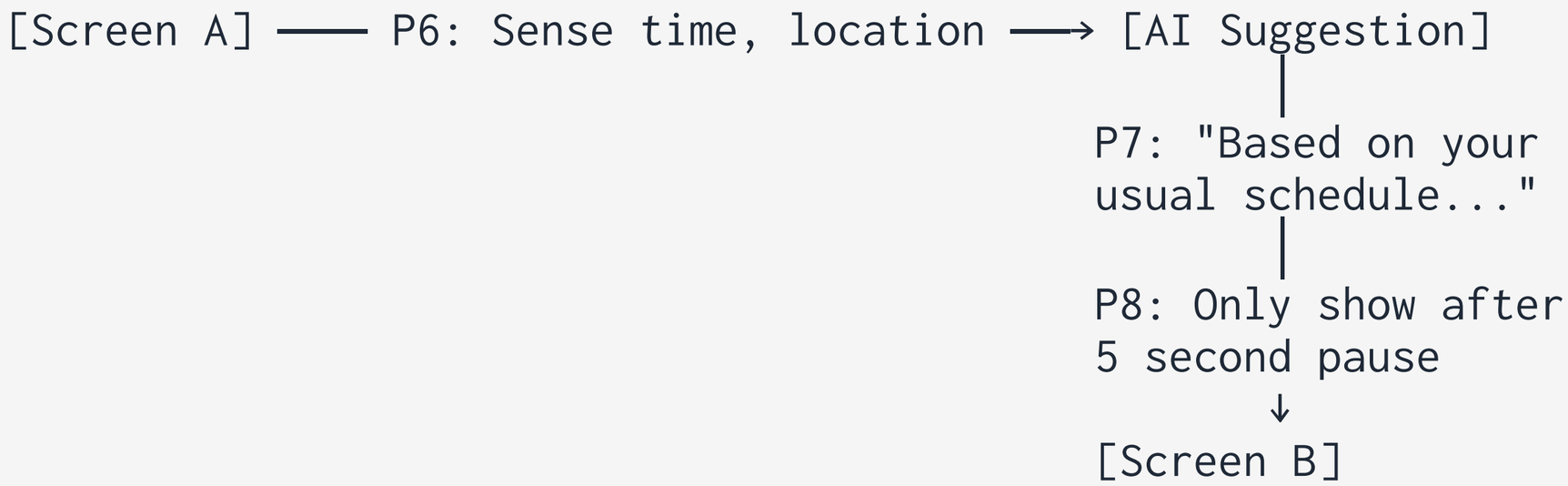
— **Dashed arrow** → AI-suggested path (user can accept or decline)

— **P6 / P7 / P8 tags** → Annotate context sensed, explanation given, and timing rationale

**Same notation you already know, plus three markers for where intelligence intervenes.**

# Annotating Flows for Intelligence

When documenting intelligent flows, annotate each intervention point:




**Your flow documentation should include P6/P7/P8 annotations at each intelligent touchpoint.**

# The Fundamentals–Intelligence Connection

| Flow Concept | Intelligence Application |
|---|---|
| **Entry points** | What context does each entry provide? (P6) |
| **Decision points** | Which decisions need explanation? (P7) |
| **Intervention points** | Where/when should AI help? (P8) |
| **Edge cases** | What if AI is wrong? (graceful recovery) |
| **Wire flows** | Where do AI elements appear on screen? |

**Flow design isn't just about user paths — it's about human-AI collaboration paths.**

# Intelligence Design Principle Cards

Today, we've added **3 more cards** to your set — now you have P1–P8.

| Week | Principles | Design Lens |
|---|---|---|
| W03 | P1 Subordinate Intelligence, P2 Efficient Dismissal | How intelligence appears |
| W04 | P3 Honest Capabilities, P4 Uncertainty, P5 Predictable Adaptation | How intelligence adapts |
| **W05** | **P6 Contextual Awareness, P7 Explain When Needed, P8 Timely Intervention** | **How intelligence intervenes** |
| W06 | P9, P10 (next week) | How intelligence collaborates |
| W08–09 | P11, P12 (generative AI) | How intelligence generates |

**By Week 6, you'll have the core framework (P1–P10). Weeks 8–9 add two more for generative AI.**

# This Week's Hands-On Work

## Designing Intelligent Flows

# Reflection: Intelligent Flow Analysis

**Due before Wednesday | Graded: ✓ / ✓- / ✓+**

Pick **one app** you use daily that has intelligent features. Map and annotate:

1. **Map the flow.** Sketch the task flow for one task you do often. Use proper notation — rectangles, diamonds, arrows.
2. **Annotate P6/P7/P8.** Mark where the app senses context (P6), explains itself (P7), and intervenes proactively (P8). Are there gaps?
3. **Reflect.** Does the intelligence feel woven into the flow, or bolted on? What would you change?

**Submit your annotated flow + a short reflection (3–5 sentences). This prepares you for Wednesday's studio.**

# Assignment 1: Foundations Portfolio

## Synthesize everything from Weeks 2–6 into one cohesive design

# Assignment 1: What You'll Submit

**Design a 4–6 screen app** for a domain you choose today. Over the next three weeks, you'll build:

— **Flow diagram** with proper notation — the task flow you start this week

— **IA diagram** with navigation model — you'll add this in Week 6

— **Analog screens** (4–6) demonstrating all design fundamentals — hierarchy, typography, color, grid, spacing, composition

— **Intelligence annotations** — tag 3+ places where P1–P10 apply (different colored marker)

— **Figma translation** — 2–3 screens digitized after the Week 6 Figma workshop

— **Process photos** — show your iterations

— **Reflection** — 500 words on foundations, intelligence principles, and analog vs. digital

# Assignment 1: Timeline

| When | What |
| --- | --- |
| **This week (W05)** | Choose domain. Design flow (Wednesday studio). Get critique (Friday). |
| **Next week (W06)** | Add navigation & IA (Monday). Learn Figma (Wednesday workshop). Start digital translation. |
| **Week 7** | Polish, refine, write reflection. |
| **Monday, March 9** | **Due on Canvas.** |

**Three weeks. Everything you do in class builds toward it. No separate studio submissions for Weeks 5–6 — this assignment is your studio work.**

# Assignment 1: Grading

| Criterion | Weight |
|---|---|
| Visual design quality (hierarchy, typography, composition) | 30% |
| Systematic design (grid, spacing, color, WCAG accessibility) | 25% |
| Interaction design (flow, navigation, intelligence annotations) | 25% |
| Process documentation (iteration evidence) | 10% |
| Reflection quality (specific, connected to decisions) | 10% |

**Full details on Canvas.**

# This Week's Step: Flow Design

## The first piece of your Foundations Portfolio

# Pick Your App Domain

**Choose a domain for your Assignment 1 portfolio — you'll build on it through Week 7:**

— **Fitness/health tracker** — log, track, insights
— **Recipe/cooking app** — browse, plan, cook
— **Campus events** — discover, RSVP, attend
— **Personal finance** — track, budget, visualize
— **Music/podcast player** — browse, play, discover
— **Travel planning** — search, compare, book

Or propose your own — any app complex enough for 4–6 screens, a multi-step flow, and real navigation decisions.

# Three Steps — Logic, Screens, Intelligence

1. **Task Flow** (5–10 min) — Get the logic right. Abstract boxes, diamonds, arrows. No screen design yet.
2. **Wireflow** (20–25 min) — Replace boxes with lo-fi screen sketches. Apply Week 2 + Week 4 skills.
3. **Intelligence Layer** (10 min) — Switch markers. Add dashed notation and P6/P7/P8 tags.

**The test: remove the colored annotations — does the flow still work on its own?**

# Step 1: Task Flow

**Get the logic right first — no screen design yet.**

— 4–6 screens as labeled rectangles
— Proper flow notation (rectangles, diamonds, arrows)
— At least 2 decision points
— Defined entry and exit points
— Happy path + one edge case branch

**This is your blueprint. Get the structure right before you invest in screens.**

# Step 2: Wireflow

**Replace the abstract boxes with lo-fi screen sketches.**

— Apply Week 2 principles (hierarchy, contrast, balance)
— Apply Week 4 systems (grid, spacing, color)
— Keep the connections and decision points from Step 1
— Show what each screen actually looks like

**Same structure, now with screens. Your task flow becomes a wireflow.**

# Step 3: Intelligence Layer

**Switch to a different colored marker. Add at least 2 intervention points:**

For each intervention point, annotate:

1. **Context (P6):** What does the system sense at this point?
2. **Action:** What does the system do or suggest?
3. **Explanation (P7):** How would you explain why?
4. **Timing (P8):** Why is this the right moment?

**Use dashed diamonds and dashed arrows for AI elements. The colored marker makes intelligence visible as a layer.**

# Before Wednesday

— **Submit:** Intelligent Flow Analysis reflection on Canvas (due before class)

— **Commit:** Pick your app domain for Assignment 1

— **Sketch:** Initial flow diagram for your app (rough is fine — Step 1 only)

— **Review:** Today's slides — especially the notation and intervention points

— **Bring:** Your principle cards (P1–P8) and **two different colored markers**

# What's Next?

— **Wednesday:** Studio — Design your flow (this feeds directly into Assignment 1)

— **Friday:** Critique — Are your flows clear and your interventions well-placed?

— **Next week:** Navigation, IA, and the final principles (P9, P10)

— **Assignment 1** is on Canvas — review the full requirements

# References


**Design Fundamentals:**

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— Cooper, A. et al. (2014). About Face — Chapter on flow and task analysis

— Tidwell, J. et al. (2020). Designing Interfaces — Navigation and flow patterns

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**Intelligence Design:**

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— Bellotti, V. & Edwards, K. (2001). Intelligibility and Accountability — 5 questions

— Horvitz, E. (1999). Principles of Mixed-Initiative User Interfaces — P3 on timing

— Amershi, S. et al. (2019). Guidelines for Human-AI Interaction — G3-G7, G11

— Google People+AI Guidebook — Explanation patterns

# Media Sources

Apple Maps Parked Car - macreports.com | Spotify Discover Weekly - Medium | Google Smart Compose - TechCrunch | Flow Notation - Anima | Gmail Smart Reply - Google Blog | Checkout Flow - Slickplan | User Flow Example - Visily | Task Flow Example - Visily | Wireflow Example - Visily | Screenflow Example - Visily