Today's Agenda

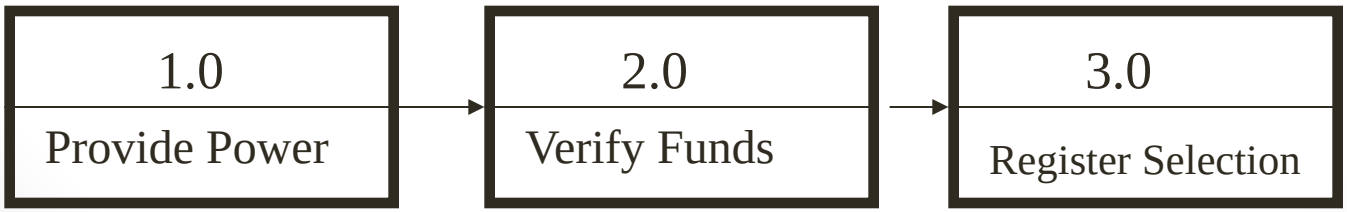
- Evaluation methods
  - Functional Analysis & Allocation
    - Functional flow diagrams
    - Decision-action diagrams
  - Task analysis
  - Personas & Cognitive Walkthrough

Quiz #4

- Starts from 2:15pm,
- Due at 2:30pm
- Open book and open notes

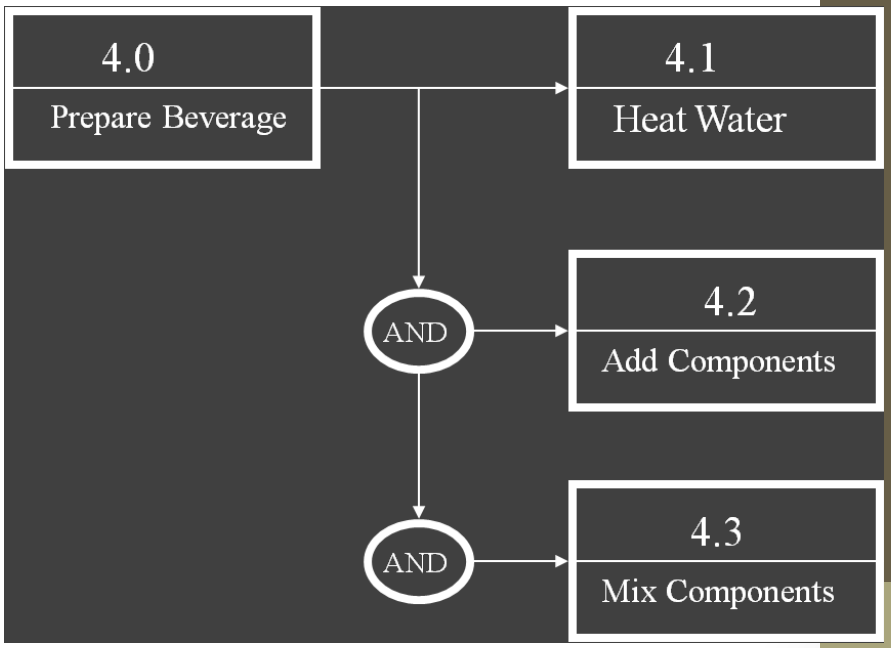
Functional Flow Diagrams

1. Functions represented as rectangles
2. Functions represented as verb + noun
3. Numbering (1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0)
4. Go down to the level of detail that is necessary, and usually, each level is a separate page
5. Top level
   - Put top level functions horizontally
   - Top level functions end in .0



Functional Flow Diagrams

6. Lower level:
   - Note numbering (4.1, 4.2, etc.)
   - Goes left to right, top to bottom
   - Use AND/OR
   - Guideline: don't want more than 2 AND



DECISION-ACTION DIAGRAMS

Decision-Action Diagram

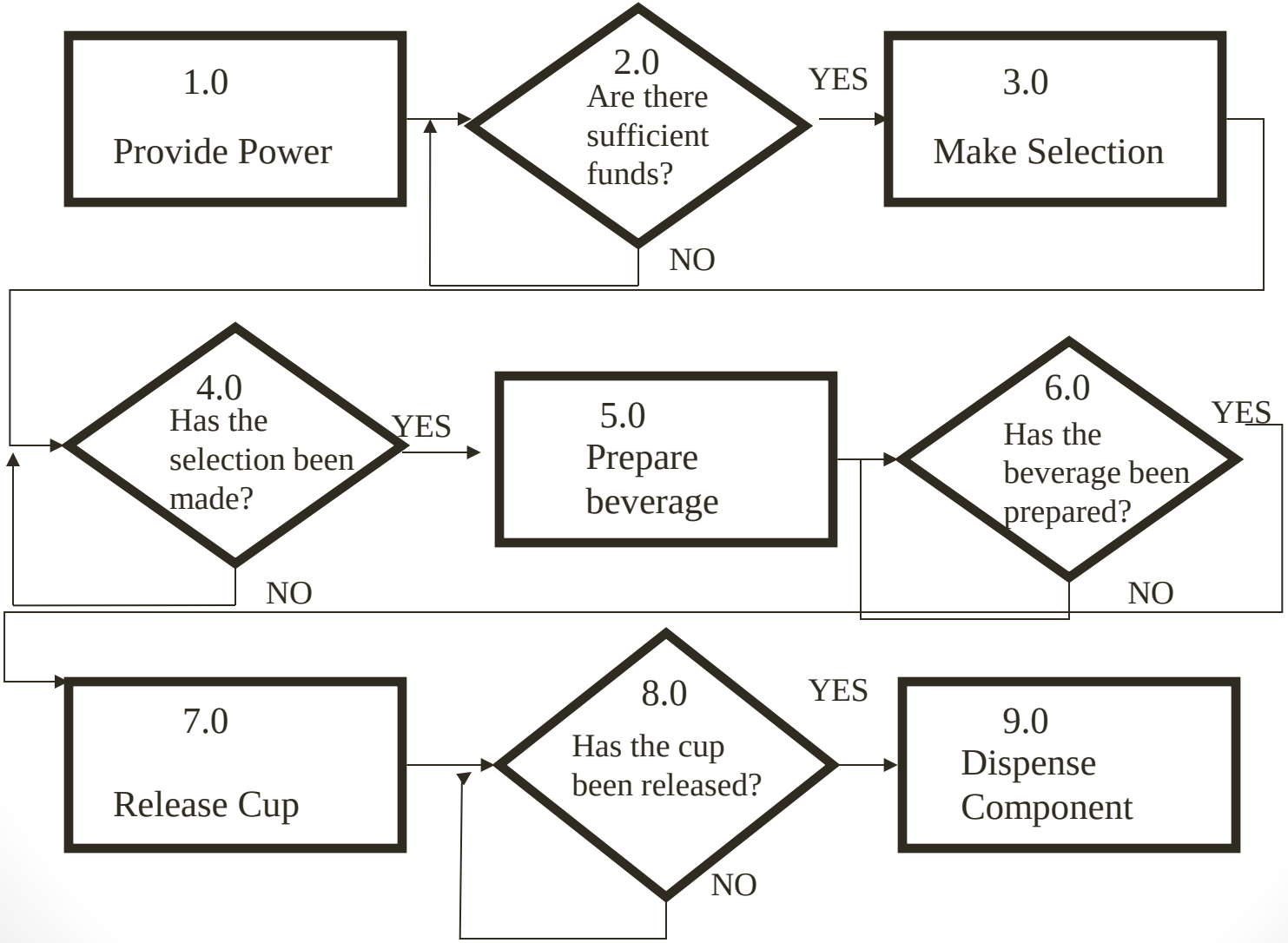
- Similar to functional flow diagram, **BUT it includes *decisions*** (cognitive component)
  - Functions are *rectangles*
  - **Decisions (Yes/No) are *diamonds***

- Decisions require displays/controls (if that decision is allocated to humans)

Let's Look at an Example…

- What decisions could be made for using a hot beverage vending machine?
- Let's consider decisions made by…
  - **Human**
    - Do I have enough money to afford a drink?
    - What beverage do I want to buy?
  - **Machine**
    - Are there sufficient funds?
    - Has the selection been made?
    - Has the beverage been prepared?
    - Is the component dispensed?
    - Has the cup been released?

Top Level


1.0
Provide Power
2.0
Are there sufficient funds?
YES
NO
3.0
Make Selection
4.0
Has the selection been made?
YES
NO
5.0
Prepare beverage
6.0
Has the beverage been prepared?
YES
NO
7.0
Release Cup
8.0
Has the cup been released?
YES
NO
9.0
Dispense Component

TASK ANALYSIS

Tasks Include…

Physical tasks

Cognitive tasks

Task Analysis: Definition

- “Systematically describing human interaction with a system to understand how to match the demands of the system to human capabilities” (Wickens, Lee, Liu, & Becker, 2004)
- “Task analysis is the process of learning about ordinary users by observing them in action to understand in detail how they perform their tasks and achieve their intended goals.” – usability.gov

Task Analysis

- What will the human do?
  - Identify the full range of tasks that the **user** performs with the product or system
- Uncovers
  - Criticality
    - Potential errors and how those affect performance
  - Duration
    - Time allowed or time required
  - Difficulty
    - Conditions that are incompatible with human performance capabilities

When do we conduct a task analysis?

At early stage before performing design work

Conducting a Task Analysis

- Step 1: Decide the purpose of the analysis
  - Developing a new system
  - Modifying an existing system
  - Troubleshooting an existing system
  - Developing operator training

Conducting a Task Analysis

- Step 2: Define the top level task goal
  - Goals, *not behaviors*
    - Goal: design an interactive interface for a visitor kiosk
    - *Not* implement design process

Conducting a Task Analysis

- Step 3: Describe the task actions
- Obtain these from
  - Observation
  - Expert reports
  - Documents, training materials

Conducting a Task Analysis

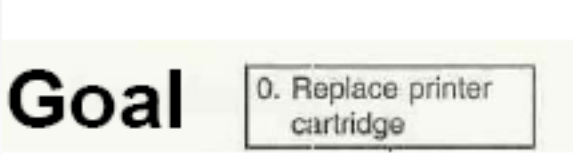
- Step 4: Decompose the goal
  - Identify plans
    - Tasks that are arranged in the required order
  - Fixed sequence: do this, then that
  - Decision: if this, then that
- Continue for each new goal

Conducting a Task Analysis

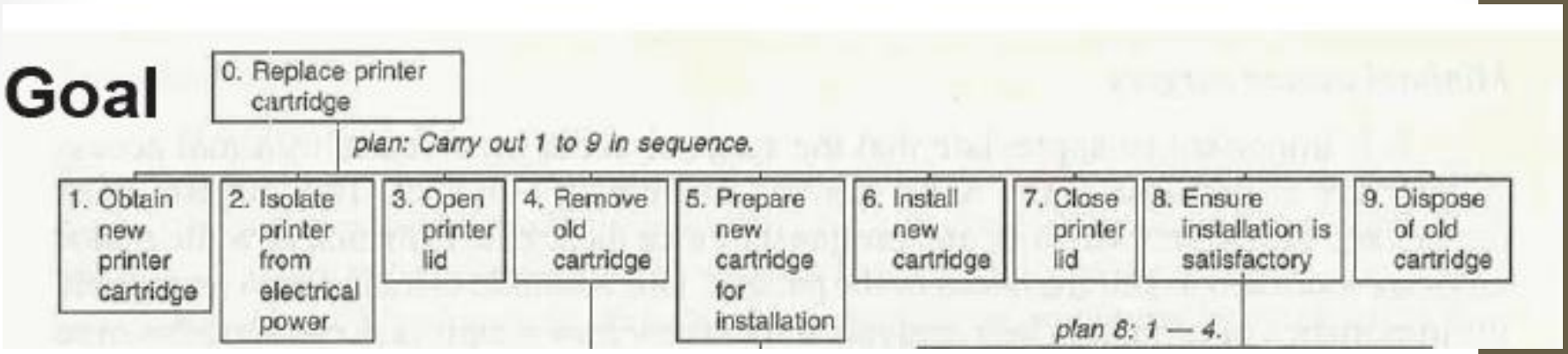
- Step 5: Stop
- How do you know when to stop?
  - Simplest stop rule: stop when further decomposition is of no further use

Example: Replace Printer Cartridge

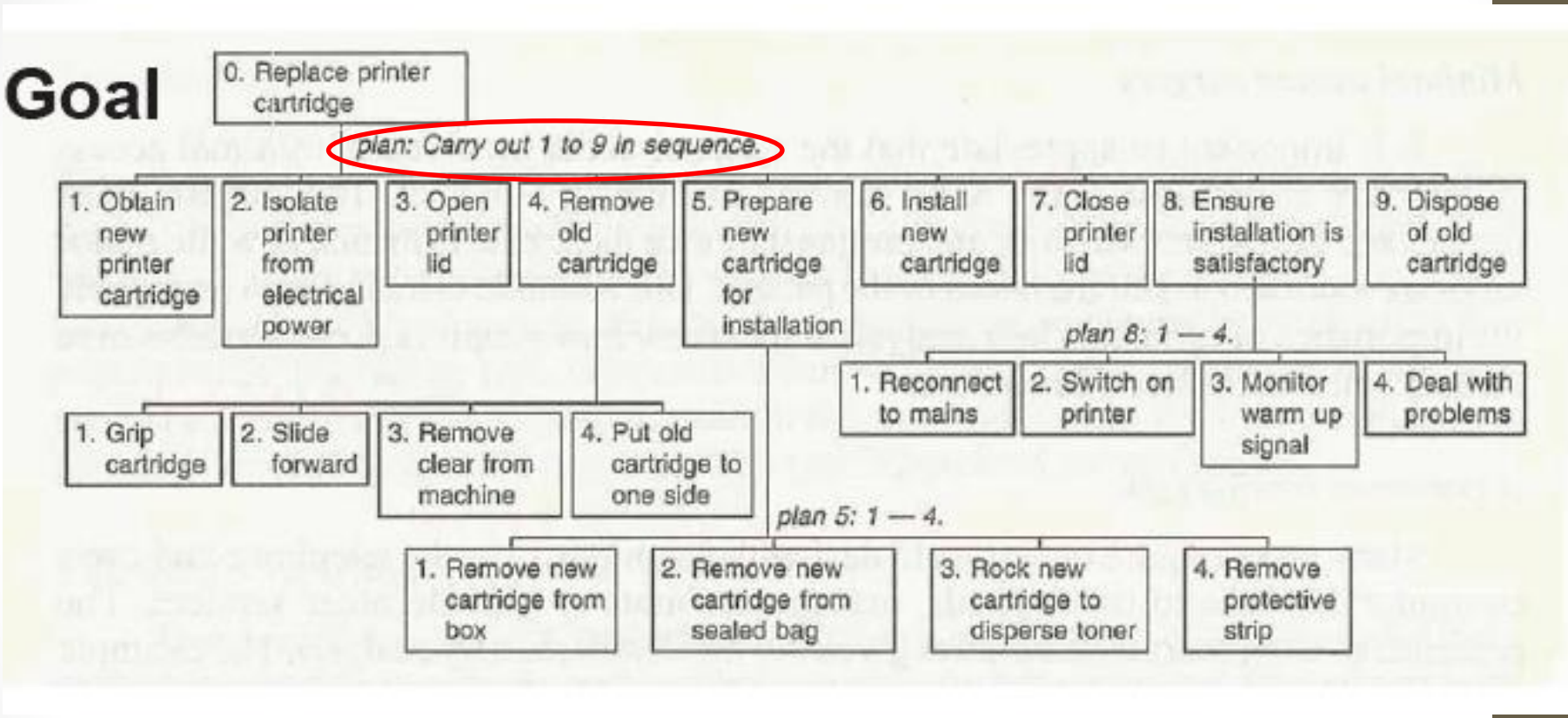
Example: Replace Printer Cartridge



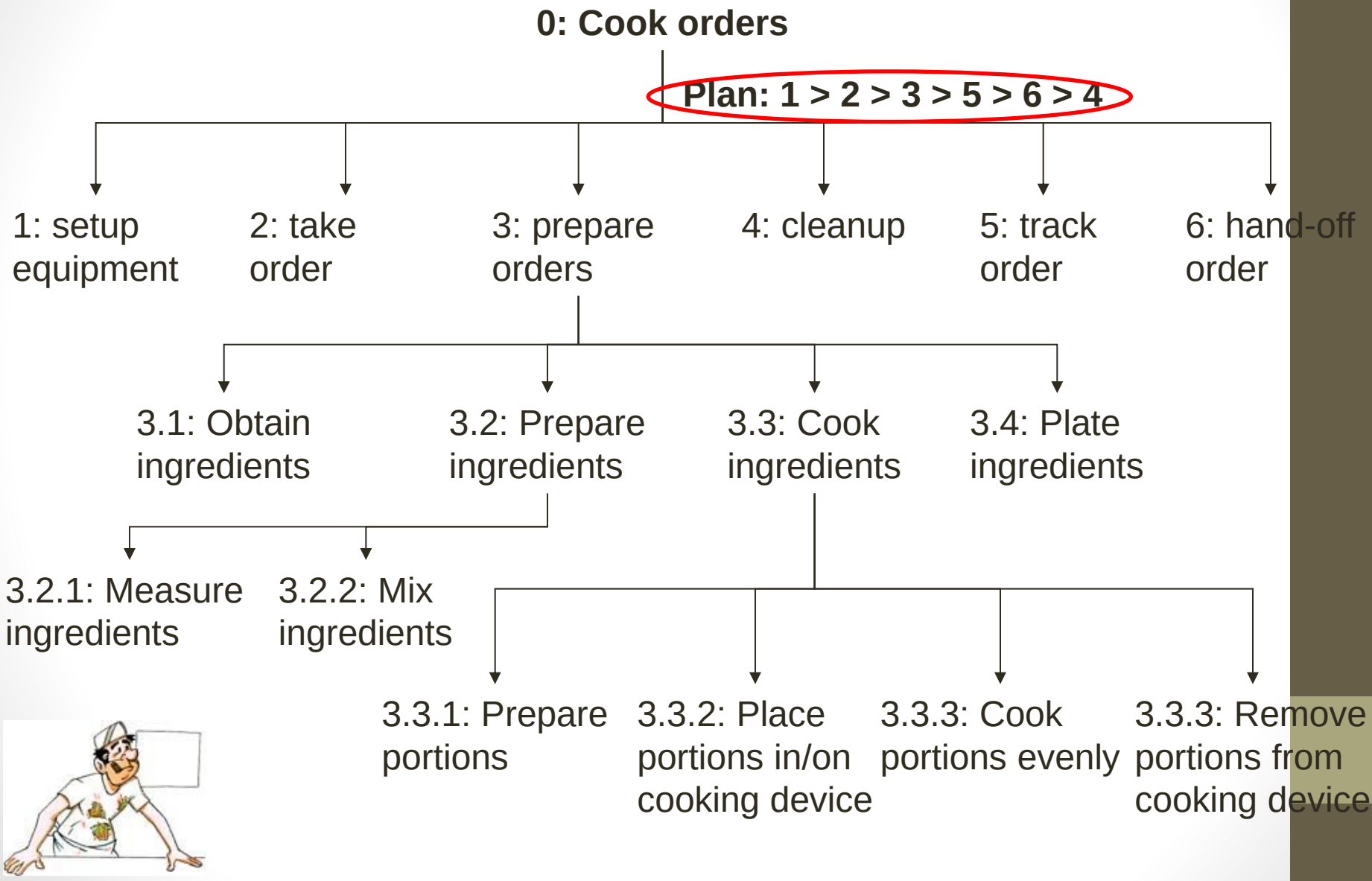
Example: Replace Printer Cartridge



Example: Replace Printer Cartridge



Hierarchical Task Analysis (HTA)



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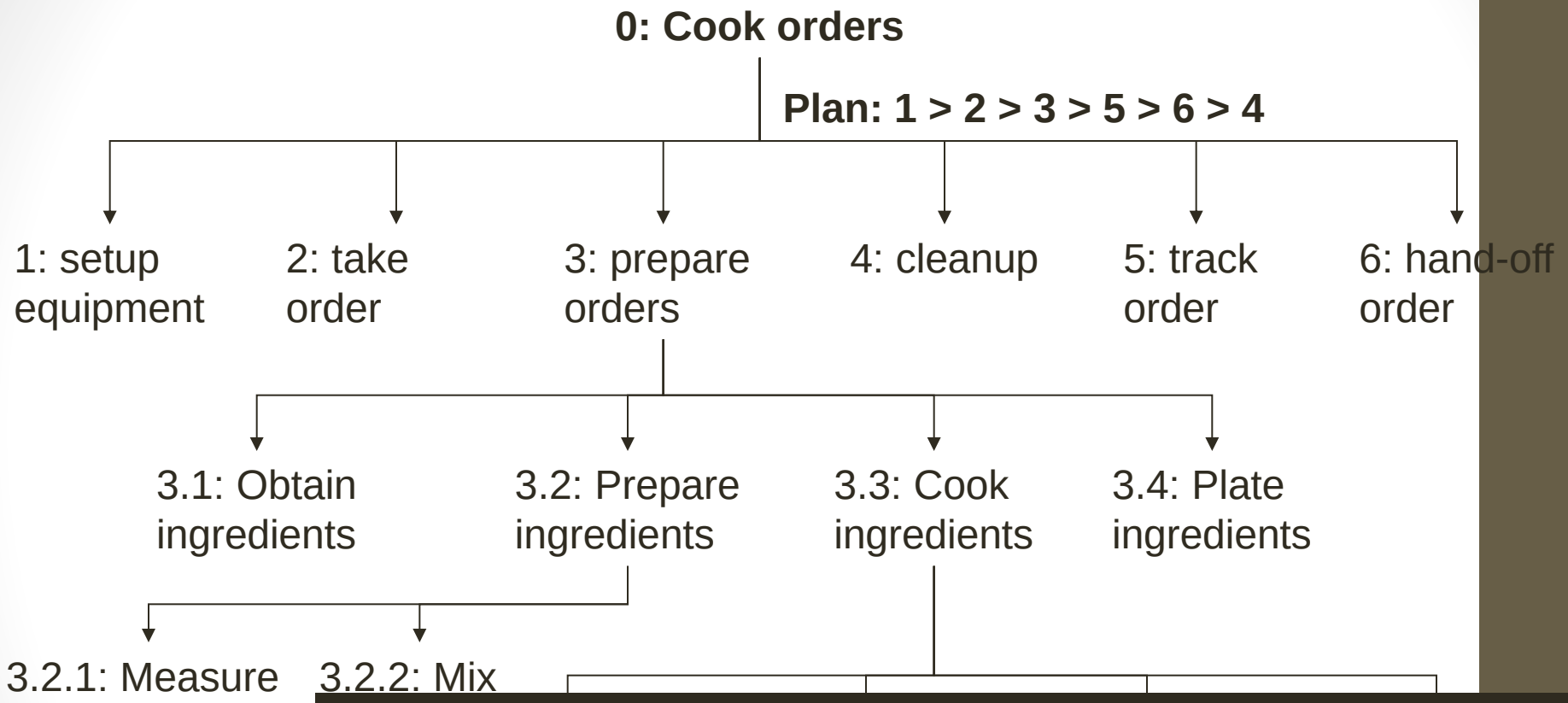


RULES

1. **Top to bottom hierarchically organized**
2. **Top level goal and sub-goals are numbered (2, 2.1, 2.2, etc)**
3. **Plan that specifies order**

In Summary

Functional analysis and **task analysis** are organized way to think about functions

I encourage you to conduct

- A functional flow diagram,
- A decision-action diagram, and/or
- A hierarchical task analysis

as you prototype.

Reading Assignment

- ID Chapters 6, 7 and 10
- UYU Chapters 7, 9, 10

Recall: What is Evaluation?

Evaluation, in general…

- Gather data about the usability of a design for a particular activity by a specified group of users

- Goals
  - Assess extent of system's functionality
  - Assess effect of interface on user
  - Identify specific problems with system

Evaluation Methods

Pre- & Post-prototype

- ✓Surveys: questionnaires
- ✓Surveys: interviews
- ✓Surveys: focus groups
- ✓Functional allocation & analysis
- ✓Task Analysis

Post-prototype

- ❑**Personas**
- ❑**Cognitive walkthrough**
- ❑**Card Sorting**
- Heuristic evaluation
- Field/ ethnographic
- User testing

Personas & Cognitive Walkthrough

Cognitive Walkthrough

- Who are the evaluators?
  - The HCI evaluators (more than one is better)
- Assess usability through simulation of way users explore with interactive system
  - “Thought Experiment”
- Try to predict what user will do
- Great for the early stages of development

What do You Need for a Cognitive Walkthrough?

1. An indication of who the users are (personas)
2. Fairly detailed prototype of the system.
3. A complete, written list of the actions needed to complete tasks with the given prototype

Sasha

ASTUTE, CONFIDENT, SAVVY, KNOWLEDGEABLE

SMART SHOPPER

GOAL Shopping smart to get more for her money

> I don't have stacks of money so I need to make the most of what I have.

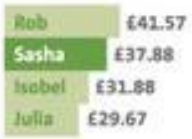
FRUSTRATION Struggling to believe she's found the best price

> I often spend too long looking for the best price on something. I'm never satisfied that I've got the cheapest price.

SATISFACTION Getting one up on retailers

> I enjoy saving so much it's starting to feel like a game. I love beating the system.

PERCENTAGE OF CUSTOMER BASE



WEEKLY ONLINE SPEND

ANNUAL HOUSEHOLD INCOME

Sasha is 34, married and has a two year old child. She currently works as a part-time office manager and lives in the suburbs of Bristol.

HER FAVOURITE BRANDS

Isobel

MATERIALISTIC, GENEROUS, SPONTANEOUS, IMPULSIVE

IMPULSE SHOPPER

GOAL Getting a good deal on everything

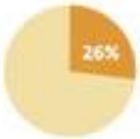
> I really like shopping and bargain hunting. I'm guilty of buying things I don't need because they're cheap.

FRUSTRATION Deal blindness

> I like shopping in-store to find a bargain. I often get lost working out the best deals online.

SATISFACTION The thrill of a bargain

> I love shopping, even if it's not for me. I've got two cupboards full of gifts to give.



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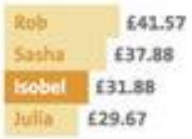


WEEKLY ONLINE SPEND

ANNUAL HOUSEHOLD INCOME

Isobel is 30 and lives with her partner and 5 month old child in the suburbs of Newcastle. She works as a shop assistant.

HER FAVOURITE BRANDS

https://www.lightpetal.com/vouchercodes-persona-decals-and-cards/

Cognitive Walkthrough:

Julia

RESERVED, CAUTIOUS, PLANNED, WARY

CAREFULLY CONSIDERED SHOPPER

GOAL Being careful with the monthly budget

> It's my responsibility to make sure everyone in my family has what they need and our money stretches.

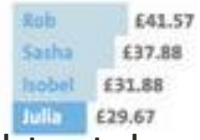
FRUSTRATION A lack of trust in voucher and deal sites

> I don't really trust deal sites. I worry that the quality of what I buy will be compromised.

SATISFACTION Having money left over at the end of the month

> When I have money left over from the monthly budget I love putting some away for savings and gifts.

PERCENTAGE OF CUSTOMER BASE



WEEKLY ONLINE SPEND

ANNUAL HOUSEHOLD INCOME

Julia is 47. She's married with three children and lives in the suburbs of Leamington Spar, where she works as a nurse at the local maternity hospital

Rob

TIME-POOR, SAFE, IMPATIENT, HABITUAL

COMFORTABLE CLASSIC SHOPPER

GOAL Shopping quickly at trusted brands

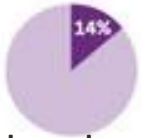
> Saving money is too much hassle. I don't have time to hunt around for deals.

FRUSTRATION Too many irrelevant offers

> I don't browse. I find what I want and buy it. No point worrying about a few quid here and there.

SATISFACTION Shopping and saving quickly - on a needs-must basis

> I bought shoes online and 10% was taken off automatically. No hunting for the discount.



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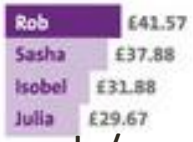

WEEKLY ONLINE SPEND

ANNUAL HOUSEHOLD INCOME

Rob is 44. He's married with two young children and lives in a large village on the outskirts of Basingstoke. He works as a primary school deputy head teacher

https://www.lightpetal.com/vouchercodes-persona-decals-and-cards/

Cog Walkthrough: Example of Persona

- ***Name*:** **Henry Wester**
- *Age*: 67
- *Location:* Indiana
- *Education*: High School
- *Job*: Family farm owner and operator
- *Crop*: Corn
- *Gross annual sales*: <$100,000
- *Equipment budget:* $120,000
- *Acreage*: 110 acres
- *Family:* Widowed, 4 adult children, 9 grandchildren
- *Tasks*: Planting corn, maintaining the fields (irrigation, fertilization), harvesting, transporting, and storing corn

Like his father before him, Henry owns and operates his corn farm. It is small acreage (compared to his competitors, and low gross annual sales. Henry is proud of his work, and is a long-time Deere customer. Henry's youngest son will take over the farm when Henry decides to retire or can no longer work. When purchasing John Deere equipment, Henry is concerned about affordability, warranty, and durability. Henry believes the simpler the machine, the more reliable it is. Henry has been saving to purchase a sprayer. He would like to trade in an old 4600 series for a new 4600 or 4700 series. However, he is not sure how much his old 4600 is worth.

Cog Walkthrough: Process

- Okay…. Now that you have personas created…
- Assign persona to evaluators
- Step through action or task sequence
  - Action 1
  - Response
  - Action 2
  - Response
  - …
- For each one, ask FOUR QUESTIONS and try to construct a usability assessment

Cognitive Walkthrough – What do You Ask?

1. **Does the user understand what subtasks are needed to reach the user's goal?**
   - E.g, does the user know how to change the display?
2. **Will the user notice that the correct action is available?**
   - E.g. is the button visible?
3. **Once found, will they know it is the right action for the desired effect?**
   - E.g. the right button is visible but the user does not understand the text and will therefore not click on it.
4. **Does the user get feedback?**
   - Will the user know that they have done the right thing after performing the action?

Example

- https://www.youtube.com/watch?v=bzvQY68lm8c

- What persona was this usability expert probably provided with?
- See if you can follow him addressing those four questions?
  - He will “thinking aloud” answers to those questions (does the user understand, notice, take right action, and get feedback?)

Why (or Why Not) Use Cognitive Walkthroughs

- Strengths?
  - No need for untrained users
  - Fast results
- Weaknesses?
  - Need a group of experts – practice makes perfect
  - Need to make assumptions about what user will do