CSCI 310
User analysis

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Reminders

- Labs start this week!

- Post your pitch for project to D2L discussion

- All course materials now on D2L

- Text for the course:

  - User Interface Design and Evaluation

    - Stone, Jarrett, Woodroffe, and Minocha

    - Elsevier, ISBN: 0-12-088436

  - So far we have covered chapters 1-4

Last class

- Data-gathering techniques

- Writing good questions

  - not leading

  - not double barrelled

  - simple/unambiguous

  - mixed typed

- What kind of info to gather

Group activity

- Gather requirements for an **Online Grocery Store and Deliver Service**

- Part 1: Data gathering techniques

  - which ones are most appropriate? why?

- Part 2: Create questions for potential users

  - at least 10 questions

Grocery Store Activity feedback

- What kinds of issues came to light?

Grocery Store Activity feedback

- What kinds of issues came to light?

  - who are our users?

  - what is the problem to be solved?

Grocery Store Activity

- Choose 2-3 data gathering techniques

  - explain why they are well suited to the problem

- Come up with at most 10 questions....

  - identify what type of question they are

  - why?

Grocery Store Activity

- Things you need to find out:

    - how do people currently shop?

    - what do they like/not like about that process?

- Need to *understand the task in detail*

What kinds of info to gather...

- Domain knowledge

- Users (primary/secondary)

  - physical characteristics

  - behavioural characteristics

- Tasks and task characteristics

- Environment

  - physical, social, organizational

- Functional needs

- Usability goals/values

- Constraints (tradeoffs)

Domain knowledge

- Gather data from domain experts

- Investigate existing competitive products/ systems

- Read documentation, training manuals

Domain knowledge example

- Grocery store activity

  - Experts:

    - shoppers

      - people use online

      - people who shop in person

  - Similar systems:

    - look at online grocery portals

    - look at conventional stores
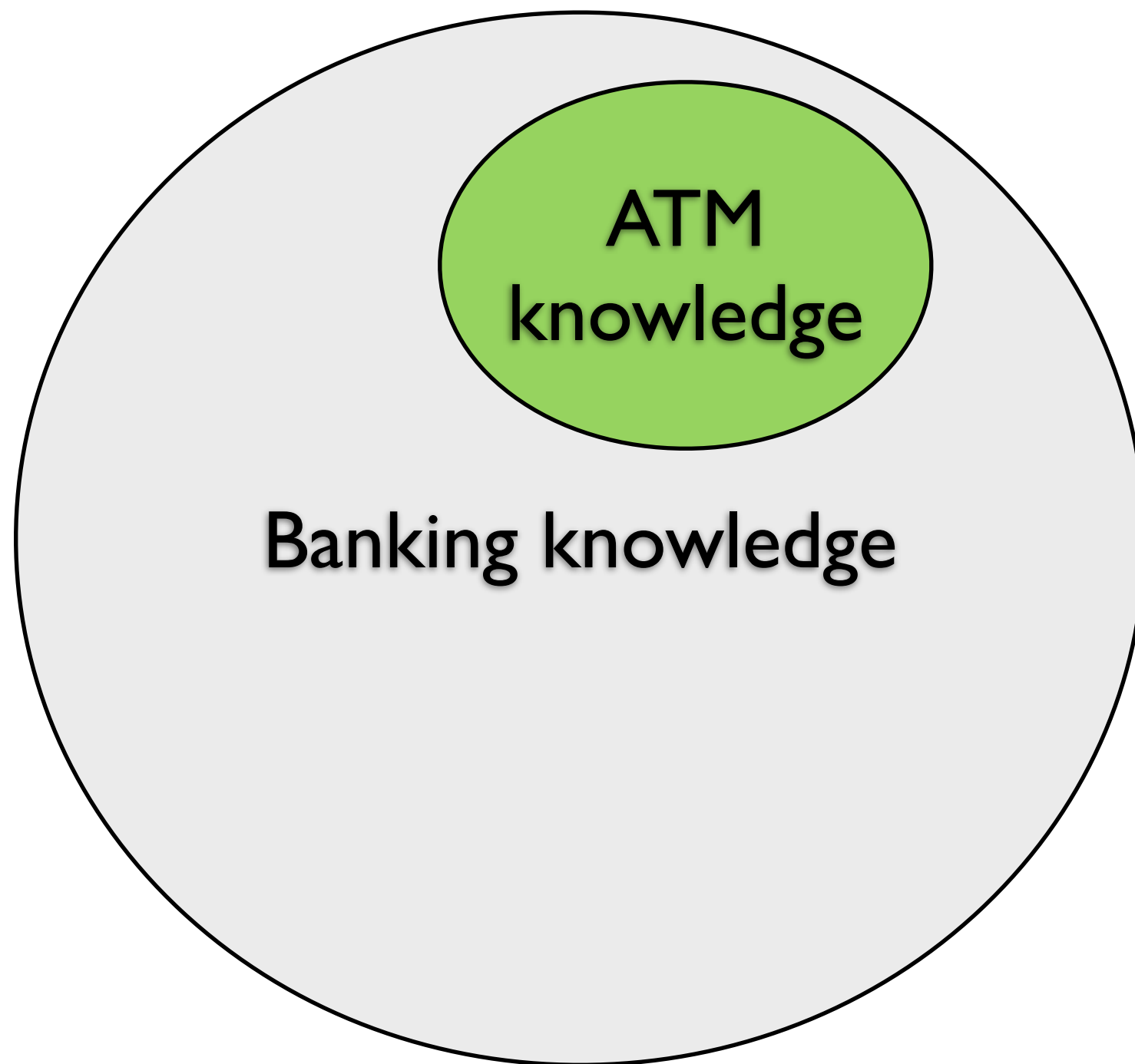
Domain analysis

- Appropriate representations of data:
  - data-flow diagrams
  - entity-relationship diagrams
  - state transition diagrams
- Important to limit your scope!

Domain analysis

ATM
knowledge
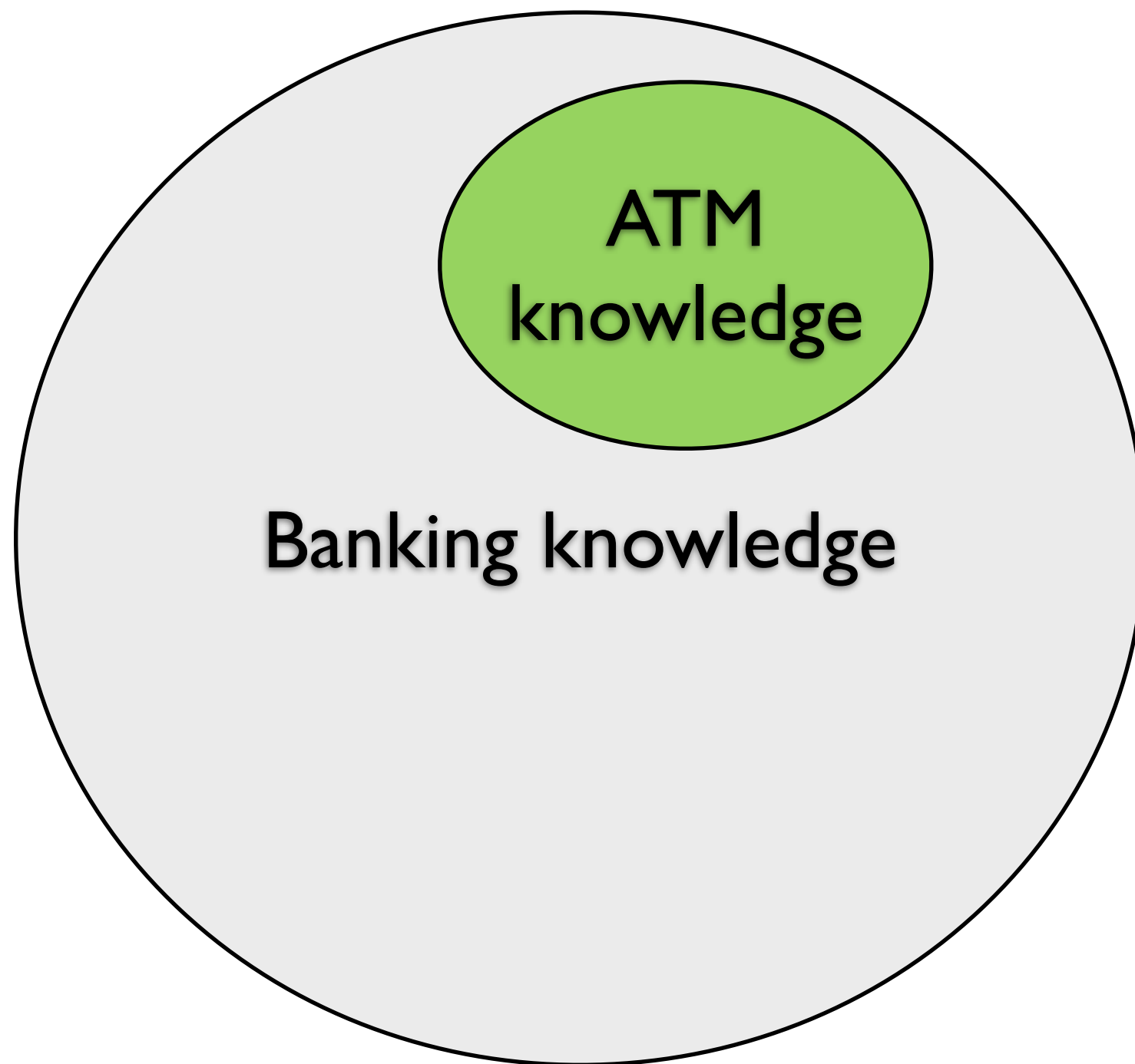
Banking knowledge

Banking knowledge
- savings & checking accounts
- mortgages
- life insurance
- loans
- business services
- investments

Domain analysis

ATM knowledge
- checking account balances
- withdrawing money
- depositing money
- ordering a statement

What kinds of info to gather...

- Domain knowledge

- Users (primary/secondary)

  - physical characteristics

  - behavioural characteristics

- Tasks and task characteristics

- Environment

  - physical, social, organizational

- Functional needs

- Usability goals/values

- Constraints (tradeoffs)

Relevant user characteristics

- Demographics:

  - age, gender, culture, income, education...

- Physical abilities/disabilities

- Computer/IT experience

- Motivation

- Attitude

Artefacts that define users

- Smaller groups are easier to define for

- Target your profiles to one group

- Defining your user:

  - user profiles

  - personals

User Characteristics to Design Requirements

- Start by broadly defining your users

- Break them into more refined sub-groups

- Translate these into UI requirements for all groups

Table 3.3 User Profile of ATM Customers (from Chapanis, 1996)

User characteristics	ATM customer characteristics
Age	Will range in age from about 12 to 80+
Sex	Both male and female
Physical limitations	May be fully able-bodied or may have some physical limitations in relation to hearing, sight, mobility, use of hands, or wheelchair use Will be of varying heights
Educational background	May have only minimal education qualifications and possess limited literacy and numeracy skills
Computer/IT use	May have little or no prior experience of computer or IT use
Motivation	May be very motivated to use the ATM, particularly if they can do their banking quickly and avoid waiting in long lines at the bank
Attitude	Attitudes to use may vary, depending on the services the ATM offers, the reliability of the technology itself, and the attitude of users toward computers

**Table 3.4** ATM User Groups (adapted from Stone, 2001)

User characteristic	ATM customer characteristics, by group		
	Teens/young adults	Young adults to middle age	Middle age to senior citizens
Age	12 to 25.	25 to 50.	50 to 80+.
Sex	Both male and female.	Both male and female.	Both male and female.
Physical limitations	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight. Will be of varying heights.	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight. Will be of varying heights.	May be fully able-bodied or may have some physical limitations in relation to, for example, hearing or sight, mobility, or use of hands. Will be of varying heights.
Educational background	May have minimal or no educational qualifications.	May have only minimal educational qualifications.	May have only minimal educational qualifications.
Computer/IT use	Probably have some prior experience of computer or IT use.	May have little or no prior experience of computer or IT use.	May have little or no prior experience of computer or IT use.
Motivation	Probably very motivated to use the ATM, especially in relation to their banking habits.	Could be very motivated to use the ATM, especially if they can do their banking quickly and avoid standing in line at the bank.	Could be very motivated to use the ATM, but would probably prefer to stand in a line in the bank.
Attitude	Attitudes to use may vary, depending on the services the ATM offers and the reliability of the technology itself.	Attitudes to use may vary, depending on the services the ATM offers and the reliability of the technology itself.	Attitudes to use may vary, depending on the services the ATM offers and the reliability of the technology itself.

Table 3.5 Translating User Characteristics into UI Design Requirements (middle age to senior citizen group)

User characteristics	ATM UI requirements
Age range from 12 to 80+	ATM screen height needs to accommodate users of varying height.
May be fully able-bodied or may have some physical limitations	ATM screen height needs to accommodate able-bodied users as well as users with walking sticks or those who use wheelchairs. Arthritis of the hands could be a problem, so any controls used should accommodate this.
May have some physical limitations in relation to hearing	All user inputs should have both visual and auditory feedback.
May have some physical limitations in relation to sight	Screen text should be of a reasonably large font, in order to be read by both the visually impaired and unimpaired.
May have some physical limitations in relation to use of hands	Touchscreens, if used, should have target areas that are large enough to locate with limited manual dexterity. Touchscreens, if used, should be sensitive enough to respond to users with decreased strength in fingers or hands.
Little or no experience of computer/IT use	The application should be easy to use (i.e., the tasks users want to undertake should be simple to perform). The application should be easy to learn (i.e., the user should be able to use the system without help, training, or instruction).

Creating user Personas

- Turn "the users" into identifiable human beings

- Create several personas

  - one for each major type of user

- Fictional users
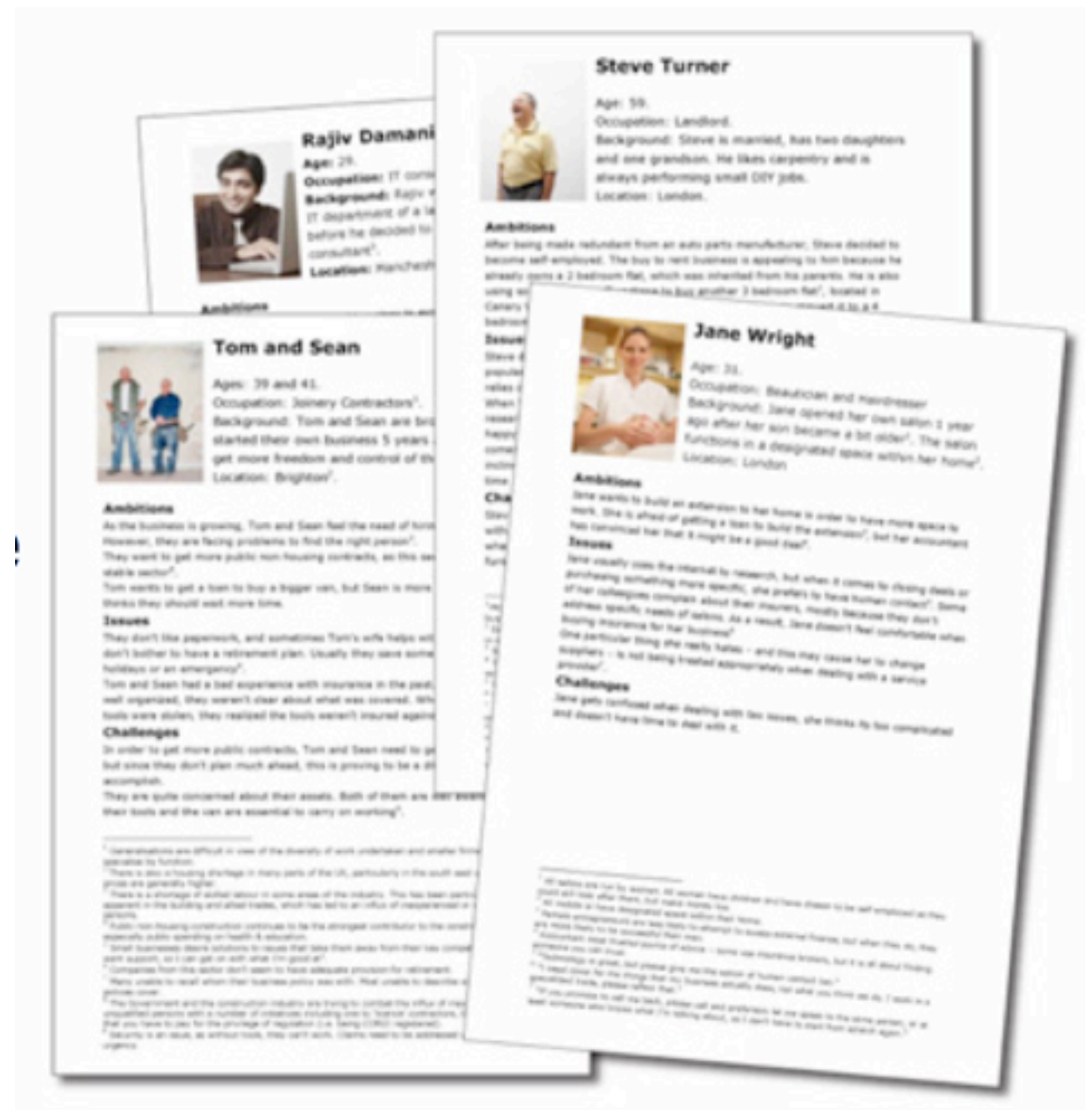
Personas

vs.

The User
*a pretend person who
will mould themselves
to fit your system*

Jessica
*a real person with real
constraints trying to get
her job done*

Persona for GoCoffee

- Johannes Zummerman
  - 34
  - Software consultant
  - Frequent traveler
  - Doesn't ask for directions
  - Limited time
- Coffee habits
  - quality of utmost importance
  - ritualistic drinker
  - not afraid to try a new place if it looks OK

Example persona-eBook Reader

- Mary is an 18yr old 1st year English major.
- limited computer experience
- regular PC user for email/facebook
- reads many novels, in bed and on transit
- likes paper-format books
- likes the idea of a eBook because many digital books are free

TAPoR

- Gateway to tools for sophisticated text analysis and retrieval:

  - http://www.tapor.ca/

Personas for TAPoR

Novice User	Intermediate User	Advanced User
Deana: Undergraduate French and Comparative Literature major	**Simon**: Associate Professor, Political Science	**Martin**: Assistant Professor, Department of English
•familiar with basics of text analysis •never used text analysis tools or create own electronics texts •Wants to learn quickly and needs step-by-step guidance •Interested in playing with a variety of tools •Works closely with her research supervisor •Would like to learn about text analysis in a non-intimidating environment	•Familiar with TACT and other basic text analysis tools, such as concordances and co-occurrences •Interested in modifying existing tools for own use, creating own tools •Familiar with XML tagging but not with programming •Cannot create DTDs independently •May work alone or closely with one colleague or Grad student •Spends large amounts of time reading and writing away from the computer •Would like to be self-sufficient, but needs guidance	•Familiar with a variety of text analysis tools, and enjoys experimenting with different tools •Has developed several text analysis tools using PHP and PERL •Familiar with DTD creation, XML tagging, and fundamentals of programming •Finds enjoyment through visualizing and conceptualizing new tools, projects •Is self-sufficient, but works collaboratively as part of a larger interdisciplinary research effort, time divided between variety of projects

more: http://www.dacko.ca/interface/intro.html

Group Activity

- Create a persona for your Online Grocery Store...

Relevant user characteristics

- Demographics:

  - age, gender, culture, income, education...

- Physical abilities/disabilities

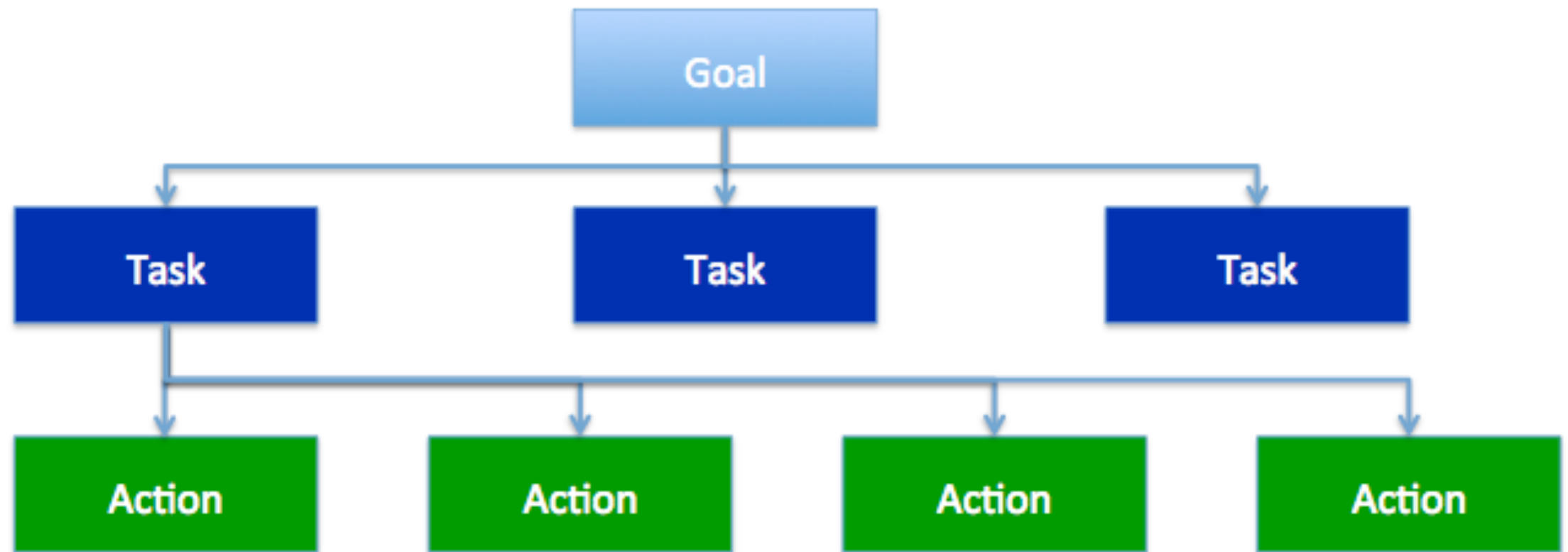- Computer/IT experience

- Motivation

- Attitude

Task Analysis

- Describes the users' tasks in a way that is useful for design

Tasks vs. Goals

- Goal:

  - an end result to be achieved

- Task:

  - a set of related activities performed in some sequence

- Actions:

  - operation or step, part of a task

Tasks, goals and actions

Some goals

- Find directions to the nearest pharmacy

- Arrange a meeting using a shared calendar application

- Choosing mp3 files to play while driving

Your job...

- To understand how a user's goals breakdown into:

  - tasks

  - actions

- Tasks have characteristics too

Important task characteristics

- Variability from one time to next

- Regularity

- Knowledge & skills required

- Physical environment

- Time critical?

- Safety hazards

- Alone vs. group?

- Other simultaneous tasks...

Techniques for task analysis

- Classes of task analysis

    - Describe actions to complete a task

    - Capture knowledge user has

    - Capture knowledge user needs to complete the task

- Examples:

    - task scenarios

    - concrete use cases

    - essential use cases

    - hierarchical task analysis

Task Scenarios

- A personal narrative story identifying a task

  - specific details

- Usually does not say anything about the system interface

- Used in requirements gathering

Restaurant guide scenario

- Christina is at the park with three friends

- They decide to go out for dinner

- Christina uses her mobile device to search for a Japanese restaurant within walking distance (1km), that will cost less than $15/person

- The system tells her that space is available

- She makes an online reservation for 6pm

Shared calendar scenario

- Joe and his colleagues all use a shared calendar tool

- Joe needs to schedule a meeting, but doesn't know when the others are available

- He enters all names and some constraints: length (2hr), approx time (Thurs/Fri this week), and where (library)

- System checks against individuals' calendars and presents Joe with a series of possible dates

- After he makes a choice, the time is reserved

- Some of Joe's colleagues want to be asked before the calendar entry is made, so the system first asks them to confirm the time before it is written in

Online Grocery Store Activity continued...

- List the tasks that people will do with the system

- Pick one of your tasks and write a task scenario, using the persona you created earlier

User Cases

- Like a scenario, except

    - Steps through a task for a given interface

    - Specific order to subtasks

    - No personalized details

    - Lists all alternate possibilities that could occur (alternate paths)

    - User more in design, than requirements gathering

Use Cases: concrete

User action	System response
User inserts credit card into the slot.	System requests PIN.
User types in 4-digit PIN number using the keypad.	System verifies user's identity. System requests foreign currency required, to be selected using menu keys.
User presses the key corresponding to the required currency.	System displays the exchange rate. System requests the user to enter the amount of foreign currency required using the keypad. The unit of currency is also displayed, as the system only deals with banknotes.
User enters amount required using the keypad.	System returns the credit card via the slot. System dispenses the currency via the currency delivery slot. System delivers a printout of the transaction via the receipt slot.

Figure 4.3 Concrete use case for obtaining foreign currency.

Use Cases: Essential

Get foreign currency	
User's purpose	System responsibility
Identify self.	Validate user's identity. Display currencies available.
Select currency required.	Display exchange rate.
Enter amount of foreign currency required.	Calculate amount multiplied by exchange rate.
Confirm amount.	Request initiation of payment. Obtain authorization for amount. Give money.
Take money and go.	

Figure 4.4 Essential use case for currency conversion ATM.

Shared calendar use case

1. The user chooses the option to arrange a meeting

2. The system prompts user for attendees

3. The user types in a list of names

4. The system checks that the list is valid

5. The system prompts the user for constraints

6. The user types in meeting constraints

7. The system searches the calendars for a date that satisfies the constraints

8. The system displays a list of potential dates

9. The user chooses one of the dates

10. The system writes the meeting into the calendar

11. The system emails all the meeting participants informing them of the appointment

Alternate paths for shared calendar use case

4. If the list of people is invalid

    1. System displays an error message

    2. System returns to step 2

8. If no potential dates are found

    1. The system displays a suitable message

    2. The system returns to step 5

Scenarios vs. Use Cases

- Scenarios are helpful for:

    - requirements gathering, design and evaluation

    - avoiding making assumptions about how interface will operate/order of answers

    - evaluate whether the interface will work for a particular user in a particular instance

- Use cases are helpful for:

    - requirements gathering, design and evaluation

    - evaluating whether a design will work for all possible cases

Hierarchical Task Analysis (HTA)

- Break a task into smaller and smaller subtasks

  - until you reach the smallest unit of work
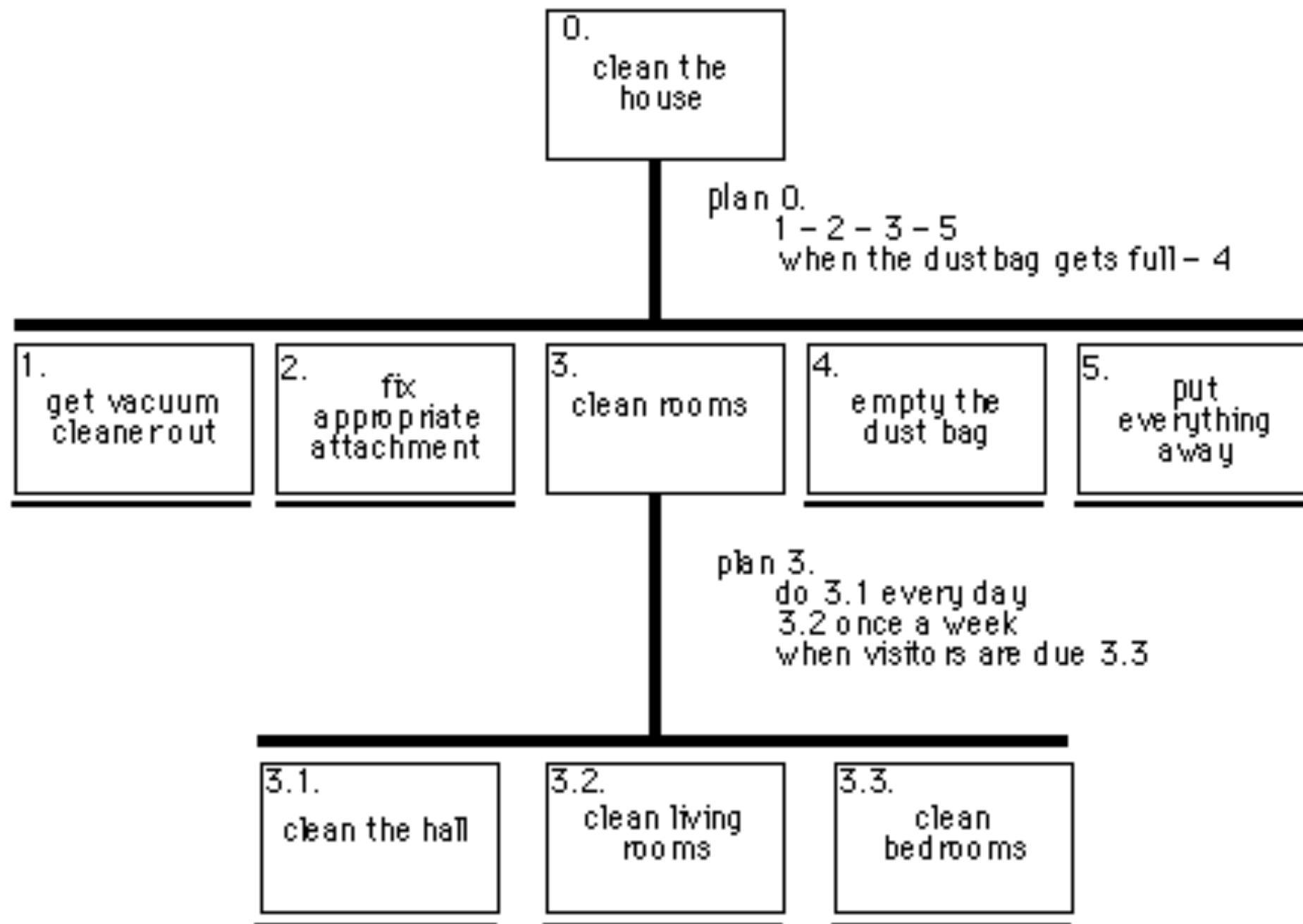
- Helps to understand a task better

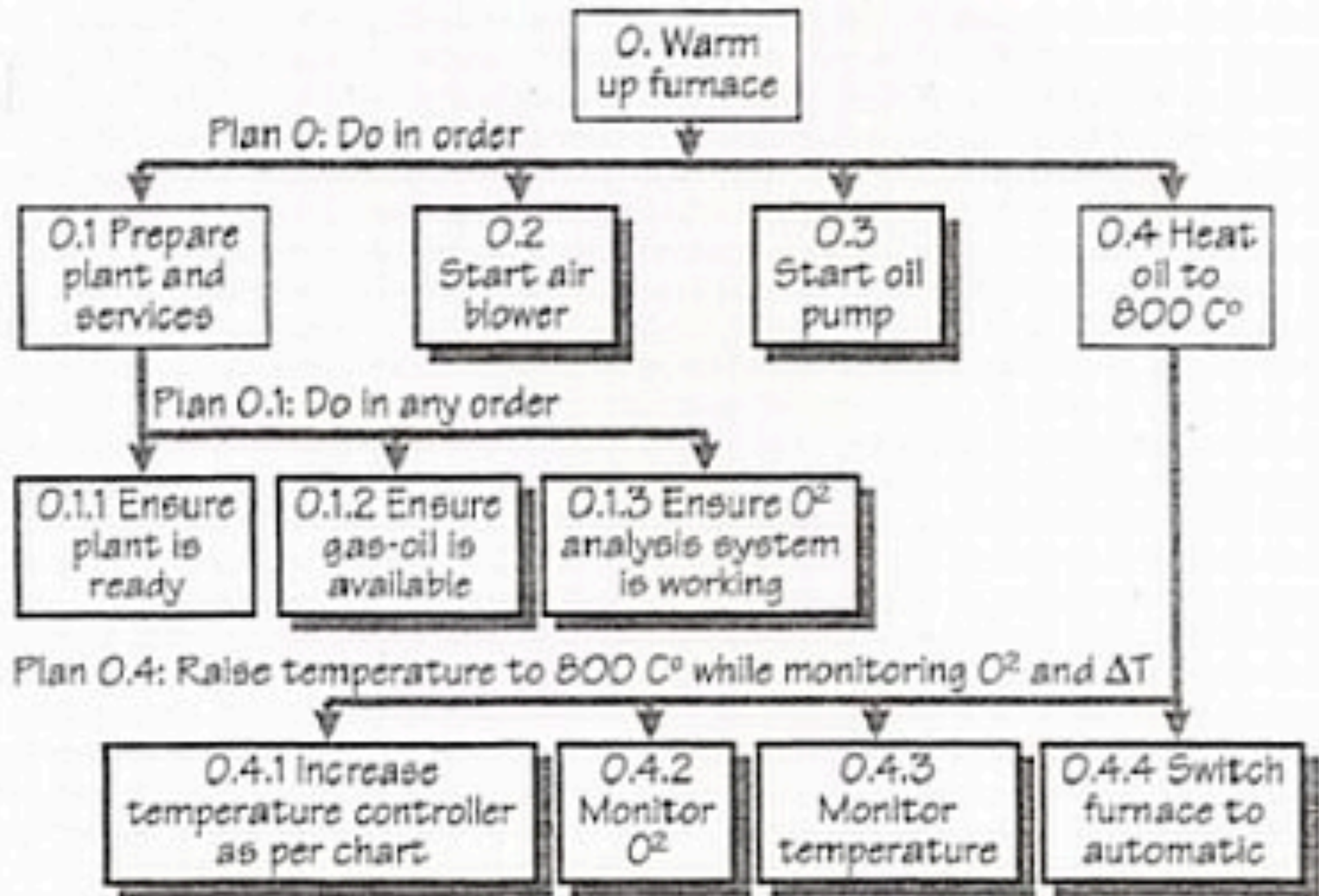**Figure Ex15.3.1 – HTA diagram for vacuum cleaning a house**

http://www.hcibook.com/e3/exercises/ch15

Exercise

- Describe the steps needed to make a cup of tea:

  -

Make a cup of tea...

http://alandix.com/academic/papers/HCI-intro-94/

http://en.wikipedia.org/wiki/File:Hierarchical_Task_Analysis.jpg

Online Grocery Store Activity: Part II

- Do a hierarchical task analysis for one of your scenarios

Leveraging scenarios, use cases, and HTAs

- To describe requirements:

  - force us to think through all details and consider all outcomes

    - may imply usability requirements that we didn't think of

- Early design

  - use cases consider order of steps and assignment of responsibilities without interface details

- Evaluation

  - does the design enable the task and all possible outcomes?

Take-away points

- Concrete representations of your user

  - personas, user profiles

  - can help to define a task for a given demographic

  - provide a concrete artefact to be used in evaluation phase

- Concrete representations of a task

  - scenarios, use cases, HTA

  - allow you to define tasks in detail before designing or evaluating interface

  - provides a concrete artefact to be used in the evaluation phase

Homework

- Should have read chapters 1-4 of *User Interface Design and Evaluation*

- Read:

  - Chapter 1 of Donald Norman's *The Design of Everyday Things*

    - pdf on D2L

- Post your Project pitches on D2L Discussion