

Advanced Interaction Design

Week 2

Requirements Analysis & Starting the Design Process

Lecture overview

- ▶ Usable interfaces do not happen by chance!
- ▶ Requirements gathering techniques
 - System centric
 - user centric
- ▶ Starting the design process

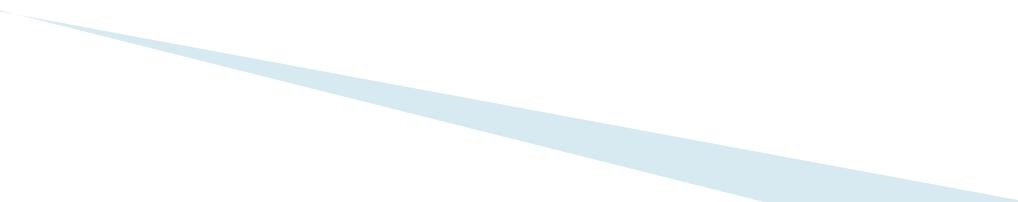
Problems with Data Gathering

- ▶ Requirements management: version control, ownership
- ▶ Communication between parties:
 - within development team
 - with user and stakeholders
 - Between stakeholders... different parts of an organisation use different terminology
- ▶ Domain specific knowledge can be distributed and implicit:
 - difficult to dig up and understand
 - knowledge articulation:
 - Availability of key people

Decision on what Tools & techniques to represent user needs

- ▶ System centric tools to represent user needs
 - Task analysis tools
 - Hierarchical task analysis
- ▶ User centric tools to represent users and user needs

System Centric



Goal and task analysis

- ▶ Goals – what people want to achieve
 - Buy new shoes
 - Undertake supported rehabilitation
- ▶ Tasks – things they do to achieve them
 - An intermediate process necessary to accomplish the goal
 - Go to shops or online to get shoes
- ▶ Focus on goals not tasks?
 - Goal-directed design
 - Avoid being caught up in the way things are done now
- ▶ Need to understand tasks and goals!

Goal analysis

- ▶ What do people want to achieve?
 - Whatever we do we have goals
 - Write an email
 - Find and order a book
 - Move stock from one inventory to another
 - Products succeed when they help users achieve their goals
- What are the goals of all of the stakeholder groups?
 - Call Centre Example:
 - Customer – give me the information I want
 - Call handler: answer calls and give answers to customers, handle as many calls as possible
 - Supervisors – see how many and maximise calls answered, part of this may be to see how long each call lasted
 - Managers – make sure the throughput is as high as possible
- The above goals don't always match!

Task Analysis

- ▶ Need to analyse peoples jobs/objectives
- ▶ One way of doing this is to undertake a task analysis

Task analysis

- ▶ Methods of analysing people:
 - What people want to do
 - What they actually do
 - In what order
 - What things/people they work with
 - What they must know
 - What they like/dislike about the way they do things now
 - Need to understand characteristics to inform design...

Example



- ▶ Programmer
 - Task of programmer to build a system that enables a customer to update their bank online that they are going abroad on holiday
- ▶ User
 - Goal : to let the bank know quickly and easily that they are going abroad and to which country(ies) in order to use their bank\credit cards
- ▶ Problem
 - What if the system only allows the customer to input one country for a particular day?
 - ▶ Mismatch:programmer has programmed the system to only allow one country per day, but user is actually going to more than one country during one day!

Uses of goal & task analysis

- ▶ Requirements capture and systems design
 - Examining an existing task for automation
 - Examining a proposed task for automation/updating
 - What elements of the task are critical to specification?
- ▶ Detailed interface design
 - How the task should be supported at the user interface

HTA Example

0. in order to clean the house
 1. get the vacuum cleaner out
 2. get the appropriate attachment
 3. clean the rooms
 - 3.1. clean the hall
 - 3.2. clean the living rooms
 - 3.3. clean the bedrooms
 4. empty the dust bag
 5. put vacuum cleaner and attachments away

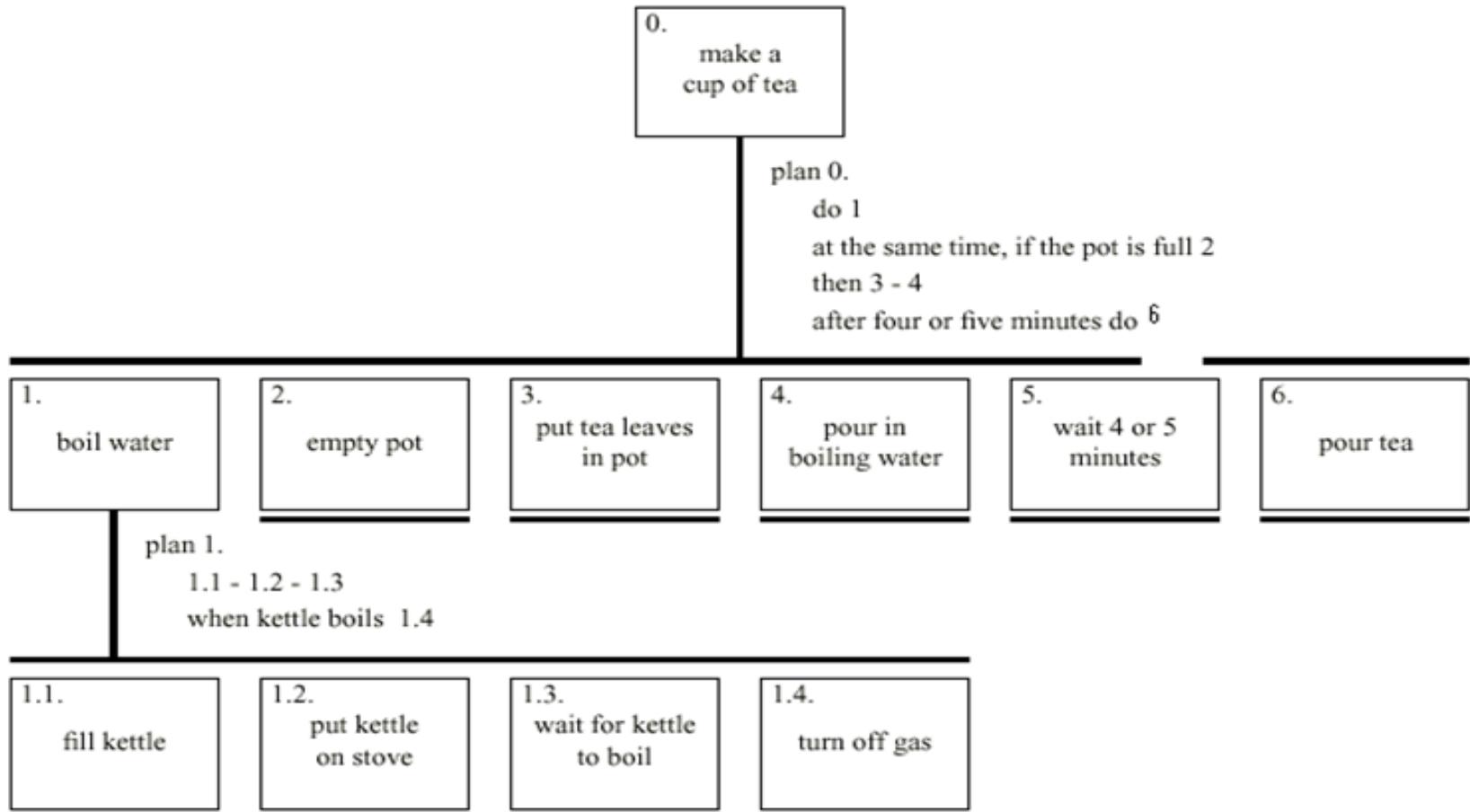
Textual
description

... and plans

Plan 0: do 1 - 2 - 3 - 5 in that order. when the dust bag gets full do 4

Plan 3: do any of 3.1, 3.2 or 3.3 in any order depending
on which rooms need cleaning

Diagrammatic HTA



Cognitive task analysis

- ▶ Some tasks are hard to break down beyond high level
- ▶ Decision tasks, e.g.
 - Choose which holiday to buy
 - Users ask themselves a range of questions
 - How much is it? How hot is it? What language? Sea view?
 - Emphasis on importance of question varies from person to person and time to time
- ▶ Most information based systems
 - Need to identify users questions to know what information to provide to answer them



Use cases

- ▶ Detailed look at user-computer interaction
- ▶ Use case associated with user goal
- ▶ Describes normal course of events (expected interaction)
 - Assume interaction with the system

Elements of a Use Case

- ▶ Actor – anyone or anything that performs a behavior (who is using the system)
- ▶ Stakeholder – someone or something with vested interests in the behavior of the system under discussion (SUD)
- ▶ Primary Actor – stakeholder who initiates an interaction with the system to achieve a goal
- ▶ Preconditions – what must be true or happen before and after the use case runs.
- ▶ Triggers – this is the event that causes the use case to be initiated.
- ▶ Main success scenarios [Basic Flow] – use case in which nothing goes wrong.
- ▶ Alternative paths [Alternative Flow] – these paths are a variation on the main theme. These exceptions are what happen when things go wrong at the system level.

Use Case Name: Place Order

- ▶ Actors: Registered Shopper (Has an existing account, with billing and delivery information)
- ▶ Non-registered Shopper (Does not have an existing account)
- ▶ Triggers: The user indicates that she wants to purchase items that she has selected on the system.
- ▶ Preconditions: User has selected the items they wish to purchase.
- ▶ Post-conditions:
 - The order will be placed in the system.
 - The user will have a tracking ID for the order.
 - The user will know the estimated delivery date for the order.

Normal Flow:

1. The user will indicate that she wants to order the items that have been selected.
2. The system will present the bill and delivery information (that the user previously stored).
3. The user will confirm that the existing billing and shipping information should be used for this order.
4. The system will present the amount that the order costs, including delivery charges.
5. The user will confirm that the order information is accurate.
6. The user will confirm that the order should be placed
7. The system will indicate to the user that the user has been charged for the order.
8. The system will provide the user with a tracking ID for the order.
9. The system will present the estimated delivery date to the user.
10. The user will exit the system.

Alternate Flows:

1A1: The user does not have an account.

1. The user indicates they need to register for an account
2. The user registers and when this is confirmed the use case continues.

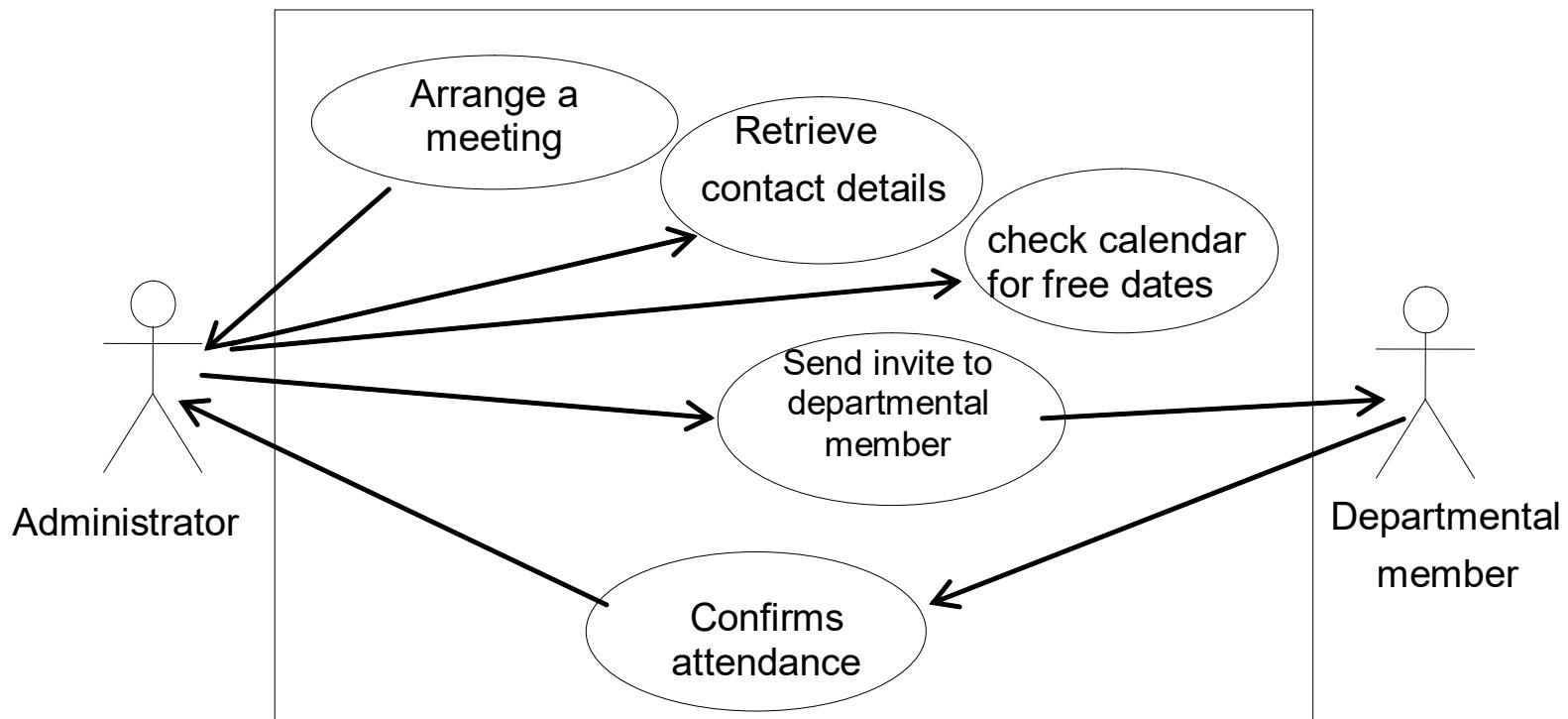
3A1: The user desires to use an alternative credit card or delivery address that differs from the information stored in her account.

1. The user will indicate that this order should use alternative delivery or credit card information.
2. The user will enter new credit card or delivery information for this order.
3. The system will validate the credit card or delivery information.
4. The use case continues

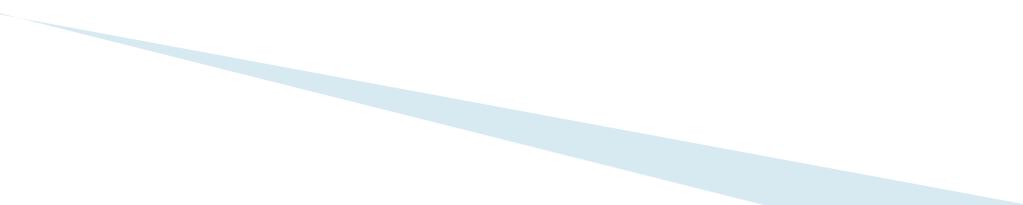
10A1: The user will determine that the order is not acceptable (due to dissatisfaction with the estimated delivery date) and wants to cancel the order.

1. The user will request that the order be cancelled.
2. The system will confirm that the order has been cancelled.
3. The use case ends.

Example use case diagram for shared calendar



User Centric



Questionnaires

- ▶ A series of questions designed to elicit specific information
- ▶ Questions may require different kinds of answers:
 - simple YES/NO;
 - Open ended comment
 - Scales
 - Often used in conjunction with other techniques
 - Can provide quantitative or qualitative data
 - Good for answering specific questions from a large, dispersed group of people
 - Poor for depth of understand

Interviews

- Forum for talking to people
- Structured, unstructured or semi-structured
- Props: sample scenarios of use, personas, basic prototypes, storyboards
- Good for exploring issues
- But can be time consuming and may be infeasible to visit everyone

Naturalistic observation

- Spend time with stakeholders in their day-to-day tasks, observing work as it happens
- Gain insights into stakeholders' tasks
- Good for understanding the nature and context of the tasks
- But, it requires time and commitment from a member of the design team, and it can result in a huge amount of data
- Ethnography is one form

Studying Previous research literature & Similar Devices/tools

- Previous research is a good source of data about what others have done which is similar to what you want to achieve e.g. the steps involved, the activities, design, development and evaluation/testing.
- Good for getting background information
- Must insure that you only use good sources e.g. peer reviewed prestigious conferences and journals (ACM SIGCHI, TOCHI, ACM Mobile HCI etc)
- Study existing tools and how they function

Participatory design

- ▶ Believes end users are key stakeholders in the design process
- ▶ Original concepts emerged from Scandinavia
- ▶ During the design and development process you work iteratively as the developer with the end users

Participatory Design Example during requirements gathering

- ▶ Must design a rehabilitation system for recovery from injurious “falls” that is easy to use for the following end user:
- ▶ User
 - >65 years old, average age 75
 - Must have fallen at least once in the past 12 months
- ▶ Duration of rehabilitation: 12 weeks
- ▶ Current rehabilitation tool: booklet (non-standardised)

Participatory Design Workshop

Phase	Rationale
Discussions of Past Experiences	To acquire a range of personal opinions regarding the use of booklets and videos for rehabilitation.
Scenarios & Personas	To acquire user opinions on the factors affecting adherence to exercise – using user journeys and personas with currently used exercise materials.
Interactive Hands-on discussion Session on design concepts	End users interact with some basic prototype concepts which are intentionally high level e.g. paper prototypes, storyboards, interface only (no functionality)
Letting the User Do Design Sketches	To encourage the participants to design and discuss rehabilitation of new tools based on the falls programme exercises and the sketches in the interactive session

Personas

- ▶ A rich picture of an imaginary person who represents your core user group (Dix et al, p201)
- ▶ Based on actual studies of users, observation, interviews etc.

“User models, or personas, are fictional, detailed archetypical characters that represent distinct groupings of behaviours, goals and motivations observed and identified during the research phase.” Calde, Goodwin & Reimann (2002)

Personas

- ▶ May have several personas to represent key stakeholder users
- ▶ Used to focus design on user needs
- ▶ Stops getting fixated on ‘general’ user

Persona examples for Rehab System

Persona	Key Characteristics
<p>Persona 1: Jack Bishop Rehab need: Knee</p> 	<p>68 years old. Retired high school coach. Has had knee replaced Hasnt been able to get out much Lacks confidence.</p>
<p>Persona 2: Agnes Newman Rehab need: falls</p> 	<p>82 years old. Retired office worker. Has fallen three times. Suffered a hip fracture. Has a high fear of falling.</p>

- Goals
 - Personal
 - Agnes: not fall again, improve walking so that she can go to the shops
 - Jack: play with grandchildren, get his knee moving again
 - NHS
 - Preventing Agnes falling means less costs (falls = £2 billion a year cost)
 - Prevent other knee needing surgery (cost saving as operation is not needed)
 - Practical
 - Understand rehabilitation exercises, be able to follow the on screen exercises and exercise along with them, check progress

Task descriptions – scenarios

- ▶ **Scenario = story of a typical use**
 - **Problems Scenarios:** used to identify the problem domain.
 - e.g. Employee needs sales data.
 - **Activity Scenarios:** explore the user and their task more directly.
 - e.g. employee actually demonstrates how they undertake searches for sales data.
 - **Information Scenarios:** help transform the activity scenarios into scenarios that help design the HCI.
 - e.g. the employee asks for dates, companies and prices for Nov sales
 - **Interaction Scenarios:** describe the actual interaction with the interface.
 - e.g. employee selects search criteria from database and chooses dates, companies and prices for Nov. They hit ‘Search’ and the database returns the sales values for that month in a format suitable for direct entry into the paper ledger.

Scenario Example

“The user types in all the names of the meeting participants together with some constraints such as the length of the meeting, roughly when the meeting needs to take place, and possibly where it needs to take place. The system then checks against the individuals’ calendars and the central departmental calendar and presents the user with a series of dates on which everyone is free all at the same time. Then the meeting could be confirmed and written into people’s calendars. Some people, though, will want to be asked before the calendar entry is made. Perhaps the system could email them automatically and ask that it be confirmed before it is written in.”

STORYBOARDING: DESIGN PROCESS

What the storyboard design process achieves:

- *provides framework for usable interface*
- *breaks down complex projects into tangible tasks*

PLANNING AND STORYBOARDING: DESIGN PROCESS

▶ Information

What is the product?

Define product, audience

Plan project, organize content

mind maps

sketches

thumbnails

notes

scenarios, use cases ..

▶ Interaction

How will it work?

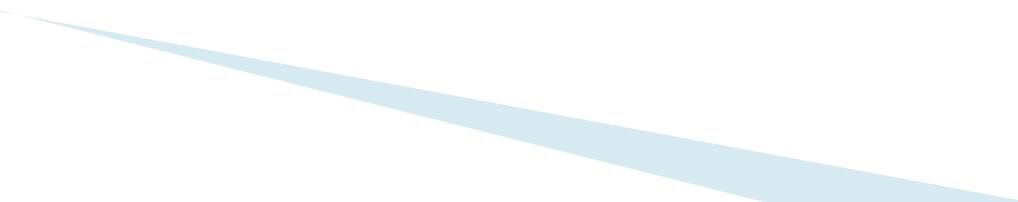
Design navigation, types of interaction,navigation chart
controls.

▶ Presentation

How should it look?

Define style, layout of elements storyboards

DESIGNING THE STORYBOARD



THE STORYBOARD

- *Visual framework for usable interface*
- *Guide for designer*
- *Communication tool*

STORYBOARD EXAMPLES



**EXAMPLE : HILLWALKER'S
KIOSK**



Please enter your user name and password

User Name

Password

[New user? Click here!](#)

Login Screen

Screen graded up from white, user can enter username and password, or new user can create a new username and password. Buttons are in a transparent style throughout.



Logged In

New User Registration Form

Please fill out all the fields below

First Name

Last Name

Address

Post Code

Telephone

Mobile

E-mail

I accept the terms and conditions

[Clear](#) [Submit](#)

New User Screen

Screen allows user to enter information that will be stored by the system for future reference. Once these details have been completed the user will be prompted to enter a username and password.



Login Screen
Screen fades up from white, user can enter username and password, or new users can create a new username and password. Buttons are in a transparent gel like format.

Logged In



New User Registration Form

Please fill out all the fields below

First Name

Last Name

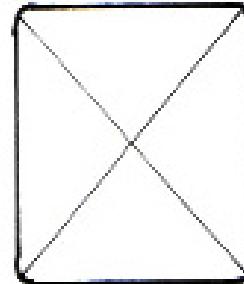
Address

Post Code

Telephone

Mobile

E-mail



New User Screen

Screen allows user to enter information that will be stored by the system for future reference. Once these fields have been completed the user will be prompted to enter a username and password.

You are now logged in as

click to go back

Continue



Login Confirmation Screen

This will show the user their username and inform them that they are logged into the system. It also allows the user to go back and change their details.

Logged In

Please select a category

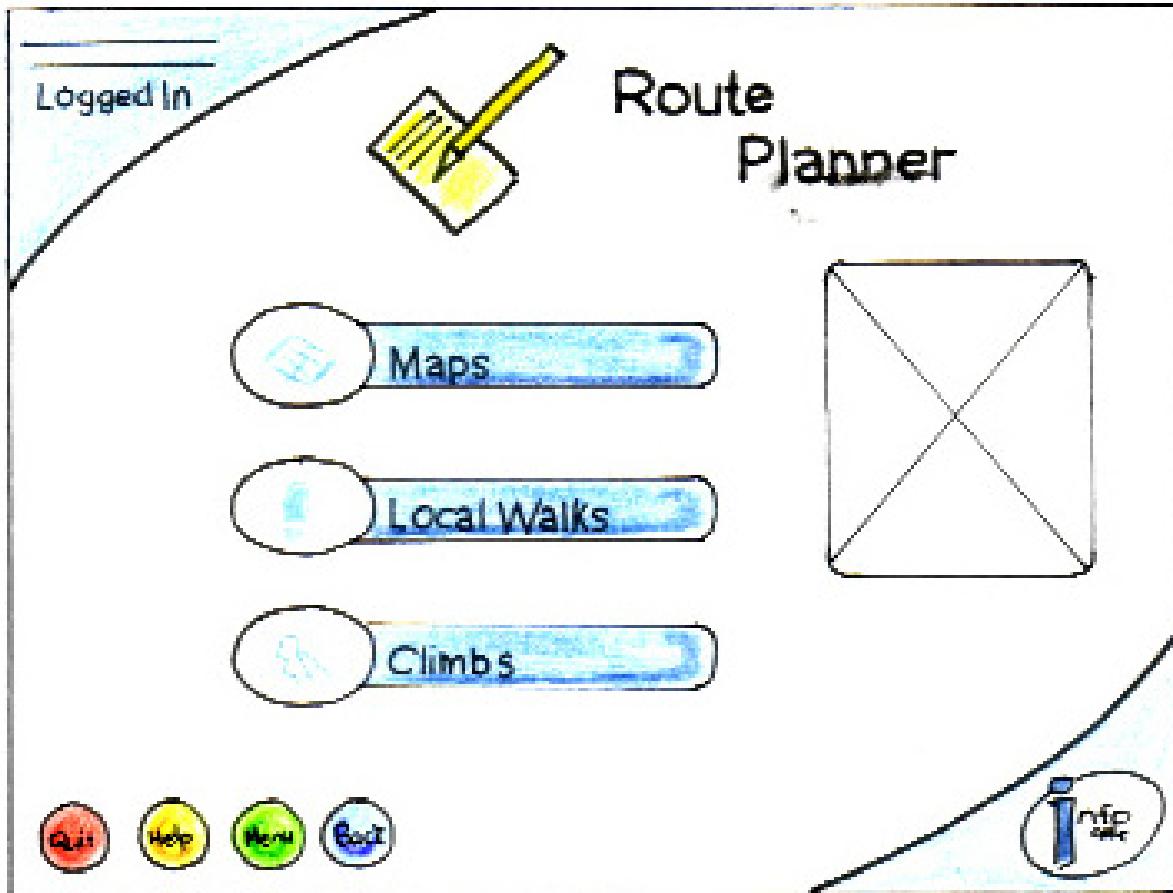
-  Route Planner
-  Weather Watch
-  Safety First
-  Local Information
-  Facility Finder



Main Menu Screen

This lists all the destinations the user can navigate too. Also available are the "Quit, Help, Menu, Back" buttons. On rollover all buttons make an audible click and the illustrated parts of the buttons become embossed.



Route Planner Screen

Allows further options to be made, image changes and is appropriate to content highlighted in subsection, i.e. maps - illustration of a map, Local walks - illustration of walking boots, and so on...

Are you sure
you wish to Exit

If you choose to exit you will be automatically
logged out and all unsaved information will be lost

Exit

Back

Save & proceed to check out

Exit Screen

Informs the user of the consequences of logging out at this stage of the process. Buttons are given allowing the user to continue to "exit," go back to the previous screen, or to jump to the checkout screen.

You are now loged out

Thank you for using



Logout Screen

Static screen informs user they have been successfully logged out of the system. After a second the screen returns to the static welcome screen.

Choosing between techniques

- ▶ Data gathering techniques differ in two ways:
 - 1. Amount of time, level of detail and risk associated with the findings
 - 2. Depth of Knowledge you require
- ▶ The choice of technique is also affected by the kind of task(s) to be studied:
 - Sequential steps or overlapping series of subtasks?
 - High or low, complex or simple information?
 - Task for a layman or a skilled practitioner?

Problems with Data Gathering

- ▶ Requirements management: version control, ownership
- ▶ Communication between parties:
 - within development team
 - with stakeholders/user?
 - Without user/stakeholders?
 - between users... different parts of an organisation use different terminology
- ▶ Domain knowledge distributed and implicit:
 - difficult to dig up and understand
 - knowledge articulation:
 - Availability of key people

Coursework

- ▶ Identify the stakeholders for your project
- ▶ Identify their main goals
- ▶ Identify main constraints
- ▶ Decide how you are going to analyse your task(s)
- ▶ What are the main characteristics of your system
 - Do other similar systems exist already?
 - Will it be useful to look at how they work?
- ▶ What techniques from the ones presented here will your group use to find out what the users goals, tasks, procedures etc are?
- ▶ Create some personas and scenarios

Sign Up sheet for Coursework A

- ▶ Is on Canvas!
- ▶ Max 3 in a group
- ▶ For your coursework I have selected some system centric and user centric techniques for you to use

Text Book Quiz Week 3

- ▶ The quiz will be available:
 - from Tuesday 25th Jan 16:00
 - until Wednesday 26th January 16:00.
- ▶ You will have one attempt and the quiz must be completed within 1 hour.
- ▶ You will receive your grade automatically upon submission,
- ▶ The quiz material will be reviewed during the Friday session on 4th February.