REALISING THE USER INTERFACE

Scenario: TechMob (for Questions 1 and 2)

You work for TechMob, a small development company that specialises in designing and building mobile applications…….

Q1 (Syllabus areas D, F & G)

a) With specific reference to the RemoCell application, list three types of quantitative data and three types of qualitative data you may be able to collect from user-testers.

Quantitative data includes, but is not limited to:
- measurement of time to achieve a given goal (eg change movie language to Finnish);
- count of number of navigation errors;
- closed question survey – user rating of interface features;
- attitude survey (Likert-type scales);
- count of button presses to achieve a given goal;
- count of smiles or grimaces during operation;
- measurement of response times to user actions;

1 mark each

Qualitative data includes, but is not limited to:
- open question survey;
- interviews;
- user diaries;
- expert reviews;
- focus groups;
- observation of user interaction (real-time/video)

1 mark for each

(6 marks)

b) Design a protocol for effective user testing of RemoCell. Outline your protocol in a document to be presented for discussion and approval.

0-12 marks will be awarded to the candidate according to the completeness of the answer and the degree with which the answer demonstrates an understanding of the test and evaluation process.

Marks will be awarded according to the degree to which the candidate addresses suitable coverage of the whole of testing process, including:
- evidence of understanding of user demographics;
- numbers of testers required at each stage;
- how reliability and validity of the test process will be ensured;
- the testing environment (physical/virtual space) etc;
- how the data will ‘look’ and how it can be usefully employed in an iterative design process.

Highest marks will be awarded to those candidates who meet the style, length and level requirements of the report format specified.

(12 marks)
c) At the team meeting, although your protocol was generally well received, before being approved your team leader has asked you to justify your design by reference to the literature on user testing.

0-7 marks will be awarded according to the coherence of the answers. A good answer will outline succinctly and lucidly the views on testing of two accepted user interface design experts eg Neilsen and Schneiderman.

(7 marks)
Q2 (Syllabus areas A, F & I)

a) An icon mapping can be described as either resemblance, exemplar, symbolic, or arbitrary. Specifically using the sound mute function of RemoCell as an example, define each of the four mapping types, and sketch an appropriate icon to illustrate the category.

- \textbf{resemblance} – similarity/likeness
- \textbf{exemplar} – perfect example/role model
- \textbf{symbolic} – typical, representative, meaningful
- \textbf{arbitrary} – personal and unjustified

1 mark for each + 1 mark for meaningful sketches

(5 marks)

b) Icons are often described as being “culturally and contextually specific.” Using real life examples to support your argument, explain what is meant by this statement, and why this makes icon design a non-trivial task.

Possible answer …
All icons require some form of association/exposure before they can be synonymous with the object they represent. This means that the culture and the context become paramount in the design of icons.
The use of the trash can (Mac OS) was contrary to users experiences i.e. o eject removable media by dragging the required icon to the trash can icon.
In the current global warming debates, recycling is totally different to recycling bin in a window desktop. Recycling bin in Win OSes is about deleting and not recycling!
In terms of designing a icon for a mute function, say in China for example, one would us the Chinese gong in a silent mode as the basis for the design which may not necessarily work with audiences outside of china. Along the same lines one could use a drum icon for African audience and so on.
0-7 marks will be awarded according to the coherence, lucidity and appropriate brevity of the answer.

(7 marks)

c) One target user group for this application are technologically-aware teenagers.

i) Considering this target user group, create and clearly illustrate (using well-formed sketches) a set of coherent, understandable icons for all RemoCell functions that will fit on a single screen. You will need to define the dimensions (in pixels) of each icon.

With technologically-aware teenagers, as opposed to universal audiences, the starting point is much higher in terms of the assumptions one can make regarding the use of icon-driven technology in new devices due to the familiarity with items like mobile phones, mp3 players, portable multimedia players.
0-8 marks awarded according to the coherence and clarity of the sketches. Highest marks will be awarded to candidates who demonstrate a creative and effective design approach.

(8 marks)

ii) Write a short report justifying your design choices including (if appropriate) visual style, colour, use of type, theme.

In this part candidates are required to justify what they present as a solution in the previous part. There is no single right answer but more to do with how it would work and issues on usability, etc. 0-5 marks awarded according to the clarity and appropriateness of the answer.

(5 marks)
Scenario: SeeSaw (for Question 3)

SeeSaw, a small mobile communications company is planning to build a screen-less mobile phone for the visually impaired….

Q3 (Syllabus areas E, F, G & I)

a) A sound-based interface to the device could form part of the design solution. However, sound as an interface has problems, …

Prepare a guidance note for the product design team giving possible solutions to each of these problems (one paragraph on each). Make reference to solutions for specific functionality of the device (e.g. volume setting or power on/power off).

0-3 marks per paragraph according to clarity and completeness of each guidance note. Answers addressing each of annoyance, discrimination and transience and presenting coherent and well-thought out solutions to specific functions of the device, will receive highest marks. An extra mark is available for the very best answers. Answers are not expected to include a description of each of the problems – this is included in the question itself!

(10 marks)

b) Speech synthesis is only one form of sound-based interaction. Earcons, for example, are musical tones that can be used as means to navigate menu structures.

Outline in a report to the Project Director (no more than 250 words) …

0-10 marks will be awarded according to the clarity and completeness of the answer. Highest marks will be awarded to answers that show a thoughtful and creative design process and are likely to include descriptions of the possible earcon tones. Answers that clearly exceed the word limit specified in the question will be penalised.

(10 marks)

c) The company CEO has emailed you asking for your view on whether it is possible to produce the mobile phone functionality set out above without any visual user-device interaction. …

This is a largely open-ended question that expects candidates to present a thoughtful and reasoned argument for, or indeed against, a completely non-visual device. Arguments include:

- Bandwidth of visual design v. aural design
- Navigational difficulties (eg with deep nav structures)
- Speech v earcons – personalisation/learning etc
- Other alternatives to visual design such as haptic interaction (eg vibrations)
- etc

(5 marks)
Scenario: CalCutter (for Questions 4 and 5)

A health club has approached you to develop CalCutter - an application to monitor an individual's calorie intake and consumption on a daily basis. Functionality of the application will … include:

Q4 (Syllabus areas A, B, F & H)

a) Write a brief report (no more than 200 words) to your client explaining why you intend to use a prototyping approach to the user interaction design, …

0-7 marks awarded accordingly to the clarity of the report and adherence to the word length. Over long reports will be penalised. Highest marks will be awarded to candidates who include a number of benefits that might accrue from a prototyping approach, for example:

- Cost - cheap
- Easy to build
- Continuous evaluation and user feedback
- Unlimited design refinements
- Physically demonstrate user interactions
- Ease of communicating concept and structure
- Finished product based on user feedback on look, feel and performance

(7 marks)

b) Briefly describe THREE low-fidelity prototyping techniques that can be used to capture user requirements and reactions at early stages of development.

Fidelity describes how easily prototypes can be distinguished from the final product and can be manipulated to emphasize aspects of the design. Suitable low-fi techniques include:

- Rough sketch of your interface design. E.g. Dialogs, Menus, Main Screen
- Sketch storyboards to show overall design concept and structure to communicate the functionality of the application. E.g. From user's input (personal information and consumption) to the app’s output (exercise duration)
- Use post-its and overlays to simulate critical interactions. E.g. The application’s navigational structure.
- The way in which these prototypes could be used:
  - Ask the user to perform a task
  - Manipulate prototype to reflect actions
  - Ask the user to think aloud
  - Identify trouble points with the interface
  - Write down each usability issue

0-2 marks for each, according to clarity of description

(6 marks)

c) Following the low fidelity prototyping, several further prototypes will be required.

i) Provide your client with an outline plan (in the form of a diagram) of the type, number and sequence of distinct prototypes you envisage using to develop the user interface.

A number of different prototypes will be required which will increase in detail and functionality. These prototypes will deal with site structure, navigation structure, concept and mood boards leading to a small scale functional prototype. The table below lists the various prototypes that could be built and their use identified in the context column.

0-5 marks according to clarity and appropriateness of diagram.
<table>
<thead>
<tr>
<th>Seq.</th>
<th>Type</th>
<th>Function</th>
<th>Technology</th>
<th>Time</th>
<th>Justification</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Site Structure</td>
<td>Chart</td>
<td>Establish the</td>
<td>1 week</td>
<td>Organising information into sections</td>
<td>User Input, Library,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>information</td>
<td></td>
<td></td>
<td>Outputs (Reports)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Navigation</td>
<td>Chart</td>
<td>Establish the</td>
<td>1 week</td>
<td>Connecting the different sections</td>
<td>Links,</td>
</tr>
<tr>
<td></td>
<td>Structure</td>
<td></td>
<td>connectivity of</td>
<td></td>
<td></td>
<td>Menus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>various sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Concept Boards</td>
<td>Visual</td>
<td>Establish the</td>
<td>2 weeks</td>
<td>To ensure that the application appeals aesthetically</td>
<td>Logos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>metaphor/ context</td>
<td></td>
<td></td>
<td>icons, inspirational</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>health images.</td>
</tr>
<tr>
<td>4</td>
<td>Interactive</td>
<td>Small-scale functional model</td>
<td>To test the usability</td>
<td>2 weeks</td>
<td>To ensure that the application meets user requirements</td>
<td>Task analysis, front to</td>
</tr>
<tr>
<td></td>
<td>Prototype</td>
<td></td>
<td></td>
<td></td>
<td>– iterate, refine</td>
<td>back-end linkage.</td>
</tr>
</tbody>
</table>

ii) Write a paragraph on EACH of the prototypes you have outlined in part i, advising your client on their function and resource requirements (time, technology, etc.), and justifying the use for each.

0-7 marks awarded according to completeness of the answer. An appropriate answer may, for example, draw on the information in the table above.

(5 marks)

(7 marks)
Q5 (Syllabus areas E, F & H)

a) A CalCutter user may wish to access the application on a variety of different platforms. Three example platforms are:

- Mobile phone (240*320 pixel screen, 16 colours, standard telephone keypad, up/down/left/right buttons)
- PDA (480*320 pixel touch screen, 4,096 colour, stylus input, 4 programmable buttons)
- Desktop PC web browser (800x600 pixel viewable area, keyboard and mouse input)

For each of these three platforms, design a home page with appropriate navigation options consistent with the functionality listed in the scenario. Present your design solutions using (for each platform) one well-formed sketch and a single paragraph justifying your design decisions (no more than 75 words).

An appropriate answer will present well-formed sketches, and three paragraphs justifying each of the designs illustrated in the sketch. Highest marks will be awarded to candidates who recognise the fundamental differences in the three platforms and design accordingly. Differences include:

- screen size
- screen orientation – landscape/portrait
- screen resolution, colours etc
- primary/secondary interaction methods/devices
- context in which the device will be used – home, on the move, in the gym etc
- primary functions of CalCutter according to device and location
- etc

0-4 marks for each sketch/justification combination. A maximum of two marks for a sketch without justification.

b) Recent initiatives of the W3C advocate a web design philosophy based on the separation of style, content and behaviour.

i) Explain what is meant by the phrase “separation of style, content and behaviour.”

0-2 marks awarded for clarity and brevity of answer. Key elements include:

- style and behaviour not forced on the user
- user can determine how the content presents
- based on using html to deliver content and other technologies to handle style and behaviours
- return to pure html content management
- etc

(2 marks)

ii) Describe the technologies that can be used to support this design philosophy.

0-3 marks awarded according to the clarity and brevity of the answer. Answers will include:

- content: xhtml, xml
- style: css (cascading style sheets)
- behaviour: Javascript
- etc

(3 marks)
iii) The desire for web accessibility is one driving force behind this design philosophy. Define web accessibility, and explain the role of the WAI in promoting it.

Possible answer (wikipedia):
Web accessibility refers to the practice of making Web pages accessible to people using a wide range of user agent software and devices, not just standard Web browsers. This is especially important for people with disabilities such as visual impairment. In order to access the Web, some users require special software or devices in addition to a standard web browser, or specially designed web browsers. Design for accessibility is a sub-category of good design for usability.
The World Wide Web Consortium (W3C)'s Web Accessibility Initiative (WAI) is an effort to improve the accessibility of the World Wide Web (WWW or Web) for people using a wide range of user agent devices, not just standard web browsers. This is especially important for people with physical disabilities which require such devices to access the Web.
The W3C was founded in 1994 to advance the Web. It is responsible for the development of uniform protocols to assure the interoperability of the Web. The WAI, part of the W3C, has developed a number of guidelines that can help to make Web sites more accessible, especially from the view of physically disabled people.

(4 marks)

iv) Aside from web accessibility, what other benefits might this design philosophy yield?

0-4 marks according to completeness of and level of understanding displayed. Answers may include:
- simplifying of html coding
- content presented differently according to platform or device capabilities – eg desktop/ mobile
- user controls presentation of content
- content may be presented according to learning style of user
- content may be presented according to cognitive style of user
- ability to provide skins for visual optionality
- etc

(4 marks)