



EXAMINATIONS — 2006

END OF YEAR

COMP311

User Interface Design

Time Allowed: 3 hours

Instructions: Answer all questions.
Total marks are 150.
Use the marks for each question as a guide to how much time you should spend on it.
No calculators are permitted.
Paper dictionaries for translating between English and a foreign language are permitted.
Electronic dictionaries are not permitted.

Question 1. General Knowledge

[25 marks]

(a) [6 marks]

One criterion for a useful predictive metric is that it can be applied to low fidelity designs. Discuss whether or not the Usability Metric Suite satisfies this criterion.

(b) [6 marks]

Alan Cooper refers to the menu design as having a “pedagogical vector”. Explain what Cooper means by this phrase, and how this relates to Microsoft’s recent technique of hiding rarely-used options in menus.

(c) [6 marks]

Compare and contrast *Virtual Reality* and *Augmented Reality*, and give an example of each.

(d) [7 marks]

Imagine you have website for your online book-retailer company *KelburnLiterati*. The homepage for your website has the title “Homepage — Welcome In”. The title is displayed in the browser’s frame (or tab) when the page is being displayed. Discuss two reasons why Jakob Nielsen would argue that the title is a poor choice, with respect to how customers would find your company’s website (either before or after their first visit to the website).

Question 2. Usage Centered Design

[30 marks]

(a)

Consider the following scenario:

Imagine that you are responsible for designing the user interface for an online community encyclopedia. The encyclopedia will have a webpage for each article, and the articles can be linked together using hyperlinks.

The community nature of the encyclopedia means that anyone who has registered their name, email address, and profession with the website will get a user account (with a user account name and password sent to the supplied email address).

This user account can be used to edit the articles (to add new information or correct existing information), create new articles, and link articles. Registered users may add text or multimedia, although the majority of additions will be text.

Registered users may also view the history of an existing article. The history of an article lists all the changes that have been made to the article since it was first created.

Registered users may also add comments to a *discussion page* that is created and associated with each article. Any comment made is appended to the existing list of comments on the page. The purpose of the discussion page is to get contributors to discuss the strengths, weaknesses, or work required for a particular article, so that the article is continually improved.

Anybody (regardless of whether or not they have a user account) can search the encyclopedia. People can search by the article name, or by a phrase that may appear in the article text.

Anybody may also read the discussion page associated with an article.

The encyclopedia will be run by a small group of administrators, who will manage the user accounts (such as removing a user account if the user has repeatedly vandalised articles), and maintain the correctness and legality of the articles by editing those that contain incorrect information or that contain copyrighted material without the copyright holder's permission. Administrators may view the history and discussion of existing or deleted articles, as when they search the search engine will also return articles that have been removed from public view.

The encyclopedia will also have a public relations team that is responsible for advertising the existence of the encyclopedia to the public, by advertising on other websites and through print media.

(i) [10 marks]

Draw the user role map and the use case map for the system described above.

(ii) [5 marks]

Identify the focal user roles and the focal use cases from those created in your answer to part (i).

(iii) [10 marks]

Select two of the focal user roles and two of the focal use cases identified in your answer to part (ii), and write their user role descriptions and their use case descriptions.

(b) [5 marks]

Describe one reason why you might create a Canonical Abstract Prototype before you created an executable prototype of the user interface in a development environment.

Question 3. Evaluation & Testing

[30 marks]

(a) [12 marks]

Three different types of metrics are *preference metrics*, *performance metrics*, and *predictive metrics*. For each of these three types of metric: provide a definition of that type, and discuss an advantage and a disadvantage in using that type to evaluate a user interface design.

(b) [6 marks]

Describe the process of a Heuristic Evaluation.

(c) [12 marks]

Discuss the validity of the following claim: "Heuristic Evaluation tells the designers how to improve the design, based on the usability problems that the evaluators find".

Question 4. Visual & Interactive Design

[20 marks]

(a) [5 marks]

With respect to the field of semiotics, identify two different types of signs in figure 1 and provide one example of each type from the figure.

The signs in the figure represent the following tasks, tools, or information (from left to right in the figure):

1. KMenu,
2. showing the desktop behind the visible windows,
3. a command prompt (also known as a terminal program),
4. the control center for configuring the desktop,
5. help,
6. your home folder,
7. the Konqueror web browser,
8. the KMail email client,
9. the KSpread spreadsheet application,
10. the Mozilla Firefox web browser, and
11. the Mozilla Thunderbird email client.

Note: Each example you provide should identify the sign you are referring to, and include a one sentence justification for why that sign is of the identified type.



Figure 1: The KDE panel that is normally in the bottom left of the KDE desktop.

(b) [15 marks]

Donald Norman popularised the terms “affordance” and “constraint” in interaction design. Define these terms, and identify examples of different types of affordances and different types of constraints in figure 2 (on the next page).

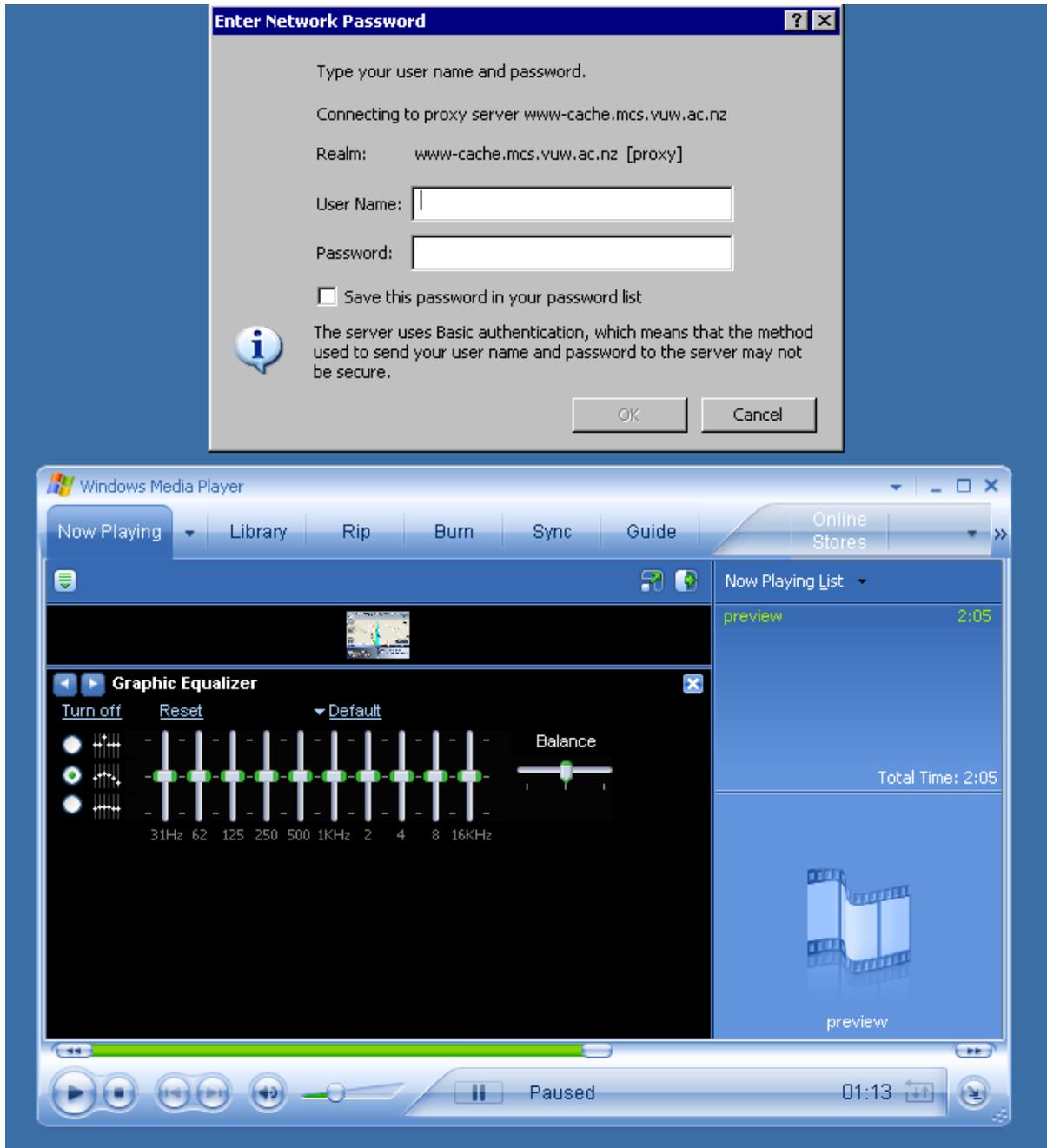


Figure 2: The Windows Media Player. The application is currently playing a video, although the video display is hidden and the tools for manipulating sound are shown instead. The application has also launched a modal dialog box requesting a username and password for accessing the Internet, and this modal dialog box is blocking any attempt to interact with the main application window in the lower half of the figure.

Question 5. World Wide Web

[25 marks]

(a) [5 marks]

Jakob Nielsen disliked the use of frames to subdivide a page in a browser window (such as can be seen in figure 3). Discuss one of Nielsen's reasons for disliking frames, with respect to how users might use the URL of a page.

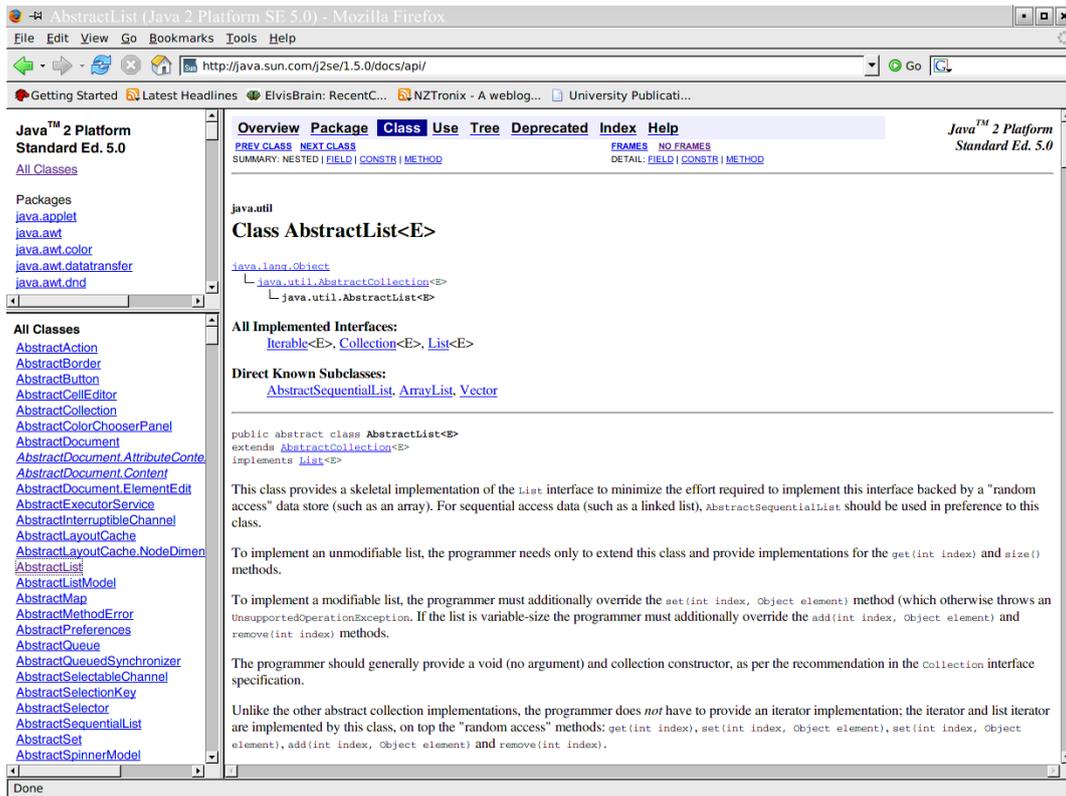


Figure 3: The Java API displayed in the Mozilla Firefox browser. There are currently three frames shown: the upper-left frame lists all the packages, the lower-left frame lists all the classes, and the right frame shows the documentation for the `AbstractList` class.

(b) [10 marks]

People increasingly access the World Wide Web through mobile devices such as mobile phones. Identify three issues regarding mobile phones that may affect how we design user interfaces for web-based applications, and discuss how these issues affect our designs.

(c) [10 marks]

A web application's user interface is typically presented to the user in the context of a client-side web browser's user interface. Using the VUW Library homepage in figure 4 (on the next page) as an example, discuss how the web browser's client-side nature, interface and functionality may influence us when designing our web application's user interface, with respect to the following three Nielsen heuristics:

- Clearly Marked Exits
- Feedback
- Short Cuts

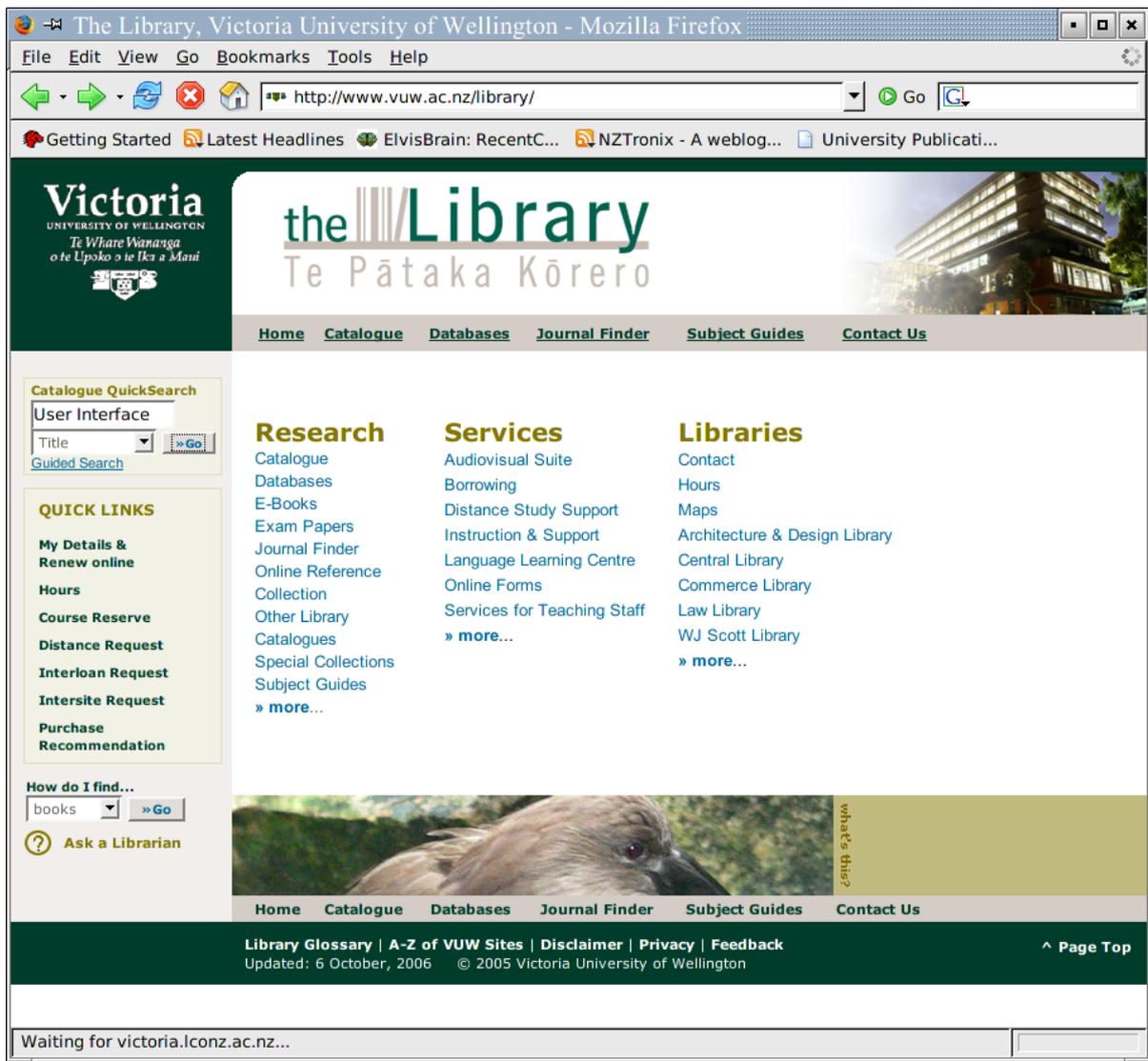


Figure 4: The VUW Library website homepage, as displayed in Mozilla Firefox. The user has entered the phrase “User Interface” into the Catalogue QuickSearch (at the top of the left-hand navigation menu), and has activated the search task. The user is now waiting for the results of their search. Firefox displays a status message in the bottom left of the browser window, and a status bar in the bottom right of the browser window. The search task will take five seconds to complete from start to end, and this screenshot is taken two seconds after the search task starts.

Question 6. Advanced Technologies

[20 marks]

(a) [4 marks]

Contrast virtual reality with ubiquitous computing.

(b) [4 marks]

Imagine a virtual world where the user is fully immersed with respect to video and audio. What other sense would ideally be added (in terms of immersion) to assist in navigating through the virtual world, and why?

(c)

Haptic interfaces are those that provide feedback through our sense of touch.

(i) [3 marks]

Identify one aspect of touching objects in a virtual world that is particularly hard to simulate.

(ii) [3 marks]

Identify a haptic interface device that is already (relatively) widely available to home computer users, and describe the device in a couple of sentences.

(d) [6 marks]

Imagine you have a computer programme for adding, moving, and removing ships from a map of the world. When a ship is created, you input the ship's nationality, the size of the ship's crew, and the ship's position on the map. You can select existing ships and either move them to a new position on the map or permanently remove them from the map.

The programme has two different interfaces that the user uses to input commands into the programme. The programme uses a third visual interface to output the current state of the ships on the map to the user.

One of the two interfaces for inputting commands is a *gestural interface*. The second interface is *not* a keyboard, a mouse, or a joystick (or any other similar device). What might the second interface be, and why might it usefully complement the gestural interface?
