



EXAMINATIONS — 2008

END OF YEAR

**COMP311**

**User Interface Design**

**Time Allowed:** 3 hours

**Instructions:** Answer all questions.

Total marks are 180.

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.

<b>Questions</b>	<b>Marks</b>
1. General Knowledge	[30]
2. Usage-Centered Design	[34]
3. Evaluation & Testing	[40]
4. Visual & Interactive Design	[20]
5. World Wide Web	[26]
6. New Technologies	[30]

## **Question 1. General Knowledge**

[30 marks]

(a) [4 marks] What is a *focal user role*?

(b) [6 marks] Lockwood and Constantine identify five usability rules. Three of these rules are *efficacy, support* and *progression*. Identify and define the other two rules.

(c) [6 marks] Discuss the validity of the following statement: “user interface designers will have less empathy for users if they use *personas* rather than *user roles* to model users.”

(d) [6 marks] Public agency websites in New Zealand should follow accessibility standards defined by the State Services Commission. Identify one such standard and describe the problem that the standard tries to solve.

(e) [8 marks] What is the goal of a “Halo” visualisation, and how does the visualisation achieve this goal?

## **Question 2. Design Processes**

[34 marks]

**(a)** [6 marks] Discuss two advantages of creating paper-based user interface prototypes for evaluating proposed designs.

**(b)** [6 marks] Why can it be useful to create *negative personas* in user-centered design?

**(c)** [8 marks] Compare and contrast essential use cases with hierarchical task analysis such as ConcurTask-Trees.

**(d)** [14 marks] In usage-centered design, user tasks are described by essential use cases. Describe five different types of relationship that can exist between essential use cases. Your descriptions should include a justification as to why each relationship is useful to model.

### Question 3. Evaluation & Testing

[40 marks]

(a)

Consider the following scenario:

You have implemented two design prototypes for a user interface. You have access to five participants for a user-based evaluation. You want to determine which prototype is better, where “better” is defined as “a user completes a set of tasks quicker”. You decide to test each participant on both designs.

Each participant is given a set of tasks to perform on the first prototype, and you time how long it takes them to complete the set of tasks. Participants are encouraged to think out loud during task completion and you record these observations for future analysis. Participants are then given the same set of tasks to perform on the second prototype. Once again you time how long it takes them to complete the set of tasks, and once again they are encouraged to think out loud during task completion. You also record these observations for future analysis.

Finally you compare the times for the first and second prototypes to see which was faster.

(i) [2 marks] Is this a within-subjects experimental design or a between-subjects experimental design?

(ii) [8 marks] Identify and discuss three problems with the experiment as described in the scenario.

(b) [4 marks] In “Love and Authentication”, Jacobsson *et al* initially used 193 questions in the first experiment, but then reduced this to only 96 questions in the second question. The authors stated that these 96 questions were the questions with the highest entropy. What do the authors mean by “entropy” in this context?

(c) [4 marks] What type of metric is the Visual Coherence metric, and why?

(d) [6 marks] Discuss the validity of the following statement: “An evaluator only needs to test an interface with five sample users to find most usability issues”.

(e) [8 marks] Assume that you are a designer who believes that more frequently performed tasks should have fewer essential use case steps than less frequently performed tasks. Describe how you would use the Task Concordance metric to see if a proposed user interface model satisfies this belief.

(f) [8 marks] In “Electronic Voting Machines versus Traditional Methods”, Everett *et al* recruited participants through local newspapers. Discuss two reasons why this may affect whether the results can be applied to the entire voting population.

**Question 4. Visual & Interactive Design**

[20 marks]

(a) [8 marks] Describe what indexical and symbolic signs are.

(b) [12 marks] Identify and describe three different kinds of metaphor that are used in user interface design.

## Question 5. World Wide Web

[26 marks]

(a) [4 marks] Discuss one user interface implication of a website using only server-side scripting and no client-side scripting.

(b) [6 marks] Jakob Nielsen's *Law of Web User Experience* states that "users spend most of their time on other websites". Discuss the implications of this law with respect to how a user interface designer supports site navigation. You should frame your discussion in the context of the sites demonstrated during lectures.

(c) [16 marks] Identify and justify four improvements to Constantine and Lockwood Ltd's homepage as shown in figure 1. The top part of the page that is currently hidden contains the company logo and the phrase "the usage-centered design resource".

The screenshot shows the homepage of Constantine & Lockwood, Ltd. The browser window has a title bar reading "Constantine & Lockwood, Ltd. Home Page – The Usage-Centered Design Resource" and a URL bar showing "http://www.foruse.com/". The page itself features a yellow header with a cartoon construction worker holding blueprints. The main content area has a large heading "We are (still) under reconstruction." Below it, a message says "Watch this space for new material and a new look and feel. Meanwhile, we have updated the current site, which is yours to browse and explore." A sidebar on the left lists links: Publications, Resources, Training, Consulting, Questions, Upcoming Events, About/Contact, and Index/Search. Another sidebar on the left says "Browse the archives." The central content area includes sections on "Four new papers!", "Is human-centered design harmful?", and "Usage-centered design". At the bottom, there are links for "News and Notes Archives" and "See also: Conference Proceedings". The footer contains a copyright notice for 2008 and a "Done" button.

Figure 1: The homepage of Constantine and Lockwood Ltd, rendered in Firefox 3.0.2 on Mac OS X. The browser is at its maximum vertical height given the desktop size.

## **Question 6. New Interface Technologies**

[30 marks]

**(a) [4 marks]** Identify two different categories of gestures in the context of human computer interaction, and describe an example of each.

**(b) [4 marks]** What is a Virtual Reality Cave?

**(c) [6 marks]** Compare and contrast zero-order, first-order and second-order navigation control in virtual reality systems.

**(d) [8 marks]** Why does the issue of power consumption impact on user interface design for mobile devices?

**(e)**

Users typically interact with user interfaces on mobile devices such as mobile phones or PDAs using the keypad. Different mobile devices may have different keypads.

**(i) [4 marks]** Discuss why the keypad can affect the design and implementation of user interfaces on mobile devices.

**(ii) [4 marks]** Discuss why the keypad can affect the efficiency of user interaction on mobile devices.

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