

Fall 2008, Nigel Ward

## Final Examination

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1. Define or explain briefly [20 points]
  - a. immersive environment
  - b. `<h2>` tag
  - c. Javascript
  - d. ergonomics
  - e. the *bg* command in Unix
  - f. the notion of “pipe” in Unix
  - g. sitepath analysis
  - h. persona
  - i. widget
  - j. task analysis
2. [2] What is the unix command to
  - a. print out all the lines from a file that match a specified pattern?
  - b. list all the files in the specified directory?

3. Fill in each blank with one of the following: model, view, controller, graphical user interfaces, callback, widget, browser, internet, web server, protocol, session layer, interrupt handler, URL. [7]

### JSF and MVC (JavaServer Faces and Model-View-Controller)

Over the last decade or so, the development of applications with \_\_\_\_\_ has pretty much standardised. Whether you are developing with Gnome, KDE, MFC, VisualBasic, Delphi, or any similar library the process is the same:

- a tree of widgets is built, either by code or by loading a configuration file
- callbacks are attached to the widgets
- the GUI framework is left to render and manage the user interface.

When the user activates a \_\_\_\_\_ (clicks a button, chooses a menu option, etc) the appropriate \_\_\_\_\_ is invoked. This then inspects the requested action, and may choose to report an error, or to update some kind of data-structure according to the user input. Then control is either returned to the UI framework with the same set of widgets, or a new set of widgets (a new "screen" is built).

The data-structure here is the \_\_\_\_\_; it may be a model of a building, of an economy, of a text-document, etc. The logic which decides whether to update the model or report an error, and whether to redisplay the same set of widgets (same screen) or a different set (new screen) is the \_\_\_\_\_. And the widgets themselves (which may have custom drawing logic) are the \_\_\_\_\_.

This approach has been vastly successful in systems where all the processing is on one physical computer system. However in our internet-connected world, accessing remote systems in interactive ways is becoming more and more common. Having to deploy applications onto client systems is becoming more and more clumsy.

One solution is the Java WebStart approach, where client logic is dynamically downloaded. The client can then be implemented much like a traditional MVC application, with the addition of communication back to the original host. However downloading logic to the client computer is not generally popular; it requires significant computer power and memory on the client side, and a large startup delay as the logic is transferred.

JSF instead is a different way to bring the successful MVC programming approach to the internet. It is designed to assume that the client has some software capable of rendering a reasonable range of graphical widgets, and of transmitting information back to the server about changes in the state of those widgets. JSF does not assume, however, that it can download any kind of logic to the remote system other than a basic description of the screen layout. Of course there is a widely-spread application that fits the description of a JSF client perfectly: the \_\_\_\_\_.

from [http://wiki.apache.org/myfaces/JSF\\_and\\_MVC](http://wiki.apache.org/myfaces/JSF_and_MVC)

4. [4] Describe what makes a metaphor good, giving examples.

5. [2] It is sometimes said that mobile devices should be designed as “information appliances”, meaning that, like kitchen appliances, they can be used almost without thinking, and certainly without an extensive learning phase. Mention two HCI design ideas, principles, or techniques that can help designers approach this ideal.
6. [6] When would you use
1. VisualBasic
  2. Card sorting
  3. Sitepath mapping
7. [13] True or False:
- a. The introduction of groupware into an organization can change the way that people work.
  - b. Video conferencing is a type of asynchronous groupware.
  - c. People sometimes adopt different personalities online (in chat, virtual worlds etc.) from in real life.
  - d. The average time to move the cursor from the current location to the center of the screen depends on the specific input device used.
  - e. Choosing appropriate anchor text for links is important.
  - f. All interrupts from input devices (mice, keyboards, etc.) cause GUI events.
  - g. Predictive text entry is guaranteed to reduce the input error rate.
  - h. If and when speech recognition rates approach 100%, speech will be the best input method in all situations.
  - i. Of the four actions in the GOMS model, P (pointing operation) takes the longest.
  - j. In the web context, password checking is best done client-side.
  - k. In the web context, checking for incorrect entry of date (like Feb 31) can be done client-side.
  - l. HCI professionals sometimes are forced into an adversarial role with respect to the developers.
  - m. Ideally document appearance should be handled by the html file, not by the CSS stylesheet.

8. [4] What is a widget,
  - a. from the user's perspective?
  
  - b. from the application programmer's perspective?
  
9. [6] Explain what usability professionals can contribute during each of these software development phases:
  - a. Requirements analysis
  
  - b. Initial interface design
  
  - c. Testing
  
10. [3] How can models such as GOMS and Fitts' law be of use to practical interface designers?
  
  
  
  
  
  
  
  
  
  
11. [4] Give one reason you might want to add more functionality to a prototype; and one reason not to.
  
  
  
  
  
  
  
  
  
  
12. [1] Sketch a simple representation of a line of people waiting to use a popular interface.

13. [3] Many interfaces to functionality on the web are limited by the difficulty of implementing some interface styles on browsers. Which interface style(s) are easiest to implement on the web? Hardest?
14. [10] Imagine a cell phone for kids that can only receive calls, has only two buttons, and can only be in one of four states: ringing, connected, waiting, and off. Choose appropriate names for the buttons and draw a transition diagram to show what they do.

15. [5] Imagine that you are a usability consultant who has given a client some advice that annoys her into yelling at you: “usability is just like fashion: what’s good this year is bad next year. It’s all arbitrary. Engineers like me have real constraints like bandwidth and processor speeds and memory. You guys don’t really know anything; usability is just fashion”. What could you say to convince her that usability is not just about fashion?

16. [2] Imagine a GUI within a browser that has poor response times. Which of the following could NOT be a cause?

- a. Insufficient memory on the computer
- b. Slow processor speed
- c. Inefficient interrupt handling in the device drivers
- d. Inefficient interrupt handling in the operating system
- e. Sloppy programming in the widget code
- f. Poor coding in the callbacks
- g. Network delays
- h. Slow disk seek times
- i. Poor event handling in the browser
- j. Server overload

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17. [30 points] A worker is assigned to listen to thousands of short audio files, classify each as good or no good, and record the results. To do this he chooses to use existing tools: the folder showing all the files he needs to classify, the audio player, and excel.

He starts out slowly, using the following procedure: From the directory window, double click on a filename to pop up the audio player, click on the play button to hear the file, click on the excel tab in the taskbar to expose that window, click on the correct cell, enter “g” or “n” in that cell, click on the directory window to expose it again, and repeat the process for the next file.

- a. Assuming that it takes 1 second to listen to each file, use the GOMS keystroke level model to predict how many seconds per file this job will take. [10 points]
- b. Later the worker realizes that he can resize the directory window and the excel window so that they are simultaneously visible. How much time can he save per file by doing this? [2 points]
- c. Later he remembers that he can do alt-tab to switch among windows. About how much time does this save per file? [2 pts.]
- d. Imagine that you have been called in to design and build an interface to support this process. Assume that the worker occasionally needs to replay a file, but never makes mistakes. What interaction style would you pick? Why? [3]

e,f. Sketch out or describe an interface for this problem in your chosen interaction style [10], and provide an estimate how much time does it take the user to classify each file using your interface, showing your work or otherwise justifying your estimate [5].