

SCHOOL OF MATHEMATICAL AND COMPUTER SCIENCES

Computer Science

F27WD

Web Design and Databases (Mock exam Q1-2)

Semester 2 201516

Duration: Whatever

ATTEND LECTURES
WASH T-SHIRTS INSIDE-OUT
WATCH OUT FOR CYCLISTS

Welcome to the F27WD mock.

This paper is designed to give you some idea of what to expect in Questions I and II.

I have pitched the difficulty level slightly harder than the exam.

However, things always seem harder in the exam, because of the pressure.

This paper exists in two versions:

- One version without answers.
- One version with answers.

If you can read this text, you're looking at the version with the answers.

You'd be wise to try the version **without** answers first.

Good luck.

Q1

- (a) (i) State what **URL** and **URI** stand for. (2)

Uniform Resource Locator and Uniform Resource Indicator.

- (ii) Write out in full what is probably the most famous URL, and explain your choice in detail. (2)

I'd pick <http://www.google.com>. Once the internet made it easy to publish stuff, the next problem became how to find it. Google invented a solution to that problem that was different from and better than anything that had come before.

Note I wrote "explain your choice in detail". This means "I seriously want a meaningful explanation for this choice and hereby warn you that I might give zero marks to something tautological like "google, because it's famous"".

- (b) Explain in specific detail the connection between the following, with emphasis on its relevance to web design: (4)

- Isaac Newton's observation that white light is composed of three primary colours.
- HTML references colours using six-character hexadecimal strings often indicated in the form RRGGBB.
- The human eye has three types of colour receptor (called *cones*), each sensitive to a distinct wavelength of light.
- Computer displays, when viewed under magnification, can be seen to consist of a mosaic of little coloured dots.

The primary colours are Red, Green, and Blue. These are also the wavelengths to which the cones in the human eye are sensitive. Thus by mixing these three colours we can stimulate the cones to generate the impression of any colour that our eyes can see. RRGGBB assigns one of 256 levels (00-FF in hexadecimal) to each of Red, Green, and Blue. This translates directly to light levels of red, green, and blue lights in a computer display and thus to perception of colour for the eye.

(I would not set precisely this question in an exam, but I might well set something similar but more focussed.)

- (c) (i) In the context of web design, explain what **navigation bars** are, and how they are used, giving at least one concrete example. (2)

A menu, usually across the top or side of the page, giving a high-level set of navigation options. For example B&Q might have "Home", "Garden", "Kitchen", and "Bathroom" or "My Account", "Basket", and so on.

- (ii) Give one example of a navigation-bar like structure that predates the Internet and has nothing to do with web browsers. (2)

The "File Edit View ..." bar at the top of your pdf viewer.

- (iii) Give one example of a navigation-bar like structure that predates the Internet and has nothing to do with computers. (2)

Table of contents in a book.

- (d) Fact 1: "Going back", as in "pressing the back button" is the most-used navigational action in web browsing. (6)

Fact 2: webpages are typically far shorter than a book chapter.

By comparing and contrasting the act of web browsing with the act of reading a book, put both facts in a detailed context and explain their relevance to web design.

Any reasonable discussion. I include an example which is neither exhaustive nor the best possible discussion.

The key is in the name: HTML, or Hypertext Markup Language. The web is an interconnected collection of documents whereas a book generally has two

directions: forward and backwards.

When reading a book the first navigational act is to find a comfortable place to sit, then to find the right page, and after that it's just "turn the page". So a book consists of a linear sequence of units of attention (chapters) which are fairly long because it is assumed that the reader has committed to reading this book and is doing so linearly.

Browsing is different: the user is presented with a graph of effectively infinite complexity, and accessing this graph is easier than accessing a book (just swipe the screen of your mobile phone, or click on a hyperlink, and you're off). Presented with so many options, the browsing experience will have a stronger element of search, and therefore of "going back" if and when we choose a wrong option, and we are less likely to spend much time with each webpage.

A webpage is the natural "unit of attention" during browsing, which is shorter than a book chapter because it is easier to get to, easier to leave, and not linearly ordered relative to all other webpages.

Webpages must therefore be designed to be relatively easy to read, and relatively easy to leave. Many webpages are part of a larger website and indeed perhaps what corresponds most closely to "book chapter" is "website" or at least "section of a website".

Q2

- (a) (i) Give the key reason that books and similar documents are typeset using pdf, and give two distinct reasons that webpages are typeset using HTML. (6)
(Note that this answer is worth six marks and not three, so your reasons should be given in reasonable detail and including specific examples where appropriate.)

1. *pdf gives complete control of layout (including margins, font, etc).*
2. *HTML source code is generally human-readable, pdf is not.*
3. *Less sensitivity to layout gives flexibility e.g. for different displays or window sizes.*

- (ii) The following HTML fragment contains four distinct errors: (5)

```
<a ref == "http://www.hw.ac.uk">
<img src == "images/hwlogo.jpg">
<a>
```

State these errors (repeats of the same mistake count as only one error), and write a corrected version.

1. *== should be = (note that whitespace around the = seems to work fine).*
2. *ref should be href*
3. *closing <a> should be *
4. *missing alt description*

```
<a href="http://www.hw.ac.uk">

</a>
```

- (b) Your colleague says that he wants to manage his webpage layout using tables. (4)

Moments after saying this, hair sprouts on the palms of his hands, then he is struck by lightning, eaten by a dinosaur, pooped out, and what is left is trampled into the earth by a passing rampaging herd of elephants and then washed away by a freak rainstorm.

- (i) Explain why this fate was well-deserved, and describe how layout should properly be managed in web design. (3)

Tables identify elements by position in the table (such as “column one, row one”) rather than by semantic label of what they are (such as “body” or “main matter” or “navbar”).

Using tables for layout blurs the separation between content and layout. Table-based layout tends to be inflexible and hard for both humans and bots to scan. For similar reasons, tables tend to nest poorly.

For instance, moving the “navbar” from the top to the bottom, requires us to cut-and-paste HTML code from the top of the table to the bottom of the table. If the change is sitewide then this must be done in every webpage. A herd of rampaging elephants was too good for your colleague.

Layout should generally be managed using CSS. Elements of the webpage should have clear and meaningful labels with CSS properties as appropriate. For instance, to move a navbar from the top of a page to the bottom should be a matter of editing the CSS properties of one CSS file.

- (ii) Describe the one and only situation where using a table is appropriate. (1)

Typeset a table.

- (c) (i) You see px, em, and % in a CSS file. What do they mean? (3)

px = pixels, em = width of "m" in the current font, % = percent.

- (ii) For each of px, em, and % give natural situations in they are most appropriate. (3)

px scales with the webpage. So suitable for a layout based on positions relative to some point of reference (such as the top left of the webpage).

em scales with the font. So suitable for an element that must fit in the flow of text.

% is useful for scaling relative to an existing quantity. This is best illustrated with an example. A declaration font-size:90% might be used to slightly reduce font size, perhaps to obtain the effect of smallcaps or after a change from font A to font B in some running text where font B naturally typesets slightly larger than font A.

Yes, this question adds up to more than 20 marks. It's a mock exam; why not?

In the real exam, each question will be out of 20 marks. Unless I miscounted, of course. I'm not terribly good with numbers.

END OF PAPER