Two hours

UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE

Building Web Applications

Date: Friday 18th May 2012
Time: 09:45 - 11:45

Answer Question 1 from Section A
and TWO questions out of the three from Section B.

Each question carries 20 marks.

This is a CLOSED book examination
The use of electronic calculators is NOT permitted
Section A

1. Answer each of the following parts concisely. Each part carries two marks.
   
a) The separation of HCI and internal processing is related to the three main stages in which a servlet handles a HTTP request. Explain this relation and how these stages should be reflected in the design of a web application program.

b) Briefly describe the difference between GET and POST commands. How should each be used?

c) Specify exactly which software unit(s) calls the functions init, doGet, doPost, and destroy. When exactly is each of these functions called?

d) Consider the HTML concepts of: element, content and tag. Define each of them in relation to the others.

e) In the following HTML fragment, add an attribute to change the colour of ‘An important paragraph’ to red.

   <p>An important paragraph.</p>

What is the best way of ensuring all important paragraphs in a website are red?

f) What is meant by load balancing and why is it important?

g) What is meant by a clean or RESTful URL, and why are they used?

h) Consider the following FORM starting tag of a HTML page currently loaded in a browser:

   <FORM METHOD="GET" ACTION="/../myFile.html">

Before submitting this form, suppose the address box of the browser contains http://www.frolics.com/leg1/leg2/leg3/anotherFile.html

Explain the difference between the URL in the form and the URL in the browser, What actual URL will be part of the HTTP request sent by the browser when the form is submitted?

i) Briefly explain the difference between client-side scripting and server-side scripting.

j) How can a Web application help to ensure the security of its user account data?
Section B

2. 
   a) i) Name and describe the three features of the MVC paradigm and how they relate to one another.
      ii) Explain why MVC is an important concept of software design, in general and in particular for web applications.
      iii) Describe the server-side basic processing cycle associated with the HTTP protocol, and show how the design principle underpinning MVC follows from this cycle.

          (10 marks)

   b) Briefly define Ajax. How might using it improve the user experience?

          (4 marks)

   c) What is the best way of ensuring a Web application is usable by and accessible to a wide audience?

          (6 marks)
3. a) Briefly describe the concept of a JSF page. Explain how such a page differs from a plain HTML page, explain the concept of a special tag and illustrate such tags by a simple example. (4 marks)

b) Describe the JSF life cycle and name and briefly explain each of its six main steps. (8 marks)

c) The text below is an excerpt from the JSF page ‘index.jsp’ of the application ‘numberquiz’. Explain the eight highlighted lines of the following excerpt, in the order in which they occur. (8 marks)

```xml
<h:form>
  <h:outputText
  value="Locale is French; 
  rendered="#{user.localeIndex == 0}"/>
  <h:commandLink
  value="Set locale to English"
  action="#{user.setLocaleToEnglish}"
  rendered="#{user.localeIndex == 1}"/>
</h:form>
<h:form>
  <h:outputFormat value="#{msgs.currentScore}"
  <f:param value="#{quiz.score}"/>
  </h:outputFormat>
  <h:outputText value="#{msgs.answer}"
  <h:inputText value="#{quiz.answer}"
  <h:commandButton value="#{msgs.next}" action="next"/>
</h:form>
```
4. a) Describe the notion of a **UI component** associated with a JSF page. Specifically:
   i) Explain the acronym ‘UI’ and what specific feature of the JSF page a UI is associated with.
   ii) Describe the two main purposes of a UI.
   iii) Comment on the visibility of a *standard* UI component to the JSF programmer, and the confusion this aspect may lead to.
   iv) Briefly describe the UI component tree associated with the JSF page.

   (8 marks)

b) The following table contains the jumbled up text of a special JSF element. This element renders a list of objects, each with two components: an identifier and a name *in this order*.
   i) Explain what this JSF element is and how it renders the list.
   ii) Rewrite the text below in the correct order, indenting it suitably.

   (6 marks)

   ```html
   <f:facet name="header">
     <f:facet name="header">
       </f:facet>
   </f:facet>
   <h:inputText value="#{lan.name}"/>
   <h:outputText value="#{msgs.lanName}"/>
   </h:dataTable>
   <h:outputText value="#{lanId}"/>
   <h:outputText value="#{lan.id}"/>
   </h:column>
   </h:column>
   </h:column>
   </h:column>
   </h:column>
   <h:outputText value="#{msgs.lanId}"/>
   <h:outputText value="#{lan.id}"/>
   </h:column>
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