

1. Client-side versus server-side web applications.
  - (a) Explain the difference between client-side and server-side web applications. (1)
  - (b) Discuss the advantages and disadvantages of each kind of application. (5)
  - (c) List five server-side web languages and two client-side web languages. (3)

Total marks: [9]

2. An on-line library access application consists of an HTML form and a database with bibliographic data. The form asks a user
  - to enter an author of a publication into a textfield (required),
  - to select a year of publication from a menu (can be left blank)
  - to enter a title of a publication into a textfield (can be left blank)
  - to select a type of publication from radio buttons with values "All", "Journal", and "Textbook" (can be left blank)

Write the Perl code of a subroutine that checks the user input from the form for errors and security problems. You can assume that the HTML code of responses that are sent back to the user is dealt with in error subroutines which you can call without specifying their content. But you must include all CGI parameter calls, regular expressions and if-statements that are needed. Try to get the security as tight as possible.

Total marks: [21]

3. Wikis are on-line applications for collaborative web page creation. They allow users to enter text with some basic formatting into a textfield which will then be converted into HTML pages. The resulting pages can be edited by other users.
  - (a) Describe the various components required for this server-side web application. You can include diagrams in your explanation. (4)
  - (b) Describe how this application works from a Perl/CGI viewpoint. (3)
  - (c) Which are the two types of users of this application? (2)
  - (d) Discuss any security issues that arise for this application. (3)
  - (e) Estimate the time it would take an experienced server-side web programmer to build this application. Explain your answer. (2)

Total marks: [14]

**End of Paper**