UNIVERSITY OF LONDON
IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE

EXAMINATIONS 2001

BEng Honours Degree in Computing Part II
MEng Honours Degrees in Computing Part II
BSc Honours Degree in Mathematics and Computer Science Part II
MSci Honours Degree in Mathematics and Computer Science Part II
for Internal Students of the Imperial College of Science, Technology and Medicine

This paper is also taken for the relevant examinations for the Associateship of the City and Guilds of London Institute
This paper is also taken for the relevant examinations for the Associateship of the Royal College of Science

PAPER C222=MC222

SOFTWARE ENGINEERING - DESIGN II

Tuesday 15 May 2001, 16:00
Duration: 90 minutes
(Reading time 5 minutes)

Answer THREE questions

Paper contains 4 questions
Calculators required

1a HTTP is referred to as a "stateless" protocol. What does this mean, and is the advantage and disadvantage for e-commerce on the World Wide Web?

b One attribute of the <form> tag in HTML is the method by which the data is submitted from the browser to the server. What is the difference between the GET and the POST methods and what are their respective advantages in this context?

c Briefly explain the <form> elements you would suggest for collecting an online pizza order which has choice of pizza, extra toppings, type of crust, delivery address and phone number, payment method and time the order is placed.

d Suppose that order tracking is to be provided to customers. What extra data and processing would be needed? Using suitable pseudo-code, outline a CGI script that would respond to the customer's query with the required information.

The four parts carry, respectively, 20%, 20%, 20%, 40% of the marks.

2 Suppose London Transport wishes to introduce new type of ticket issuing machine. A customer will have to enter the destination and type of ticket, and provide a sum or money before being issued with a ticket and receiving change.

a Construct a hierarchical task analysis, indicating whether each activity is of the user, system, or joint.

b Provide a corresponding state transition diagram for the dialogue of a system to meet the above brief.

c Provide any additional notes to the implementor on possible errors.

The parts carry, respectively, 45%, 45%, 10%, of the marks.

3a Provide a diagram or list of the stages of Norman's User Centered system Design. By considering these stages, argue the comparative merits and problems of Spoken Language, Direct Manipulation, and typed Command Language, as interaction styles for each of the following tasks:

i) A golfer guiding a remote vehicle with a local camera to retrieve balls lost in a lake.

ii) An experienced user retrieving data from a database of personnel records for viewing on a screen.

b Suppose you have been asked to produce a set of usability guidelines to aid the design of user interfaces in a company developing software for the office market. Briefly explain the purpose of such guidelines, distinguishing the usability principles from specific guidelines. What form should a guideline take?

The parts carry, respectively, 60%, and 40% of the marks.

4a In order to evaluate whether one system is more usable than another:

i) Briefly explain the benefits and limitations of using analytic evaluation rather than observational evaluation. Indicate three distinct evaluations which alternative methods of analysis can provide.

ii) Briefly describe the benefits and limitations of expert heuristic or walk-through, over observational methods

b In an experimental study comparing the use of a dataglove and a 3D mouse to reach out for an object in a virtual reality system, a number of subjects are assigned to each device and each subject given 100 trials of reaching a randomly positioned object. The distance in mm between the device position and the object is automatically recorded after 1 second and another object is shown. The final score for each subject is an average of the 100 distances.

Brightness and colour are thought to influence the result, so two levels of each of these were included in the study (brightness as B or D, colour as R or I). The results for a three way factorial experiment are given below, with control, brightness and colour as factors, each figure being the mean value for subjects used with each treatment.

Bright--ness	colour	mouse	glove
B	R	1.9	0.5
D	R	1.6	0.9
B	I	1.1	0.3
D	I	1.6	0.5

Provide a table showing how to calculate the main effects and interactions of this study and determine the simple effect of brightness.

Parts a i), a ii), and b carry, respectively, 25%, 25%, and 50% of the marks.