

1993 Paper 9 Question 3

Computer System Modelling

Consider a transaction system with 20 workstations and 4 fileservers, each with 2 discs. The system is monitored and it is found that, for each transaction, on average:

40 ms of workstation CPU is consumed

6 ms of fileserver CPU is consumed

10 ms of fileserver disc is consumed.

The system is arranged so that asymmetry in disc access is limited to 3 : 2 from highest to lowest, as is fileserver-usage asymmetry. Workstation usage is balanced.

Perform a bottleneck analysis of the system for throughput and response time. State any assumptions made. [10 marks]

Give an estimate of the response time when the system is handling

(a) 10

(b) 100

(c) 1000

transactions per second.

Note: a balanced system with K devices and N customers has a utilisation

$$U = \frac{N}{N + K - 1}$$

[10 marks]