

2001 Paper 7 Question 8

Computer Systems Modelling

- (a) What criteria would you consider when selecting between a model based on queueing theory and one based on simulation? When might you use both approaches? [5 marks]
- (b) Describe the structure of a *discrete event simulator*. What is the principal data structure involved? [5 marks]
- (c) A queueing network is characterised by a set of *visit counts*, V_i , and *per-visit service requirements*, S_i , for each of N devices. Derive upper bounds on the system throughput (i) when the load is very low and (ii) as the load tends to infinity. [5 marks]
- (d) In what situations may the bounds be particularly imprecise? What can be done to construct tighter bounds for the system throughput? [5 marks]