

COMPUTER SCIENCE TRIPOS Part IB – 2012 – Paper 5

6 Computer Networking (AWM)

- (a) Consider the host `mine.ja.net`, with a local DNS server `dns1.ja.net`.
[Note: `dns1.ja.net` is configured to use recursive DNS by default.]
- (i) Host `mine.ja.net` asks server `dns1.ja.net` to resolve the hostname `yours.foobar.com`. Assume there are no cached entries relevant to this request. Write down the steps taken to resolve `yours.foobar.com` and respond to `mine.ja.net`. [4 marks]
- (ii) Describe the differences between this solution and one achieved using iterative DNS. [2 marks]
- (iii) Compare and contrast DNS with ARP. [4 marks]
- (b) An office has an (Internet) access link rated at 10 Mbps full-duplex. Each user requires 1 Mbps when transmitting and each user is active 10% of the time.
- (i) Initially a static allocation of bandwidth is made for each user. How many users can the access link support? [1 mark]
- (ii) The office opts for a pure packet-switched access link. What is the probability that a given user is transmitting? [1 mark]
- (iii) The office supports 35 users on the packet-switched access link. What is the probability that exactly n users are transmitting simultaneously? [2 marks]
- (iv) Find the probability that there are 11 or more users transmitting simultaneously. [3 marks]
- (v) Describe an assumption about the nature of the traffic that underlies the answer to part (b)(iv) and give two examples of network traffic where this assumption is not valid. [3 marks]