Sample Exam Question Model Answer

Question 2: Model Answer

1. Circuit switching means that if point A in a network wants to communicate with point B, then first of all a circuit (a route from A to B) is established, so that all points in the circuit know that they are transmitting information from A to B; this circuit is used for the whole "conversation" between A and B. (1 mark) The telephone system used circuit switching. (1 mark)

   Packet switching means that data is broken up into small chunks, or packets, and the packets are routed independently. A "conversation" between A and B is just a sequence of packets; intermediate points on the way from A to B can also handle other packets (unrelated to A and B) during this conversation. (1 mark) The Internet uses packet switching. (1 mark)

2. A central database of Internet routes would be very large (1 mark) and therefore difficult to access quickly if stored on a single machine (1 mark); it would be a bottleneck in the network because there would be a huge number of requests for routes (1 mark); the structure of the Internet changes (1 mark), so the database would have to be kept up to date, resulting in even more traffic (1 mark)

3. Individual packets are routed independently (1 mark). Each node (router) in the Internet knows about its immediate neighbours (1 mark). A packet is labelled with the IP address of its ultimate destination (1 mark), and each router knows, for each ultimate destination, which is the best neighbouring router to send the packet to (1 mark); this information is stored in the local routing table (1 mark). This is called "next-hop routing" (1 mark). Routers communicate with each other, so that the local routing tables can be updated if necessary: for example if a router fails (1 mark) or if changes in the structure of the Internet mean that new routes become available (1 mark).

4. *Up to 10 marks depending on the number of points made, the use of examples, and the overall clarity and style. Here are some relevant points. I don't claim that this is written in a perfect style.*

   Technically, the main disadvantage of requiring users to install specialised software is that it is less convenient for them than providing access over the Internet via a standard browser. Also, modifications of the airline booking system would require an upgrade of the software, whereas using the web means that the airline retains control of the entire system. One advantage is that it might be easier to provide a secure connection, because security would be implemented in the software provided by the airline; there would be no need to rely on generic security facilities on the Internet. (However, the standard security mechanisms are much better than they used to be, so this advantage might no longer be significant.) Another advantage is that more functionality or data could be put into the user's software, in order to minimise

the amount of network communication: for example, the airline's timetable could be built into the application (and perhaps automatically updated from time to time, over the network) and network communication might only be required in order to check availability of seats on a particular flight. With a web interface, on the other hand, constant network communication is required as the user navigates around the site.

The main advantage in HCI terms of a web interface might seem to be that the web will provide a uniform interface to all applications: for example, all airline web sites might be similar and therefore it would be easier to learn to use them. However, we know that the commonality of the web interface is relatively superficial; there are huge differences in structure and method of use between the web sites of different airlines.

The advantage of specialised software is that the user interface could be designed independently of the basic style of interaction supported by the web; this might make the application easier to use. For example, there might be a better way of selecting a country than the standard web system of huge popup menus.