INFORMATION TECHNOLOGY

THEORY QUESTIONS WITH ANSWERS

Cont. from previous article

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CONTINUED FRO PREVIOUS ARTICLE

Question 3 Data Communications and Networks

3.1 The two computers that have been donated to the school need to be networked, so that data being gathered can be stored on a central database (on the secretary's computer). This data can be communicated via the Internet to the central database at the organisers' offices. The computers can be connected in a variety of ways, but you have been given the choice of using UTP cables or WiFi technology.

3.1.1 Describe and compare these two strategies with reference to communication media cost and security.

3.2 Ethernet has evolved into a complex networking technology that today lies behind the majority of local computer networks. Originally coaxial cables were used to communicate data between workstations, but mostly they have been replaced by hubs and/or switches with UTP cables. An Ethernet network has been used to connect the two computers. A central switch has been put in place, and UTP cables connect the computers to the switch.

3.2.1 CSMA/CD is an access method used by Ethernet that regulates communication on the network. Describe how the method works. **(4)**

3.2.2 Give TWO reasons for having a switch in a network. **(2)**

3.2.3 Ethernet networks are referred to as collision-based. Name and briefly describe an alternative to this type of network. **(2)**

3.2.4 Briefly discuss the security aspects of the data that moves across an Ethernet network. **(2)**

3.3 Communication protocols are always required for computers communicating in a network.

3.3.1 What is a protocol? **(2)**

3.3.2 Error-control is one of the factors that forms part of a protocol. One of the aspects of error control is parity checking. Explain how parity checking works. (Your explanation should refer to odd parity.) **(3)**

3.3.3 Name TWO of the protocols that are commonly used when transferring information across the Internet. **(2)**

3.4 A few of the participating schools are situated in very remote areas and the organisers have decided to install a home/business satellite dish for communication to the Internet.

3.4.1 Give ONE advantage of having the satellite connection **(1)**

3.4.2 There is a fixed monthly cost for the connection that includes costs for different amounts of bandwidth. What is bandwidth? **(1)**

3.4.3 Satellites are usually thought of as man-made devices that orbit the earth. Explain how it is possible to maintain the "line of sight" Internet connection 24 hours out of 24 if the satellite is moving. **(2)**

ANSWERS

3.1.1 Cables (UTP) Communication Media Bounded medium Cheap cabling type twisted pairs of cables with no shielding Wifi - Unbounded medium, No cables required, but uses, requires radio frequency to transmit Signals, Cost Low cost, and easy to install. No cost for cabling, but initial expense for Wifi controller card / or Wifi AP (access point). Security Suffer attenuation, but less susceptible to eavesdropping, Attenuation EMI and eavesdropping is easy.

3.2.1. Computers listen on the medium for packets that are addressed to them. If they wish to transmit, wait until medium idle and then attempt transmission. If collision detected stop transmission. Wait a random amount of time and then attempt transmission again.

3.2.2. Point of connection Manages collisions
Perform intelligent path selection

3.2.3. Token-ring networks... Only the workstation holding a 'token' is able to transmit while others listen. No collisions take place.

3.2.4. Any information sent by one computer is received by all, even if that information is intended for just one destination... A node on an Ethernet network can therefore eavesdrop on all traffic on the wire if it so chooses

3.3.1 A set of rules.. that govern the way data is transmitted between two devices on a network

3.3.2 An extra bit (parity bit) is added.. to each piece of data being transmitted. This bit ensures that the total number of '1's being transmitted in an odd number.. If an even number of '1's are received, the receiver assumes the information to be corrupt and requests retransmission

3.3.3. HTTP TCP/IP FTP

3.4.1. Won't have to deal with faulty cables

3.4.2. The maximum amount of data that can travel a communications path

3.4.3. The satellites are geostationary orbit at a constant speed and with the rotation of the earth.. and are therefore always in one spot and therefore the dish can be aligned to this spot and receive and transmit 24/24

Question 4: e-Communications

4.1 The Internet plays an important role in the co-ordination of the sports meeting, as the data obtained from different schools must be gathered and organised centrally. This will be done by transmitting the data via the Internet to the central offices of the organisers.

4.1.1 What is the Internet? **(2)**

4.1.2 There are always costs associated with an Internet connection. Give TWO of these costs. **(2)**

4.1.3 Although a high speed Internet line at the school is not essential, it would be nice to have one. Give TWO advantages of changing a dial-up connection to an ADSL connection? **(2)**

4.1.4 The secretary has heard from a friend that it is possible to make cheap overseas phone calls by using the Internet connection. Name TWO things you would need to make this possible. **(2)**

4.2 The Internet connection is also going to be used for banking. The secretary, who receives payment for reserved tickets, needs to deposit money into the account of the event organisers so that they cover their ongoing costs.

4.2.1 Briefly describe THREE ways in which the secretary can ensure that the Internet banking procedure is as secure as possible. **(3)**

4.3 The learners at all participating schools have been asked to design a website promoting the sports meeting. The website judged to be the best will become the official website for the Event.

4.3.1 Many learners at schools are not programmers, but are computer literate.

a. Name ONE package that someone who does not have programming skills could use to design and create a website. **(1)**

b. What programming language could be used if you want to develop the website without the use of the tools provided by the package in question 5.3.1.a? **(1)**

4.3.2 Once a website has been created, it cannot remain on your computer. Internet Service Providers (ISP) can provide space for your website, so that the rest of the world can view it. Explain how your website data can be moved to the ISP for display. **(2)**

ANSWERS

4.1.1. Connection of networks joined into a GAN allowing for the movement of information via services such as (e.g. email, Web browsing, FTP etc)

4.1.2. Costs for a ISP Costs for the rental on the line
Accept cost of Modem or other associated hardware

4.1.3. The higher speed connection 24/7 aspect of the line

4.1.4. Skype phone or headset (or microphone/speakers), Skype Software/account VOIP protocol software

4.2.1. Keep the computer virus-free, Install spyware checkers
Take advantage of bank website security features, such as password pin keypads, digicode devices, sms'ing when transfers take place etc Not going to the bank site via another link and checking the security of the site Digital certificates verify that the site is what it claims to be (these are issued by a Certification Authority)

4.2.2. Transfer the monies from an existing account this will track the account number into which the money has been paid. Take a printout after each transaction is verified on the screen, most sites give a transaction print facility. Select to send proof of transaction to the organiser's email address most banking sites provide this option

4.3.1. a. Many programs such as Dreamweaver, FrontPage, Publisher can be used to create a website b. HTML.. for the web

4.3.2 The website, which may be a collection of files, pictures, folders etc must be moved to the correct location on the ISP.. An FTP program of some sort can be used.

Question 5: Social and Ethical Issues

5.1 Although an operating system has been provided with each computer, no general software that one would use in an office environment has been included. It has been suggested by some people that the Microsoft office suite Microsoft Office be bought, while others recommend Sun Microsystem's office suite, StarOffice.

5.1.1 Name 2 tasks for which the office suite software can be used? **(2)**

5.1.2 Name 2 adv. that StarOffice offers over Microsoft Office **(2)**

5.1.3 If StarOffice or Microsoft Office is chosen, the package must still be licensed. If the package is to be used for school purposes only, how might this affect licensing fees? **(2)**

5.2 The upgraded computer that is being kept in the classroom is being used at breaks for gaming. Learners have brought games from their home computers, installed them and play them in their break time.

5.2.1 Explain how this would affect the security of the network. **(2)**

5.2.2 If learners have legally bought their game software, are they entitled to install the game anywhere they want to play, such as on the school computer? Justify your answer. **(2)**

5.2.3 Game playing is often frowned upon by educators, but there are positive aspects to playing computer games as well. Give TWO of these positive aspects. **(2)**

ANSWERS

5.1.1. Letter writing, Spreadsheets, Presentation Software, etc

5.1.2. Much cheaper than MicroSOft Office. (Basis for OpenOffice, which is free) StarOffice can generate PDF and Flash files. Can read MS Office file formats and Macro Converter for converting Microsoft Office VBA-macros to StarBasic StarOffice works across different platforms

5.1.3. Companies producing software sometimes make concessions for educational institutes. Microsoft has a well known deal with South African schools to provide licensing cheaply or free.

5.2.1. Games are often downloaded and carry spyware, Disk that it is on may have a virus. 5.2.2. Probably not. It would depend on the licencing, but most games would allow a licence for one computer.

5.2.3. Certain games test language proficiency, hand-eye-co-ordination, mathematical skills.