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**Course Code: CIS 211**

**Course Title: Computer Network**

**Assignment Title:** Rehab Housing Real Estate

**Summer 2019**

 **Total Marks: 35**

# **Introduction**

This assignment enables you to demonstrate your knowledge and understanding of computer networks. You are required to produce a substantial document that totals 1200 words. Subsequently, you are advised to start work on the assignment at an early stage during the unit. The assignment is divided into tasks, which relate to the sequence of the module, so you do not need to wait until all the teaching is finished to start them.

Some aspects of this assignment will require you to research real components that are currently available in the marketplace. Furthermore, you will also be asked to make judgments about what is best for a particular scenario. Please note that there is not always one right answer. However, you will need to justify your reasons for any choices you make to get high marks.

You are NOT required to design a complete network. You are required to detail the specifics covered by the task list shown below.

**Scenario**

Rehab Housing is a growing real estate business located on a busy high street near the Centre of the city of Dhaka. It specializes in residential and commercial property sales and lettings. Due to the small size of its operation, Rehab Housing currently focuses on properties from within a 10 miles radius and does not provide any added services its clients. It currently employs 7 full-time staff and 5 part-time staff.

The business process such as finances, employee management, property listing, client inquiries, follow ups, potential client leads etc. depend highly on the IT infrastructure of the company. The company’s front end is a web site (hosted by an ISP) where the properties are listed. Details on the website are managed by the staff and uploaded from data stored on the office computers. The IT and networking infrastructure of the company was procured, designed and installed when the business was established 13 years ago and the computers are set up as a Peer to Peer network.

The office uses a 10baseT over Cat 5 UTP cabling and all devices (printer, PCs, router) are connected to a hub. High-quality images of properties are stored, processed and transferred from one of the more modern PCs. Another PC also maintains the property and client database and runs on Windows 7 professional. Currently employees of Rehab Housing experience slow response times in their Local Area Network (LAN). There is also an issue of slow access to images and employees have difficulty sending and receiving large image files from and to the Internet. Furthermore, the current infrastructure has no security solution in place other than Anti-Virus software. The images and client details stored in the office database and image PC are sensitive information, which needs protection from unauthorized access.

The company Managing Director (MD) has called you in to advise him about upgrading the network to improve performance and security. At the same time he wants to enable prospective customers to browse properties via touch screen tablets (10-12 inch screen) set up (fixed) in the shop. He would like to start with 5 of these. Sales staff will also have their own tablets which they will use both inside and outside of the office. He acknowledges that the computer hardware is mostly old and will need replacing. The company further aims to expand by opening a branch office 15 miles from the city Centre where a University is located and wants to focus on student lettings in the new branch. The branch office should have appropriate communication links with the main office for optimum daily operations. Initially, there are planned to be 3 sales staff in the office. The following outline requirements have been identified.

**Overall System Requirements**

**1.** Provide a network solution (hardware and software) to meet the needs of the company which ensures timely and secure access to information.
**2.** To provide Internet access for staff (via tablet and desktop) and customers via their own device or tablet in the shops.
**3.** To provide network access between the new branch and the head office.
**4.** To provide VOIP telephony.

**Data and information**

**1.** Client & property information stored at the head office.
**2.** Corporate web email provided via the company’s ISP.
**3.** Corporate web site hosted by ISP, maintained by head office staff.
**4.** Client appointments/ records, including personal contact information stored at the head office. Payment card data are not stored.

**Hardware**

**1.** New computers to meet performance, security and storage requirements (including backup).
**2.** New PC workstations (total 11 x desktop) running Microsoft Windows.
**3.** New network printers (2).
**4.** Network components as required.
**5.** 20 x Tablets (5 for Liverpool shop, 15 for staff).

**Software**

**1.** Latest Microsoft Office suite required.
**2.** RealEstate Agency management software (appointments/ records) used throughout the company.
**3.** Web & email Internet access
**4.** Suitable security software

**Security requirements**

1. Restrictions are required to be implemented to control access to the confidential client information.

2. The system is required to be secure from internal and external threats.

3. An automated daily backup policy and procedure, for all of the information stored within the business.

# **Task 1: Network Infrastructure and Protocols (8 Marks)**

The building has an existing 10base T infrastructure. The MD has asked you to provide a report to clarify the following-
**a)** It has been suggested that there are THREE (3) major options for providing the network: Use the existing 10base T infrastructure, Replace it with newer Ethernet components/ cabling, or Use Wi-Fi. Explain the differences between 10base T over Cat 5 UTP; newer versions of Ethernet; and Wi-Fi. Based on the THREE (3) options, recommend which technology the company should use. **3 marks**

**b)** A hub, a switch, a wireless access point and a router are networking components. Explain the differences between them and identify the OSI layer at which each component operates. For each component, support your answer with ONE (1) reason. **5 marks**

**This task requires around 300 words.**

# **Task 2: Addressing (7 Marks)**

Rehab Housing wants you to provide a clear explanation about network addressing.

a) Distinguish briefly between IPv4 and IPv6. **3 marks**
b) what is ARP and why is it needed? **2 marks**
c**)** Define the terms Default Gateway and Subnet Mask and briefly explain why
 bothare required in this project. **2 marks**

**This task requires around 300 words.**

# **Task 3: Security (7 Marks)**

The MD is seriously worried about security.
**a)** How would you ensure that there is a secure connection between the new shop and head office networks? Explain your answer. **4 marks**
**b)** How would you ensure that users of the open access tablets or the Wi-Fi can’t access the local server? **3 marks**

**This task requires around 300 words.**

# **Task 4: Diagram and explanation (7 Marks)**

# Rehab Housing wants a clear diagram to show how the components of the new system will be connected. You should provide the following-**a)** Draw a logical network diagram (topology) that shows the main components of the network (including connection to the new branch office). Allocate suitable IP addresses and add them in the diagram. **5 marks****b)** give local prices and specification of suitable hardware/ software you use. **2 marks**

**This task requires around 100 words.**

# **Task 5 Topology– 6 Marks**

1. What do you mean by topology of a network? Does it affect the performance of a network? **2 marks**
2. Explain different types of topology of a network. **2 marks**
3. Recommend a suitable topology for this particular scenario? Justify your answer. **2 marks**

**This task requires around 200 words.**