Unit:
Computer Networks

Assignment title:
Marketing Company

December 2015 – Sample Assignment

Important notes

- Please refer to the *Assignment Presentation Requirements* for advice on how to set out your assignment. These can be found on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- You must read the NCC Education documents *What is Academic Misconduct? Guidance for Candidates* and *Avoiding Plagiarism and Collusion: Guidance for Candidates* and ensure that you acknowledge all the sources that you use in your work. These documents are available on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- You **must** complete the *Statement and Confirmation of Own Work*. The form is available on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- Please make a note of the recommended word count. You could lose marks if you write 10% more or less than this.
- You must submit a paper copy and digital copy (on disk or similarly acceptable medium). Media containing viruses, or media that cannot be run directly, will result in a fail grade being awarded for this assessment.
- All electronic media will be checked for plagiarism.

Introduction

This assignment enables you to demonstrate your knowledge and understanding of computer networks. You are required to produce a substantial document that totals 3000 words. Subsequently, you are advised to start work on the assignment at an early stage during the module. 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 judgements 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

AMDM Marketing is marketing company that was established five years ago by two brothers: Andrew Michaels and David Michaels. The company has 10 employees and it has been growing steadily over the last two years. It wants to move to a larger premises and recruit more staff. It expects to have a staff of between 15 and 20 people within the next year.

Before starting the company, Andrew Michaels studied networks and computer systems at college, so he remembers some of the old technology. Andrew takes responsibility for designing the office premises and purchasing equipment. In the past, he had some bad experiences of IT companies trying to sell him things that he did not require, so he has asked you to advise him.

Andrew is very keen to ensure that the network will be as future-proof as possible. In other words, he wants the network to still be operational even when technology changes. However, he also wants the network to not be expensive.

The office premises that Andrew wants to move the company into are a single floor of a modern steel-frame building. The office contains 5 rooms: 1 large open plan office-space and 4 smaller offices for managers. In the modern steel-frame building, there are three floors of concreate construction and stud-partition walls. Different companies occupy the other two floors of the building. The building is in a business park with high-speed (fibre) communications available.

Marketing in the 21st century is now dominated by digital marketing and media. *AMDM* are now dealing with an increasing amount of multimedia data and have subsequently employed a member of staff with expertise in web analytics. Some staff will be using desktop PCs (Andrew is one of the few in the media industry who is not wedded to Apple), others have laptops and most staff have Samsung tablets (or iPads).

Task 1 – Networking infrastructure and Protocols (40 Marks)

Andrew Michaels remembers learning at college about several networking technologies including Token Ring, Ethernet and FDDI. He recalled that FDDI was 'the future', but he cannot remember specific details about it. As a result, he has asked you to complete the following:

a) Briefly explain the difference between Ethernet, Token Ring, FDDI and Wi-Fi. You **must** make a recommendation about which technology he should use. You should discuss differences in topology, data rate and the type of cable required. A good answer will relate your recommendation to the business requirements of *AMDM Marketing*.

b) Andrew recalls that Ethernet used something called 'baseband' and that it did not work effectively with high levels of congestion. He also thought that Token ring did not degrade as quickly under higher loads.

Explain what is meant by baseband **and** how Ethernet deals with two computers transmitting at the same time. You should also explain how modern Ethernet networks increase performance.

c) In his old office, the staff used long cables to plug their computers into a 10-base-T hub. This organisation was very untidy and the performance was not good. Andrew wants better performance and more professional environment.

Explain what is meant by a 10-base-T hub is **and** say whether it would be suitable for the new office. If you do not think it is suitable, you should propose an alternative technology that would be better. You should discuss how the cabling and connections should be made installed for the network. A good answer will identify costs of components involved.

d) Wireless access for tablets and mobile phones is essential. Andrew wants to know whether it is possible to dispose of all cables and just use Wi-Fi. He remarked that 'Wi-Fi is just as good these days as the new 802.11ac provides you with one gigabit per second'.

Is Andrew's comment valid? Your answer should include an explanation of Wi-Fi standards and components. It should also include a discussion of the advantages and disadvantages of Wireless.

This task requires approximately 1300 words.

Tasks continue on next page

Task 2 Addressing (20 Marks)

Andrew has a series of questions about what he calls 'network addresses'. He has asked you to complete the following:

a) Explain why devices on a network need addresses.

b) Explain the difference between a *MAC address* and an *IP address*. You should relate your answer to the OSI model.

c) Explain how devices get their MAC or IP address.

d) Explain how a packet gets from one network to another. Your explanation should relate this movement to the IP address format.

e) As the Internet has expanded we have run out of IP addresses. Outline TWO (2) ways how this problem has been overcome.

This task requires approximately 600 words.

Task 3 – Security (15 Marks)

Andrew has read many stories about hacking and security breaches and wants to ensure that he is taking appropriate measures. He has asked you to complete the following:

a) Identify and briefly explain THREE (3) security concepts.

b) Identify SEVEN (7) measures that should be taken to keep the network secure. It should include hardware, software, policies and ways of checking them.

c) Your uncle has heard that a firewall 'blocks ports'. Briefly explain what is meant by a port **and** whether a firewall would want to block a port. You should also discuss what is meant by a *well-known port*.

d) What do you think is the biggest threat for this system? Justify your answer.

This task requires approximately 500 words.

Task 4 – Diagram and explanation (15 Marks)

Andrew likes your ideas, but he thinks it would be easiest to understand with a diagram. He has asked the following:

a) Draw a network diagram, showing the main components of the network.

b) Invent suitable IP addresses and add them in the diagram. You should include the subnet mask.

c) Explain why you have chosen the particular components **and** why you have connected them together in that way. Discuss the location of components.

d) Give local prices and specification of suitable hardware/ software you recommend.

This task requires approximately 300 words plus a diagram.

Task 5 Telephony (10 Marks)

Finally, Andrew has a few questions concerning the phone system. He wants to reduce the company's costs, and he has heard that VOIP is a cheaper form of telephony. He has asked you to complete the following:

a) Briefly explain what is meant by a VOIP.

b) Explain how you could incorporate VOIP into the system. You should identify the required components and outline the actions you would need to perform to get it to work.

c) Briefly explain how incorporating VOIP into the system impacts on network performance?

This task requires approximately 300 words.

Guidance and submission requirements

- Your answers should be word-processed and total 3000 words in length (+/- 10%) You will lose marks if you go under or over this word count.
- Familiarise yourself with the NCC Education Academic Dishonesty and Plagiarism Policy and ensure you correctly reference all the sources which you use in your work.
- All references and citations must adhere to the Harvard system.
- Media containing viruses, or media which cannot be run directly, will result in a fail grade being awarded for this module.

Candidate checklist

Please use the following checklist to ensure that your work is ready for submission.

Have you read the NCC Education documents *What is Academic Misconduct? Guidance for Candidates* and *Avoiding Plagiarism and Collusion: Guidance for Candidates* and ensured that you have acknowledged all the sources that you have used in your work? ❑

Have you completed the *Statement and Confirmation of Own Work* form and attached it to your assignment? **You must do this.** ❑

Have you ensured that your work has not gone over or under the recommended word count by more than 10%? ❑

Have you ensured that your work does not contain viruses and can be run directly? ❑