جامعة الحسين التقنية
Al Hussein Technical University

ASSIGNEMNT BRIEF

HTU Course No: 30201110	HTU Course Name: Networking
BTEC UNIT No: H/615/1619	BTEC UNIT Name: Networking

Assignment Brief Number: 8

Version: 2

جامعة الحسين التقنية
Al Hussein Technical University

Assignment Brief

Student Name/ID Number	
HTU Course Number and Title	**30201110 Networking**
BTEC course number and title	**H/615/1619 Networking**
Academic Year	2020/2021 (Spring Semester)
Assignment Author	Eng. Moath Sulaiman
Course Tutor	Dr. Huthaifa Omari, Eng. Moath Sulaiman
Assignment Title	(COVID-19) Vaccine Centres
Assignment Ref No	Assignment 8
Issue Date	**28th April 2021**
Formative Assessment dates	22nd April , 3rd June 2021
Submission Date	**18th June 2021 13:00**
IV Name & Date	Eng. Malik Louzi 26/4/2021

Submission Format

There should be one submission for this assignment (including all parts). Each student individually should submit his work that shall include:

a) **An individual written report** covering the required details in the (Assignment Brief and Guidance) section.

b) **Evidence** of an implemented network supported by a **witness statement or observation record**. Students should use the **Cisco Packet Tracer** simulator **version 8** and submit a **soft copy of the .pkt** file and a screen shot included in the report. There will be a mandatory discussion session regarding your implemented work. Instruction, date and time for the discussion will be specified later.

PS: Do not upload a zipped file!! Just upload each file separately.

report guidelines:

in your report, you should make use of headings, paragraphs, and subsections as appropriate. The expected word limit is about 5000 words (recommended 20-25 pages including designs/screenshots/images…etc), although you will not be penalised for exceeding the total word limit. Do your best to be within the word limit. Your report should be:

1. In a form of a **soft copy** submitted via the URL below.
2. Written in a formal business style using **single spacing and font size 12**.
3. Must be supported with research and referenced using the Harvard referencing system.

Note: Soft copies submissions should be done through the university's eLearning system within the deadline specified above from below link: https://elearning.htu.edu.jo/

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Unit Learning Outcomes

LO1 Examine networking principles and their protocols.
LO2 Explain networking devices and operations.
LO3 Design efficient networked systems.
LO4 Implement and diagnose networked systems.

Assignment Brief and Guidance

You have been recently employed as a Junior Network Architect for Ministry of Health (MoH). As the number of covid-19 infected people in Jordan is increasing dramatically, MoH is planning to open (11) big centers all over the country to provide vaccines for people. Cities of **Amman, Irbid, Zarqa, Madaba, Jarash, Ajloun, Mafraq, Karak, Ma'an, Tafelah, and Aqaba** were selected as the locations for those centers.

Information of citizens being taken the vaccine should be entered in a centralized database located in MoH datacenter. The access to the database is done through a secure website based on a front-end back-end architecture.

Dedicated datacenter is located in MoH headquarter (HQ) in Amman but different from the location of the vaccine center. Those centers should be all connected to each other as well as to the datacenter to access multiple e-services as described below.

Based on the business requirements, it has been decided that employees, in all those centers shall:

1. have access to the MoH internal system that was built to register and input information for people taking the vaccine via a **secure** website (https://vaccine.moh.gov.jo). The access should be done using FQDN (Fully Qualified Domain Name).
2. be able to share and **transfer files (**like medical reports, images, etc..) among all centers.
3. be able to send and receive **emails** for each other.
4. be able to connect some portable devices to the local network **wirelessly and securely.**

Part1:

Regarding the network infrastructure for the centres to be implemented, your manager asked you to provide some information that might help in taking some decisions related to the network infrastructure like the different network topologies, protocols, servers, and devices. He mainly asked you to provide a detailed report that should include but not limited to:

- discussion about different **Network types** (minimum four) that might be used in this project including their usage, benefits, and constraints. **You should recommend** what network types to be used for the project.
- Explanation of different physical Network **topologies** (minimum four) and their characteristics. Provide **detailed comparison** (in table format) between any two of the network topologies of your choice.
- Identifying Networking **Protocols** that are needed to achieve the business requirements above. Critically evaluate the topology protocol you selected to demonstrate the efficient utilisation of a networking system. Relate this to the OSI model.

- Discussion about different **networking devices** that you think might be needed for this project (not necessarily to be implemented in the simulation).
- Explore a range of **server types** and **justify the selection** of the servers to be implemented, taking into consideration applications used, infrastructure needs, cost, and performance optimization.
- Discuss the inter-dependences of the hardware (devices like servers, client PC, routers…etc) with relevant networking software.

Part 2:

Your manager selected you to be part of the team who is going to design and implement the IT network required for those centres. The centers must be connected to the MoH's data center in Amman. You will need to analyse the specifications that you collected from the decision makers in MoH as below:

HQ datacentre:

People: 2 network administrators.

Resources: 2 PCs, all servers, no Wi-Fi should be provided in the datacentre

Each vaccine center:

Resources: 5 computers used to access the e-services required, 2 network printers, Wi-Fi access.

- Each centre must be of different IP subnet than the other centres.

Part 2.1: Design efficient networked systems

1. **Design a networked system** to meet the business requirements listed above. Prepare a written step-by-step plan on how you are going to design a Local Area Network. **Your design should include**:
    a. **a clear blueprint** of your overall network including all servers and devices in all locations.
    b. **Network configuration** information **for each field hospital**. (including devices, valid IP range used, IP configuration used, router configuration…. etc).
    The main subnet given to you as a Network Architect is **192.168.55.0/24**. For the IP configuration in all centres and the servers network, you have to **do the proper subnetting** for this range **(192.168.55.0)** that fits the number of subnets and the number of hosts per subnet.
    c. Detailed information about the servers to be installed:
        i. Services to be installed (minimum five services)
        ii. Configuration of each service
        iii. IP address of the server.
2. **Justify** your choice of **network services** and **devices** for your network design.

3. Produce a **detailed test plan** to <u>test the design</u> against the requirements above. The plan should cover the following:
    a. What to be tested
    b. Tools or commands used for testing.
    c. Expected results.
4. Provide a **maintenance schedule** to support the networked system.

<u>Part 2.2: Implement tests and diagnose networked systems</u>

1. **Implement a networked system** based on your prepared design. *(might use a network simulator)*
2. **Conduct verification** with e.g. Ping, extended ping, trace route, nslookup, telnet, ftp, etc.
3. **Record** the test results **and analyse** these against expected results.
4. **Recommend** potential enhancements and **investigate** what functionalities would allow the networked system to support device **growth** and the addition of communication devices.
5. Discuss the significance of upgrades and security requirements in your recommendations. Use critical reflection to **evaluate own work** and **justify valid conclusions**.

Learning Outcomes and Assessment Criteria			
Learning Outcome	**Pass**	**Merit**	**Distinction**
LO1 Examine networking principles and their protocols			
	P1 Discuss the **benefits** and **constraints** of different **network types** and standards. **P2** Explain the impact of **network topology**, communication and bandwidth requirements.	**M1 Compare** common networking principles and how **protocols** enable the **effectiveness** of networked systems.	**D1** Critically evaluate the topology protocol selected for a given scenario to demonstrate the efficient utilisation of a networking system.
LO2 Explain networking devices and operations			
	P3 Discuss the **operating principles** of networking devices. **P4** Discuss the **inter-dependence of workstation hardware with** relevant networking **software**.	**M2** Explore a range of **server types** and **justify** the selection of a server, considering a **given scenario regarding cost and performance optimisation**.	
LO3 Design efficient networked systems			
	P5 Design a networked system to meet a given specification. **P6** Test and evaluate the design to meet the requirements and analyse user feedback.	**M3** Install and configure network services and applications on your choice.	**D2** Design a maintenance schedule to support the networked system.
LO4 Implement and diagnose networked systems			
	P7 Implement a networked system based on a prepared design. **P8** Document and analyse test results against expected results.	**M4** Recommend potential enhancements for the networked systems.	**D3** Use critical reflection to evaluate own work and justify valid conclusions.

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STUDENT ASSESSMENT SUBMISSION AND DECLARATION

When submitting evidence for assessment, each student must sign a declaration confirming that the work is their own.

<table>
<tr><td colspan="2">Student name:

Student ID:

Is the student repeating the unit? Yes No</td><td>Assessor name:

Eng. Moath Sulaiman</td></tr>
<tr><td>Issue date:
28/4/2021</td><td>Submission date:
18th June 2021</td><td>Submitted on:</td></tr>
<tr><td colspan="3">Programme: Computing</td></tr>
<tr><td colspan="3">HTU Course Name: Networking BTEC Course name: Networking
HTU Course Code: 30201110 BTEC Course Code: H/615/1619</td></tr>
<tr><td colspan="3">Assignment number and title:

Assignment 8: (COVID-19) Vaccine Centers</td></tr>
</table>

Plagiarism

Plagiarism is a particular form of cheating. Plagiarism must be avoided at all costs and students who break the rules, however innocently, may be penalised. It is your responsibility to ensure that you understand correct referencing practices. As a university level student, you are expected to use appropriate references throughout and keep carefully detailed notes of all your sources of materials for material you have used in your work, including any material downloaded from the Internet. Please consult the relevant unit lecturer or your course tutor if you need any further advice.

Student declaration
I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.
Student signature: **Date:**