TECHNOLOGICAL UNIVERSITY DUBLIN

Grangegorman

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TU857 – BSc in Computer Science (Infrastructure)

Year 4

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SEMESTER 1 EXAMINATIONS 2022/23

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CMPU4050 – Systems Integration

Internal Examiner(s):
Dr. Eoin Rogers
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External Examiner(s):
Ms. Caroline McEnroy

Instructions To Candidates: Answer **ALL** Questions. All questions worth equal marks.

Exam Duration: 2 hours

1. **(a)** In the context of DNS, explain in your own words the difference between an *authoritative* and *non-authoritative* response.

   (5 marks)

   (b) Explain in detail how the domain name **www.website.com** would be resolved using DNS. Assume the DNS resolver sends its query to a recursive server. In your answer, reference the behaviour of the resolver, recursive server and authoritative servers.

   (10 marks)

   (c) Briefly define each of the following terms in your own words:

       i.   DNS zone
       ii. Negative cache
       iii. Time-to-live (TTL)
       iv. DNS resolver
       v. CNAME record

   (5 marks)

2. **(a)** Describe in your own words a typical DHCP transaction, making explicit reference to the four message types used in such a transaction.

   (10 marks)

   (b) In your own words, describe the difference between *static* and *dynamic* address allocation in the context of DHCP.

   (5 marks)

   (c) List *five* types of network configuration information that can be provided to a client by a DHCP server.

   (5 marks)

3. **(a)** Describe in your own words the purpose of the NFS protocol.

   (5 marks)

   (b) Describe the *four* steps that must be undertaken to allow file sharing to take place between a client and server using NFS.

   (8 marks)

   (c) The following entry appears in the **/etc/exports** file for an NFS server:

   /var/shared 192.168.0.0/24(rw,async,no_subtree_check)

   Give a detailed explanation of the meaning of this entry in your own words.

   (7 marks)

4. **(a)** Describe in your own words the meaning of the term *DevOps*.

   (5 marks)

   (b) The permissions for a particular directory on a Linux/Unix system are displayed as:

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drw-rw-r---
```

Explain in your own words what this notation means.

(5 marks)

(c) On a typical Linux filesystem, what would you expect to be stored in each of the following directories:

    i.   /boot
    ii. /etc
    iii. /usr
    iv. /sbin
    v. /home

(5 marks)

(d) Briefly describe in your own words what each of the following commands do on a Linux/Unix system:

    i.   cd
    ii. grep
    iii. cp
    iv. file
    v. expr

(5 marks)

5. (a) As a system administrator for a small company you have been asked to set up a web server to host content for internal access. There is no budget and you've been asked to use a low specification system for the task. Explain the steps required to setup a locally accessible web server.

(5 marks)

(b) It has been decided to allow access to the previously configured web server for external users. Assume the company uses fixed globally accessible public IP addresses. Explain how access to the server could be achieved.

(5 marks)

(c) If the company switched ISP and were given a single IP address for use with NAT, how would this affect the web access?

(5 marks)

(d) Describe in your own words how the problem mentioned in part (c) could be addressed.

(5 marks)