FRANKLIN UNIVERSITY PROFICIENCY EXAM (FUPE)
STUDY GUIDE

Course Title: COMP 204: Principles of Computer Networks

Recommended Textbook(s): https://www.franklin.edu/current-students/academic-resources/textbooks

Number & Type of Questions: 55 – Multiple Choice

Permitted Materials: Scratch paper

Time Limit: 120 minutes (2 hours)

Minimum Passing Score: 80%

Outline of the Topics Covered:

Course Description

This course serves as an introduction to the function, design, administration, and implementation of computer networks. Topics include network infrastructure, architecture, protocols, applications, and the OSI networking model. Note, this course has proctored exam(s).

Prerequisites

COMP 111: Introduction to Computer Science and Object-Oriented Programming

Course Outcomes

1. Upon successful completion of this course, students will be able to:
2. Diagram an end-to-end network communication path, describing each intermediate step
3. Design a small-scale network configuration, including addressing, routing, and switching
4. Describe the functions of the TCP/IP and Ethernet protocols including select fields, flags, options, headers, and trailers for both
5. Distinguish between types of data elements (segments, packets, frames, and bits)
6. Map the key elements of the TCP/IP protocol suite to the OSI model

Course Content

1. Network Models & Cabling and Topology
   a. OSI seven-layer model and the TCP/IP model
   b. Major functions of networks
   c. Types of network topologies
   d. Types of network cabling and connectors
   e. IEEE networking standards

2. Ethernet Basics & Modern Ethernet
   a. Early Ethernet implementations
   b. How to Extend and enhance Ethernet networks
   c. Copper- and fiber-based Gigabit Ethernet
   d. Varieties of 100-megabit Ethernet, Gigabit and beyond Gigabit ethernet

3. Installing a Physical Network & TCP/IP Basics
   a. Structured cabling system
   b. Network interface cards
   c. Basic troubleshooting of a structured cable network
   d. TCP/IP protocol suite working principles

      e. CIDR and subnetting

      f. Static and dynamic IP addresses

4. Routing & TCP/IP Applications
   a. Working principles of routers
   b. Dynamic routing technologies
   c. Common Transport and Network layer protocols
   d. Port numbers
   e. Common TCP/IP applications such as HTTP, HTTPS, Telnet, SSH, e-mail (SMTP, POP3, and IMAP4), and FTP.

5. Network Naming & Securing TCP/IP
   a. Early name resolution solutions
   b. Functions and capabilities of DNS
   c. Utilities to diagnose problems with DNS
   d. Securing TCP/IP networks
   e. TCP/IP security standards
   f. Secure TCP/IP applications

6. Advanced Networking Devices
   a. Features and functions of VPNs
   b. Capabilities and management of managed switches
   c. Virtual LANs
   d. Advanced switch features.

7. IPv6 & Remote Connectivity
   a. Fundamental concepts of IPv6
   b. IPv6 practices and implementation of IPv6 in a TCP/IP network
   c. WAN telephony technologies, such as SONET, T1, and T3
   d. Remote access connection methods
   e. Troubleshooting in various WAN scenarios

8. Wireless Networking & Virtualization and Cloud Computing
   a. Wireless networking standards
   b. Implementing Wi-Fi networks
   c. Troubleshooting techniques for wireless networks
   d. Fundamentals of virtualization
   e. The benefits and uses cases of virtualization in modern networks
   f. Cloud service layers and architectures

9. Mobile Networking & Building a Real-World Network
   a. Mobile networking technologies
   b. Deployment schemes for mobile devices

c. Security issues with mobile devices

d. Basic network design & unified communication features and functions

e. ICS/SCADA network functions and major components

10. Managing Risk & Protecting Your Network

   a. Risk management standards

   b. Contingency planning

   c. Safety standards and actions

   d. Security threats in network computing

   e. Vulnerabilities inherent in networking

   f. Hardening networks

   g. Basics of firewalls

11. Network Monitoring

   a. SNMP protocol principles

   b. Network monitoring tools

   c. Network troubleshooting process and tools

   d. Common network issues

Sample Questions

1) Which sentence is correct for two computers in the same network?

   a. They should have unique IP addresses to communicate

   b. They can communicate over MAC addresses even if they do not have IP addresses

   c. They can use the same IP addresses if they are using a switch instead of a hub

   d. They can always use the same IP address because they have different MAC addresses

2) Which of the following subnet can be used in a network with less than 70 computers?

   a. 255.255.255.192

   b. 255.255.255.0

   c. 255.255.0.0

   d. 255.0.0.0

3) Which of the following cannot be usually detected by a port scanner?

   a. Active hosts on a network

   b. Open TCP ports on the active hosts

   c. Open UDP ports on the active hosts

   d. MAC addresses of the active hosts

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