COMP 012 - Network Administration

Windows + Linux + Packet Tracer + Python Automation

SESSION 2: NETWORK TOPOLOGY AND SIMULATION

ACTIVITY 2.1: NETWORK TOPOLOGY DESIGN PRINCIPLES

Topic: Understanding and designing network topologies

Description: Learn network topology types and design best practices

INSTRUCTIONS:

Research network topologies:

- Bus topology - characteristics, pros/cons
- Star topology - most common, central point
- Ring topology - token passing, redundancy
- Mesh topology - full vs partial mesh
- Hybrid topology - combining topologies

Hierarchical network design:

- Access layer - end devices connect
- Distribution layer - routing, filtering
- Core layer - high-speed backbone

Design considerations:

- Scalability
- Redundancy and fault tolerance
- Performance
- Security boundaries
- Cost

Create comparison table of all topologies

Deliverables: Submit topology design document with comparison table	**25 Points**

ACTIVITY 2.2: PACKET TRACER FUNDAMENTALS

Topic: Mastering Cisco Packet Tracer interface

Description: Learn to use Packet Tracer for network simulation

INSTRUCTIONS:

Explore Packet Tracer interface:

- Device categories (Routers, Switches, End Devices)
- Connection types (Copper Straight, Crossover, Serial, Fiber)
- Realtime vs Simulation mode
- Accessing device CLI

Practice device placement and connections:

• When to use straight-through cable
• When to use crossover cable
• When to use serial cable (WAN links)

Basic device configuration:

• Access CLI (click device → CLI tab)
• Enter privileged mode: enable
• Enter config mode: configure terminal
• Set hostname: hostname [name]
• Save config: copy running-config startup-config

Create simple network: 2 PCs, 1 Switch

• Assign IPs and test ping

Deliverables: Submit Packet Tracer screenshots showing interface mastery	**25 Points**

ACTIVITY 2.3: BUILDING A COMPLETE LAN

Topic: Designing and implementing a LAN in Packet Tracer

Description: Build a realistic local area network with multiple segments

INSTRUCTIONS:

Build a small office LAN:

Network requirements:

• 3 Departments: Sales, IT, Management
• 4 PCs per department (12 PCs total)
• 1 Server for file sharing
• 1 Printer shared across departments

Physical design:

• 1 Switch per department (3 switches)
• 1 Core switch connecting all
• Proper cabling between devices

IP addressing (192.168.1.0/24):

• Sales: 192.168.1.10-19
• IT: 192.168.1.20-29
• Management: 192.168.1.30-39
• Server: 192.168.1.100
• Printer: 192.168.1.200

Configure all devices with:

• IP address, subnet mask, default gateway

Test connectivity between all departments

Deliverables: Submit .pkt file and network documentation	**35 Points**

TOTAL POINTS: 85