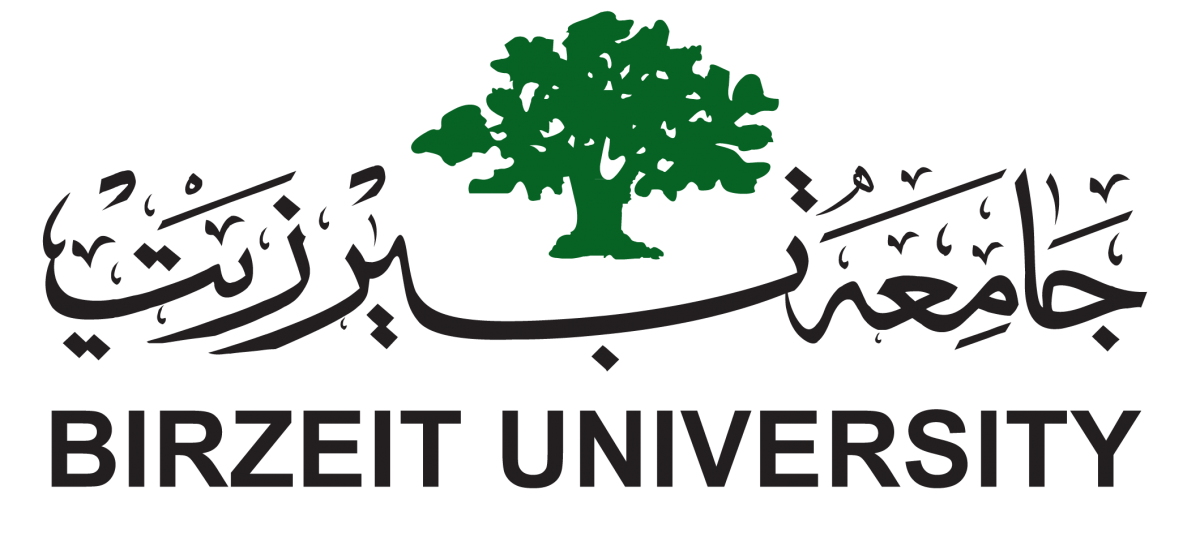
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**Faculty of Engineering and Technology**

**Department of Electrical and Computer Engineering**

**ENCS 3320: Computer Networks**

**Project#2: Cisco Packet Tracer**

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**Section: 1**

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# Abstract

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# Theory

## IP Addressing and Subnetting

## Routing Protocols

### Static Routing

### Dynamic Routing

#### OSPF

#### BGP

## Address Translation

### Network Address Translation (NAT)

### Port Address Translation (PAT)

## Wireless LAN Configuration and Security

## Network services

### Web and Email Servers

### Domain Name System (DNS)

### Dynamic Host Configuration Protocol (DHCP)

## Topology

The topology comprises three interconnected Autonomous Systems (ASs): Google Network (AS-300) for DNS and email services, Faculty of Engineering and Technology Network (AS-100) with multiple subnets and essential services like web, email, DNS, and DHCP, and Home-ISP Network (AS-200), integrating wireless LAN, NAT, and BGP for connectivity.

### Google Network (AS-300)

This network primarily handles DNS and email functionalities. Configurations include assigning static IPs to router ports and activating the DNS service with specific resource records (RRs) for domain name resolution. Additionally, an email server utilizing SMTP and POP3 protocols is set up to facilitate communication. The overarching goal is to establish efficient and reliable DNS and email services within the network.

### Faculty of Engineering and Technology Network (AS-100)

This network comprises various subnets, such as Servers, Electrical and Computer Engineering (ECE), and Computer Science (CS), with subnetting employed for optimal IP address allocation. Key configurations include setting up web, email, DNS, and DHCP services. OSPF routing ensures internal communication, while DHCP pools are created to provide dynamic IP addresses to devices within the subnets. The interconnected structure enables seamless communication and access to external resources.

### Home-ISP Network (AS-200)

This network integrates private and public IP address schemes for home and ISP connectivity. A wireless LAN is deployed with WPA2 security, and dynamic NAT combined with PAT enables internet access. DHCP is used for dynamic IP allocation to home devices, while email and web services are configured for local use. Inter-AS routing is managed using BGP to ensure connectivity between the networks.

# Procedure

Cisco packet tracer

## Google Network (AS-300)

## Faculty of Engineering and Technology Network (AS-100)

### Servers Subnet

### Electrical and Computer Engineering (ECE) Subnet

### Computer Science (CS) Subnet

### Backbone Subnet

## Home-ISP Network (AS-200)

# Results and Discussions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Servers Subnet | ECE Subnet | CS Subnet | Backbone Subnet |
| IP address (CIDR) |  |  |  |  |
| Subnet mask |  |  |  |  |
| Broadcast IP address |  |  |  |  |
| First usable host address |  |  |  |  |
| Last usable host address |  |  |  |  |

# Issues and Limitations

# Teamwork

# References

[1] Computer Networking: A Top-Down Approach, 8th edition, Jim Kurose, Keith Ross Pearson, 2020