ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCES

INDIVIDUAL ASSIGNMENT : ADMINISTRATION OF SYSTEMS AND NETWORKS
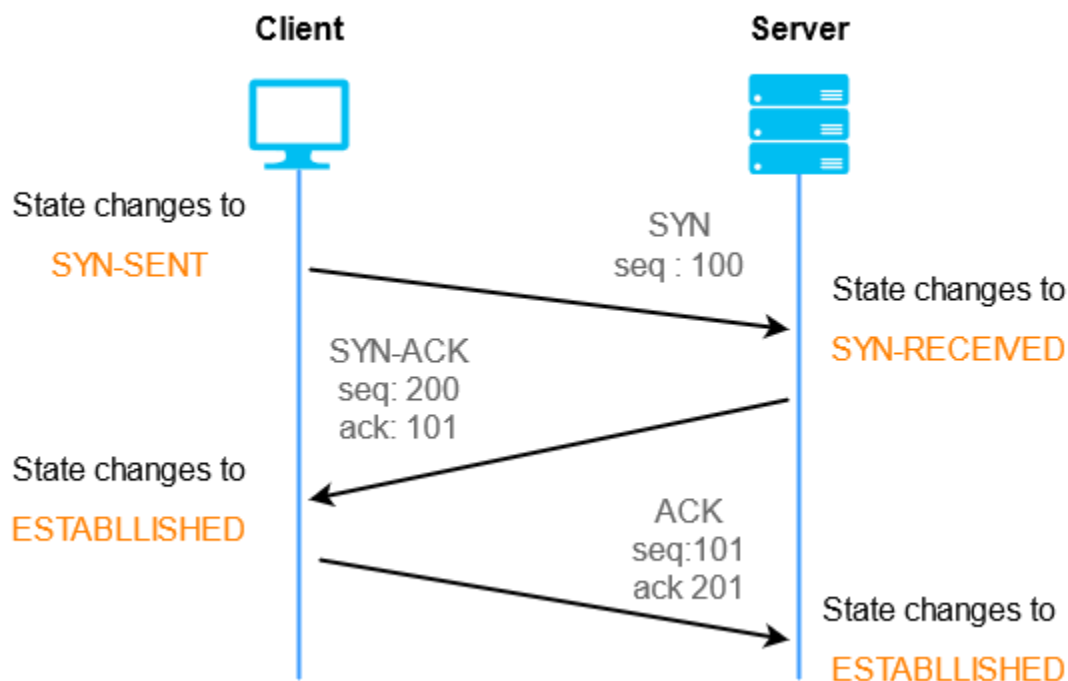
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ADMINISTRATION OF SYSTEMS AND NETWORKS INDIVIDUAL ASSIGNMENT

1. show with diagram the three way handshaking at time of connection establishment. Which transport
    protocol is used for such a purpose.

Before devices establish an actual connection, a three-way handshake takes place. This process ensures that the receiving device is synchronized and capable of acknowledging and processing data sent by the sender.

First, the sender initiates communication by transmitting a synchronization (SYN) message to the receiver. In response, the receiver acknowledges this request with a SYN-ACK message. Finally, the sender confirms the connection by sending an acknowledgment (ACK) message, completing the handshake and allowing data transfer to begin.

This process is handled by the Transmission Control Protocol (TCP), which operates at the transport layer (Layer 4) of the OSI model. Since the connection is established before data transmission, TCP is considered a connection-oriented protocol, ensuring the receiver is ready before packets are sent.

1.   Assume there are 5 networks in an organization each consisting of a maximum number of 50, 24, 16, 5 and 3 computers respectively. You are given IP address 192.168.1.0/24. Using VLSM subnetting allocate IP addresses for each network. Determine also the network, broadcast, subnet mask and default gateway addresses for each network.

Branch Name	Maximum number of devices	Number of addresses	Host bits
Branch 1	50	52	6
Branch 2	24	26	5
Branch 3	16	28	4
Branch 4	5	7	3
Branch 5	3	5	2

IP given = 192.168.1.0/24.

Branch 1 = Maximum 50 devices needed, IP = 192.168.1.0/24

	/26
Network Address	192.168.1.0
Subnet Mask	255.255.255.192
Broadcast Address	192.168.1.63
Host Address Range	192.168.1.1 - 192.168.1.62
Default Gateway	192.168.1.1

In this branch we needed to connect a maximum of 50 devices so we used the /26 representation, By borrowing 2 bits from the host side.

Branch 2 = Maximum 24 devices needed, IP = 192.168.1.64/24

	/27
Network Address	192.168.1.64
Subnet Mask	255.255.255.224
Broadcast Address	192.168.1.95
Host Address Range	192.168.1.65 - 192.168.1.94
Default Gateway	192.168.1.65

In this branch we needed to connect a maximum of 24 devices so we used the /27 representation, By borrowing 3 bits from the host side.

Branch 3 = Maximum 16 devices needed, IP = 192.168.1.96/24

	/28
Network Address	192.168.1.96
Subnet Mask	255.255.255.240
Broadcast Address	192.168.1.111
Host Address Range	192.168.1.97 - 192.168.1.110
Default Gateway	192.168.1.97

In this branch we needed to connect a maximum of 16 devices so we used the /28 representation, By borrowing 4 bits from the host side.

Branch 4 = Maximum 5 devices needed, IP = 192.168.1.112/24

	/29
Network Address	192.168.1.112
Subnet Mask	255.255.255.248
Broadcast Address	192.168.1.119
Host Address Range	192.168.1.113 - 192.168.1.118
Default Gateway	192.168.1.113

In this branch we needed to connect a maximum of 5 devices so we used the /29 representation, By borrowing 5 bits from the host side.

**Branch 5 =** Maximum 3 devices needed, IP = 192.168.1.120/24

	/30
Network Address	192.168.1.120
Subnet Mask	255.255.255.252
Broadcast Address	192.168.1.123
Host Address Range	192.168.1.121 - 192.168.1.122
Default Gateway	192.168.1.121

In this branch we needed to connect a maximum of 3 devices so we used the /30 representation, By borrowing 6 bits from the host side.

1.A   given organization needs to establish independent networks for its 10 branches. Assume it has been decided to use two class C IP addresses 200.200.22.0/24 and one 200.200.33.0/24. Use VLSM (Variable Length Subnet Mask) to subnet and allocate IP addresses for all branches.

Branch name	Maximum number of computers	Number of addresses	Host bits
Branch 1	49	51	6
Branch 2	58	60	6
Branch 3	42	44	6
Branch 4	119	121	7
Branch 5	37	39	6
Branch 6	25	27	5
Branch 7	3	5	2
Branch 8	4	6	2
Branch 9	5	7	3
Branch 10	5	7	3

a. Draw a diagram that shows all the networks and the interfaces of the routers.
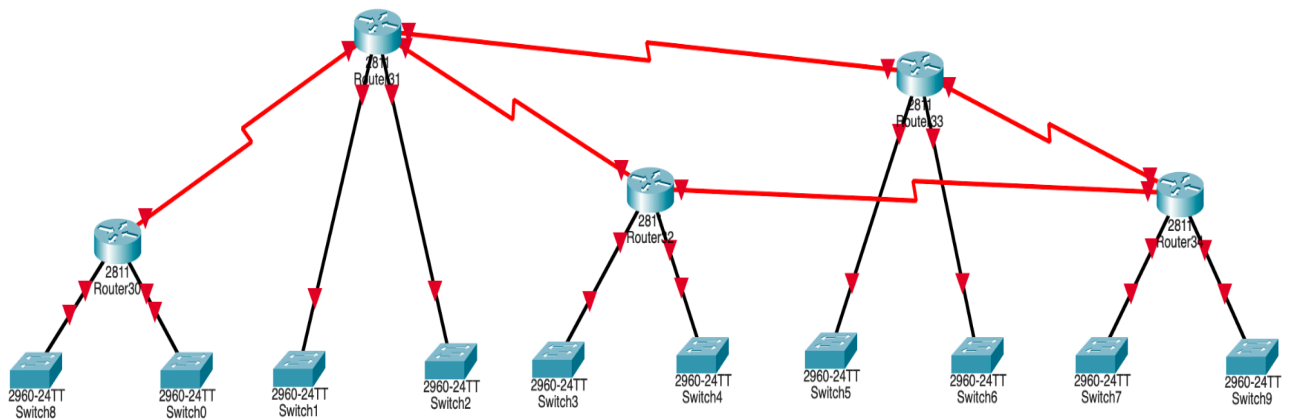
B. Write for all networks the network, broadcast, subnet mask addresses.

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Branch 1 = Maximum 49 devices needed, IP = 200.200.22.0/24

	/26
Network Address	200.200.22.0
Subnet Mask	255.255.255.192
Broadcast Address	200.200.22.63
Host Address Range	200.200.22.1- 200.200.22.62
Default Gateway	200.200.22.1

In this branch we needed to connect a maximum of 49 devices so we used the /26 representation,
By borrowing 2 bits from the host side.

Branch 2 = Maximum 58 devices needed, IP = 200.200.22.64/24

	/26
Network Address	200.200.22.64
Subnet Mask	255.255.255.192
Broadcast Address	200.200.22.127
Host Address Range	200.200.22.65- 200.200.22.126
Default Gateway	200.200.22.65

In this branch we needed to connect a maximum of 58 devices so we used the /26 representation,
By borrowing 2 bits from the host side.

Branch 3 = Maximum 42 devices needed, IP = 200.200.22.128/24

	/26
Network Address	200.200.22.128
Subnet Mask	255.255.255.192
Broadcast Address	200.200.22.191
Host Address Range	200.200.22.129- 200.200.22.190
Default Gateway	200.200.22.129

In this branch we needed to connect a maximum of 42 devices so we used the /26 representation, By borrowing 2 bits from the host side.

Branch 4 = Maximum 119 devices needed, IP = 200.200.22.192/24

	/25
Network Address	200.200.22.128
Subnet Mask	255.255.255.128
Broadcast Address	200.200.22.255
Host Address Range	200.200.22.129- 200.200.22.254
Default Gateway	200.200.22.129

In this branch we needed to connect a maximum of 119 devices so we used the /25 representation, By borrowing 1 bits from the host side.

Branch 5 = Maximum 37 devices needed, IP = 200.200.33.0/24

	/26
Network Address	200.200.33.0
Subnet Mask	255.255.255.192
Broadcast Address	200.200.33.63

Host Address Range	200.200.33.1- 200.200.33.62
Default Gateway	200.200.33.1

In this branch we needed to connect a maximum of 37 devices so we used the /26 representation, By borrowing 2 bits from the host side.

Branch 6 = Maximum 25 devices needed, IP = 200.200.33.64/24

	/27
Network Address	200.200.33.64
Subnet Mask	255.255.255.224
Broadcast Address	200.200.33.95
Host Address Range	200.200.33.65- 200.200.33.94
Default Gateway	200.200.33.65

In this branch we needed to connect a maximum of 25 devices so we used the /27 representation, By borrowing 3 bits from the host side.

Branch 7 = Maximum 3 devices needed, IP = 200.200.33.96/24

	/30
Network Address	200.200.33.96
Subnet Mask	255.255.255.240
Broadcast Address	200.200.33.111
Host Address Range	200.200.33.97- 200.200.33.110
Default Gateway	200.200.33.97

In this branch we needed to connect a maximum of 3 devices so we used the /30 representationBy borrowing 6 bits from the host side.

Branch 8 = Maximum 4 devices needed, IP = 200.200.33.112/24

	/30
Network Address	200.200.33.112
Subnet Mask	255.255.255.240
Broadcast Address	200.200.33.127
Host Address Range	200.200.33.113- 200.200.33.126
Default Gateway	200.200.33.113

In this branch we needed to connect a maximum of 4 devices so we used the /30 representation,
By borrowing 6 bits from the host side.

Branch 9 = Maximum 5 devices needed, IP = 200.200.33.128/24

	/29
Network Address	200.200.33.128
Subnet Mask	255.255.255.248
Broadcast Address	200.200.33.135
Host Address Range	200.200.33.129- 200.200.33.134
Default Gateway	200.200.33.129

In this branch we needed to connect a maximum of 5 devices so we used the /29 representation,
By borrowing 5 bits from the host side.

Branch 10 = Maximum 5 devices needed, IP = 200.200.33.136/24

	/29
Network Address	200.200.33.136
Subnet Mask	255.255.255.248
Broadcast Address	200.200.33.143

Host Address Range	200.200.33.137- 200.200.33.142
Default Gateway	200.200.33.137

In this branch we needed to connect a maximum of 5 devices so we used the /29 representation, By borrowing 5 bits from the host side.

C. Assume RIP is configured on all routers. Write the routing table formed at Router 1 after convergence.

enable
configure terminal
show ip route

Destination Network	Subnet Mask	Next Hop	Interface
200.200.22.0	255.255.255.192	Directly connected	f0/0
200.200.22.64	255.255.255.192	Directly connected	f0/1
200.200.22.128	255.255.255.192	200.200.22.129	s0/2/0
200.200.22.192	255.255.255.128	200.200.22.129	s/0/2/0