Q1. The network of Dimension International School is subnetted based on an IPv4 address of 192.168.3.0/24. The School consists of 20 classroom and 5 offices. Each classroom and office require a subnet to support the teaching and administrative works. Answer the following questions.

1. How many subnets are needed? *(201705 TAR UC, resit)* (1 mark)

25

1. How many bits must be borrowed to support the required number of subnets?

*(201705 TAR UC, resit)* (2 marks)

5

1. How many usable host addresses per subnet? *(201705 TAR UC, resit)* (2 marks)

8

1. Compute the decimal value of the new subnet mask. *(201705 TAR UC, resit)* (2 marks)

11111111 11111111 11111111 11111000

255.255.255.248

1. Compute and list the first 4 subnets information in the table below. Write your answer in dotted decimal format. *(201705 TAR UC, resit)* (8 marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subnet Number | Subnet Address/Prefix Length | First Usable Address | Last Usable Address | Broadcast Address |
| 1 | 192.168.3.0/29 | 192.168.3.1/29 | 192.168.3.6/29 | 192.168.3.7/29 |
| 2 | 192.168.3.8/29 | 192.168.3.9/29 | 192.168.3.14/29 | 192.168.3.15/29 |
| 3 | 192.168.3.16/29 | 192.168.3.17/29 | 192.168.3.22/29 | 192.168.3.23/29 |
| 4 | 192.168.3.24/29 | 192.168.3.25/29 | 192.168.3.30/29 | 192.168.3.31/29 |

Table 1: Subnet Table

Q2. Given Host IP address 192.168.4.210 and subnet mask 255.255.255.240. Complete the Table

2. *(201703 TAR UC, resit)* (8 marks)

|  |  |
| --- | --- |
| Host IP Address | 192.168.4.210 |
| Subnet Mask | 255.255.255.240 |
| Number of Subnet Bits | 4 |
| Number of Subnets | 16 |
| Number of Host Bits per Subnet | 4 |
| Number of Usable Hosts per Subnet | 14 |
| Subnet Address for this IP Address | 192.168.4.208 |
| IP Address of First Usable Host on this Subnet | 192.168.4.209 |
| IP Address of Last Usable Host on this Subnet | 192.168.4.222 |
| Broadcast Address for this Subnet | 192.168.4.223 |

Table 2: Custom Subnet Table Q3. With reference to Figure 1, answer the following questions:

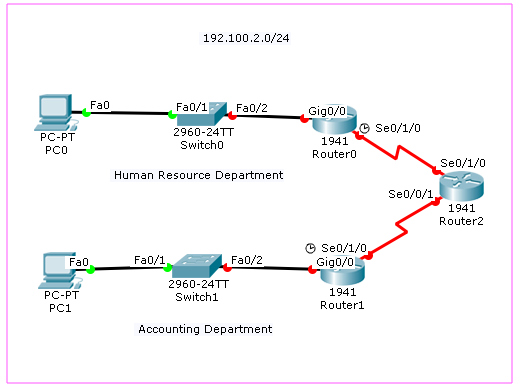


Figure 1: Branch Campus Network

1. In Figure 1, how many subnets are needed? *(201609 TAR UC, Main)* (1 mark)

4 subnets

1. How many bits must be borrowed to support the required number of subnets?

*(201609 TAR UC, Main)* (2 marks)

2 bits

1. How many usable host addresses per subnet? *(201609 TAR UC, Main)* (2 marks)

2^6-2 = 62

1. Compute the decimal value of the new subnet mask. *(201609 TAR UC, Main)* (2 marks)

255.255.255.192

1. Computer and list all possible subnet information in the format given in Table 3.

*(201609 TAR UC, Main)* (8 marks)

|  |  |  |  |
| --- | --- | --- | --- |
| Subnet No | Subnet Address/ Prefix length | Host Range | Broadcast Address |
| 0 | 192.100.2.0/26 | 192.100.2.0/26 - 192.100.2.62/26 | 192.100.2.63/26 |
| 1 | 192.100.2.64/26 | 192.100.2.65/26 - 192.100.2.126/26 | 192.100.2.127/26 |
| 2 | 192.100.2.128/26 | 192.100.2.129/26 - 192.100.2.190/26 | 192.100.2.191/26 |
| 3 | 192.100.2.192/26 | 192.100.2.193/26 - 192.100.2.254/26 | 192.100.2.255/26 |

Table 3: Subnetting Table

Q4. Provide any TWO (2) reasons for subnetting a network. (*201709 TAR UC main*) (4 marks)

TWO (2) reasons for subnetting (okay I know there’s 3 here stop panicking and just pick 2 already):

* It reduces overall network traffic (less broadcasts & ARP cr\*p flying everything)
* It improves network performance (related to first point)
* Enables administrator to implement security policies such as which subnets are allowed or not allowed to communicate together (just like how we have rooms in a building)

Q5. Define Variable Length Subnet Mask (VLSM). (*201709 TAR UC main*) (3 marks)

* Variable length subnet mask allows a much tighter control over your addressing scheme (means less waste)
* If you use a class C address with a default subnet mask, you end up with one subnet containing 256 addresses. (Example of wastage)
* By using VLSM, you can adjust the number of subnets and number of addresses depending on the specific needs of your network.. (Example of less waste, if you think this doesn’t make sense, its okay, I mean its not like your clothes are cut to fit your body right? /s)

Q6. The network of Sri Intan Holding is subnetted based on an IPv4 address of 192.168.13.0/24.

The company needs 4 networks. Based on these needs, answer the following questions:

1. List TWO (2) considerations when planning subnets. (2 marks)

The number of host addresses required for each network

The number of individual subnets needed. (Yes, yes I know they are complete opposites, but this is what the marking scheme says)

1. How many subnets are needed? (1 mark)

4 subnets

1. How many bits must be borrowed to create the required number of subnets? (2 marks)

2 bitts

1. How many usable host addressed per subnet? (2 marks)

64-2 = 62 hosts

255.255.255.192

* 1. How many subnets are available for future use? (2 marks)

0 subnets

* 1. Calculate and list all the possible subnet information in the table below. Write your answer in dotted decimal value.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Subnet Number** | **Subnet Address/ Prefix Length** | **First Usable Host Address** | **Last Usable Host Address** | **Broadcast Address** |
| 0 | 192.168.13.0/26 | 192.168.13.1 | 192.168.13.62 | 192.168.13.63 |
| 1 | 192.168.13.64/26 | 192.168.13.65 | 192.168.13.126 | 192.168.13.127 |
| 2 | 192.168.13.128/26 | 192.168.13.129 | 192.168.13.190 | 192.168.13.191 |
| 3 | 192.168.13.192/26 | 192.168.13.19 | 192.168.13.254 | 192.168.13.255 |

Table 3-1: Subnet Table

(8 marks)