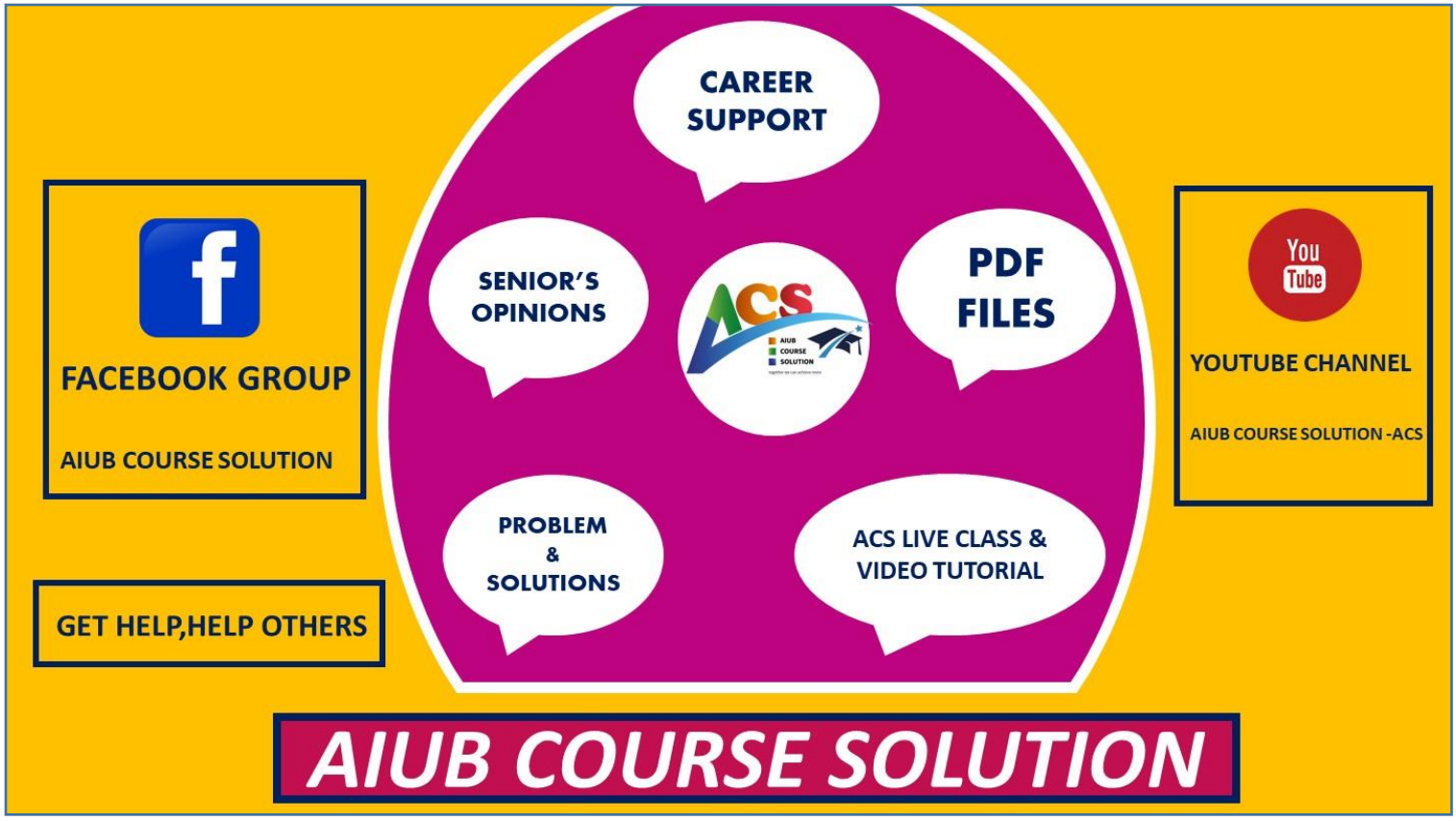

TOGETHER WE CAN ACHIEVE MORE

COURSE NAME: Computer Networks

CHAPTER: Lab Lecture-3

SOLVED BY

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☆ Lab Lecture :- 3 || Variable Length Subnet Masking

⇒ VLSM → Variable length Subnet Masking

⇒ VLSM → different networks → different number of IP-এর requirement থাকে।

⇒ Point-to-point network – Wide Area Network (WAN) → require ২টি IP

⇒ Each link requires 4 IP → ⇒ 2 host IP ⇒ 1 broadcast IP
⇒ 1 network IP

IP distribution in Classful Addressing :

⇒ In classful addressing, the number of IP addresses allocated for each network is 256.

Example: Suppose there are 7 networks A, B, C, D, E, F and G, which requires 56, 5, 21, 26, 9, 4 and 4 number of IPs respectively. So find the percentage of unused IP?

Ans: Here, the number of required IPs are -

$$56+5+21+26+4+9+4 = 120$$

And, the number of allocated IPs are = $256 \times 7 = 1792$

So, the percentage of unused IP = $\frac{(1792-120)}{1792} \times 100$

$= 93\%$ (approx)

Ans)

IP allocation using VLSM:

Example: Suppose that, network A, B and C requires IP 50, 4 and 28. You are given an IP block 130.3.0.0; allocate IP performing subnetting.

Ans:

Subnet	Required IP	Bit to borrow	Number of allocated IPs	No. of host bits No. of ned bits	Subnet Mask	Allocated IP range
A	50	$2^6 > 50 > 2^5$	64	$x = 6$ $y = 32 - 6 = 26$	255.255.255.192	13.3.0.0 - 13.3.0.63 /26
C	28	$2^5 > 28 > 2^4$	32	$x = 5$ $y = 32 - 5 = 27$	255.255.255.224	13.3.0.64 - 13.3.0.95/27
B	4	$2^2 = 4$	4	$x = 2$ $y = 32 - 2 = 30$	255.255.255.252	13.3.0.96 - 13.3.0.99/30

⇒ IP requirements -এর descending order-এ সাজানো।

⇒ 4th Column: Number of allocated IPs must be greater or equal to required IPs

⇒ 3rd column -এ 2-এর ঘাত power হবে 5th column-এর x, তারপর number of host bits এবং $y = 32 - x$ = number of ned bits [total number of bit = 32]

⇒ 6th column -এর subnet mask-এর last octate হবে = (256 - Number of allocated IPs)

⇒ 7th Column IP allocation-এর last octate - (range-এর last IP) ⇒

For C, $63 + 32 = 95$; For B, $95 + 4 = 99$

Example:- Suppose, network A, B and C requires IP 500, 4000 and 208 respectively. For IP block 130.3.0.0, allocate IPs performing subnetting. Find percentage of unused IP.

Ans:

Subnet	Required IPs	Bits to borrow	Number of allocated IPs	Number of host bits Number of net bits	Subnd Mask	Allocated IP range
B	4000	$2^{12} > 4000 > 2^{11}$	4096	x = 12 Y = 32-12 = 20	255.255.240.0	130.3.0.0 – 130.3.15.255/20
A	500	$2^9 > 500 > 2^8$	512	x = 9 Y = 32 - 9 = 23	255.255.254.0	130.3.16.0 – 130.3.17.255/23
C	208	$2^8 > 208 > 2^7$	256	x = 8 Y = 32-8 = 24	255.255.255	130.3.18.0 – 130.3.18.255/24

Here, number of allocated IPs = (4096 + 512 + 256) = 4864

and, number of required IPs = (4000 + 500 + 208) = 4708

So, the percentage of used IP's = $\frac{(4864 - 4708)}{4864} \times 100 = 3.20\%$

Ans

[Here, for subnet A, net IP = 130.3.16.0 ; host IP = 130.3.16.1 – 130.3.17.254 ;
broadcast IP = 130.3.17.255 ;]

⇒ 6th Column: For class B, in 5th column we can see the host bits = 12 and net bits = 20 ; so convert the net bits (1s) and the host bits (0s) to decimal. The result will be the subnet mask of 6th column। বাকিগুলো same ভাবে করতে হবে।

⇒ 7th Column: For subnet B, 4th column থেকে পাই → no. of allocated IPs = 4096 ; এখন, 4096 ÷ 256 = 16 ; এখন 7th column এর range-এর last IP বের করতে হলে → 130.3.0 + (16-1).255 = 130.3.15.255 । 130.3.15.255 এর পরের IP হচ্ছে 130.3.16.0 । (বাকিগুলোও same calculation)