CCN assigment

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Q1. Explain Hamming code?
Demonstrate Representation of 4-bite code 1101 into 7 bit, even parity hamming code.

→ Hamming codes are advanced error detection codes that use combination of parity bits to identify the position of error. Redundant bits are added to the original bits to ensure no bits were lost during transfer.

Convert to Hamming Code
1101

Number of Redundant bits = r

$$2^r \geq m + r + 1,$$ where m is number of original bits.

For $r = 3$
$2^r \Rightarrow$
$2^3 \geq 4 + 3 + 1$
$8 \geq 8$

Total bits in hamming code = $3 + 4 = 7$

7	6	5	4	3	2	1
P_7	P_6	P_5	D_4	P_3	D_2	D_1

Redundant bits are added to pos^n: 1,2,4

7	6	5	4	3	2	1
1	1	0	D_4	$P_3$1	D_2	D_1

For D_1, check even parity at 1,3,5,7. 1 if no parity, else 0.

$D_1 = 0$

7	6	5	4	3	2	1
1	1	0	D_4	1	P_2	0

For D_2, check even parity at 2,3,6,7. 1 if no parity, else 0

$D_2 = 0 1$

			D_4	1	0 1	0

1	1	0	D_4	1	1	0

For D_4, check even parity at 4,5,6,7

$D_4 = 0$

1	1	0	0	1	1	0

∴ 1101 in Hamming code is 1100110

Q2 On a local subnet with 255.255.240.0 subnet mask. Number of IP addresses issued to host.

→ 32 bit representation of 255.255.~~255~~ 240. 0 is:

11111111. 11111111. 11110000. 00000000

↓
Network

Host
$n = 12$

Total number of Host IPs $= 2^n = 2^{12} = 4096$

∴ 4096 IPs can be issued to the host.