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CSE320

Quiz-3

Fall 2022

Total Marks: 15

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[CO3] 1. Write two benefits of using FHSS. What is the number of possible frequency hopping if we use FHSS with a channel bandwidth of B =5 KHz [bandwidth needed to transmit data] and Bss =80 KHz? [bandwidth given as carrier frequency] [5]

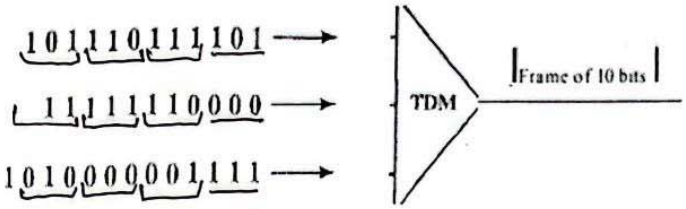
Two benefits of using FHSS are, we can use multiple carries frequency here. and our data is more secure her.

Number of the possible frequency hopping if we use FHSS with a channel bandwidth of B = 5 KHz and Bss = 80 kHz is,

$\frac{80}{5} = 16$. (Ans:)

5

[CO3] 2. The figure shows a multiplexer in a synchronous TDM system. Each output slot is only 10 bits long (3 bits taken from each input plus 1 framing bit). What is the output stream? The bits arrive at the multiplexer as shown by the arrows. [5]



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Output bit stream:

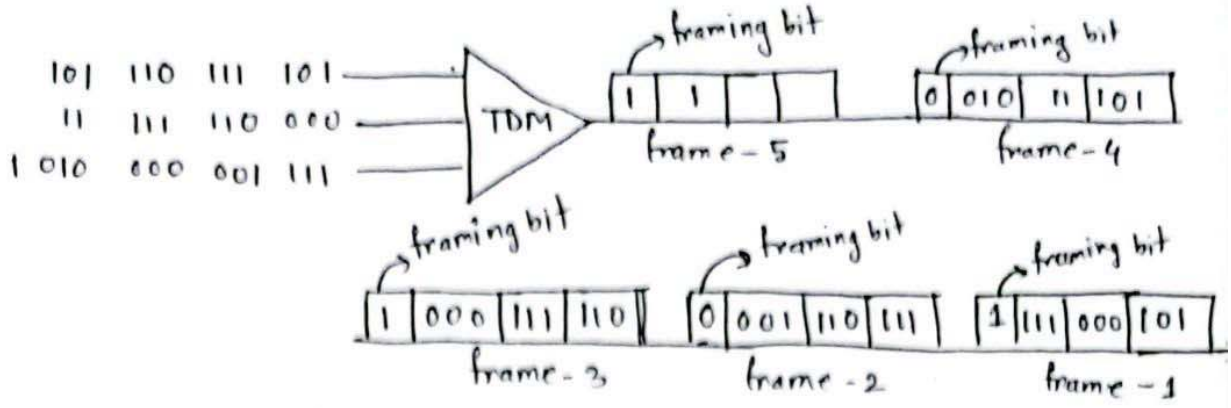
For Frame 1: 1 | 111 | 000 | 101

For Frame 2: 0 | 001 | 110 | 111

For Frame 3: 1 | 000 | 111 | 110

For Frame 4: 0 | 010 | 111 | 101

For Frame 5: 1 | 1 | | |



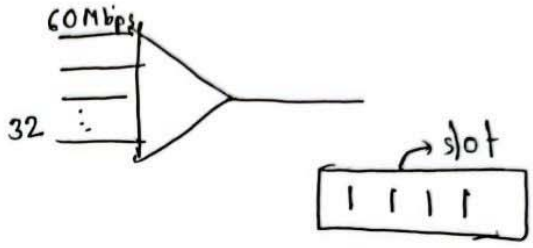
[CO3] 3. In which scenario, Statistical TDM would be a better choice over Synchronous TDM? Suppose, BRAC_TEL company has 32 data channels, each of 60Mbps. They use synchronous TDM to multiplex these channels. If 4 bits at a time is multiplexed (4 bits in each output slot), answer the following questions: [1+4]

i. What is the size of an output frame in bits?

ii. What is the duration of an output frame?

iii. What is the output bit rate?

iv. What is the input bit duration?



When we do not know that a channel will send data or not in that case statistical TDM would be a better choice over synchronous TDM.

(i) size of a frame = $4 \times 32 = 128$ bits

(ii) Output frame duration = $\frac{\text{no. of bits per frame}}{\text{output bit rate}} = \frac{128}{1.92 \times 10^9} = 6.67 \times 1$

(iii) Output bit rate = $60 \times 10^6 \times 32 = 1.92 \times 10^9$ bps

(iv) Input bit duration = $\frac{1}{60 \times 10^6} = 1.67 \times 10^{-8}$ s

4+1 = 5