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BTECH 3RD YEAR

MIT Tutorial 4

Ans 1: Let us first calculate the T-states.

$$\text{Total Tstates} = 10 + (6 + 32 + 8 + 4 + 4) \times X + 10(X-1) + 7$$

Here X denotes the number of times the loop gets executed.

It is equal to the value of BC pair when B or C is 0.

Hence, At first check $B = 12H$ $C = FEH$ and ~~or~~. This will run until $B = 0$ and $C = 0$. Hence $X = (12FF)_{16} = 4863$.

$$\text{Hence, Tstates} = 10 + (54)(4863) + 10 \times 4862 + 7 \\ = \underline{311239}$$

$$\text{Delay} = 311239 \times \frac{1}{3} = 103746 \mu\text{s} = \underline{103.746 \text{ ms}}$$

Ans 2: Delay generated by given code =

$$7 + (4 + 4 + 4) \times \text{COUNT} + 10(\text{COUNT} - 1) \\ + 10 + (\text{COUNT} - 1) + 7 = 100 \times 3.072$$

$$14 + 12\text{COUNT} + 10\text{COUNT} - 10 = 3072$$

$$22\text{COUNT} + 4 = 3072$$

$$22\text{COUNT} = 3068 \quad 303.2$$

$$\text{COUNT} = \frac{303.2}{22} = \underline{13.78}$$

$$= 14$$

$$= \underline{\underline{0EH}}$$

Ans 3: let the required 16 bit value be X.

Then the total T states for loop 1 are

$$= (6+4+4)X + 10(X-1) + 7$$
$$= 24X - 3$$

Total T states for loop 2 are:-

$$= (10 + 24X - 3 + 4)20 + 19 \times 10 + 7$$

$$= 11 + 24X \times 20 + 197$$

$$= 220 + 480X + 197$$

$$= 480X + 417$$

Now,

$$480X + 417 = 6144000$$

$$X = 12799.950$$

$$\approx (12800)_{10}$$

$$\approx (3200)_H$$

Ans 4: let the required 16 bit value be X.

Then the total T states for loop 1 are

$$10 + (6+4+4+10)X$$
$$= 24X + 10$$

Now,

$$24X + 10 = \frac{250 \times 10^6}{325}$$

$$X = (32050.86)$$

$$\approx (32051)_{10}$$

$$\approx (7D33)_H$$

If last cycle is considered to add 7 states,
then total Tstates =

$$10 + (6 + 4 + 10)X + (10)(X-1) + 7$$

$$= 10 + (6 + 4 + 10)X - 10 + 7$$

$$= 7 + 24X$$

Hence,

$$24X + 7 = \frac{250 \times 10^6}{325}$$

$$X = 32050.99$$

$$X \approx (32051)_{10}$$

$$\approx (7D33)_H$$

Hence, No change is seen