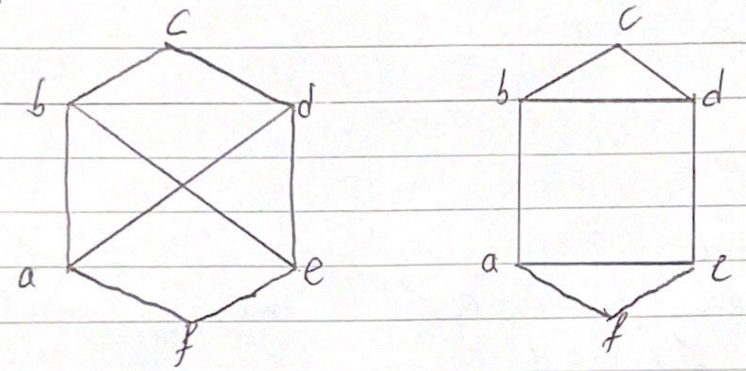
Q3A)

i) Two graphs $G_1$ and $G_2$ are said to be isomorphic if :1. Number of component (vertices and edges) are same

2. Their edge connectivity is retained ~~ie~~ the graph $G_1$ & $G_2$ is a bijection between the vertex set $G_1$ & $G_2$.

$G_1$



$G_1$ & $G_2$ are isomorphic graphs.

$$\begin{array}{ccc} G_1 & & G_2 \\ c & \longrightarrow & c \\ b & \longrightarrow & b \\ d & \longrightarrow & d \\ a & \longrightarrow & a \\ e & \longrightarrow & e \\ f & \longrightarrow & f \end{array}$$

∵ Both graphs have 6 vertices with same degree of matrices, they are isomorphic

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B) ii) $((P \to Q) \to R) = ((\sim P \vee Q) \to R) \to$ Implication low

$= \sim(\sim P \vee Q) \vee R \to$ Implication low

$= (P \wedge \sim Q) \vee R \to$ De Morgan Law

$= (P \vee R) \wedge (\sim Q \wedge R)$ // $\to$ Distributive Law

$\therefore$ The CNF of $((P \to Q) \to R)$ is $(P \vee R) \wedge (\sim Q \vee R)$

B) ii) 1, 1, 2, 3, 5, 8, . . .

$f_n = f_{n-1} + f_{n-2}$

The recurrence is given by $f_n = f_{n-1} + f_{n-2}$ which is homogenous & linear. The quadratic equation $x^2 = x + 1$, $f_1 = f_2 = 1$

$ax^2 - x - 1 = 0$

$$x = \frac{1 \pm \sqrt{1+4}}{2}$$

$$x_1 = \frac{1+\sqrt{5}}{2}, \quad x_2 = \frac{1-\sqrt{5}}{2}$$

$f_n = u x_1^n + v \cancel{3} x_2^n$

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$$f_n = u\left(\frac{1+\sqrt{5}}{2}\right)^n + v\left(\frac{1-\sqrt{5}}{2}\right)^n$$

$n=1$

$$f_1 = u\left(\frac{1+\sqrt{5}}{2}\right) + v\left(\frac{1-\sqrt{5}}{2}\right)$$

$$u\cdot\left(\frac{1+\sqrt{5}}{2}\right) + v\cdot\left(\frac{1-\sqrt{5}}{2}\right) = 1 \quad \rightarrow (1)$$

Put $n=2$

$$\therefore f_2 = u\left(\frac{1+\sqrt{5}}{2}\right)^2 + v\left(\frac{1-\sqrt{5}}{2}\right)^2$$

$$u\left(\frac{1+\sqrt{5}}{2}\right)^2 + v\left(\frac{1-\sqrt{5}}{2}\right)^2 = 1 \quad \rightarrow (2)$$

Solve (1) & (2) simultaneausly

$$u = \frac{1}{\sqrt{5}} \;\&\; v = \frac{-1}{\sqrt{5}}$$

$$f_n = \frac{1}{\sqrt{5}}\left(\frac{1+\sqrt{5}}{2}\right)^n + \left(\frac{-1}{\sqrt{5}}\right)\left(\frac{1-\sqrt{5}}{2}\right)^n$$

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