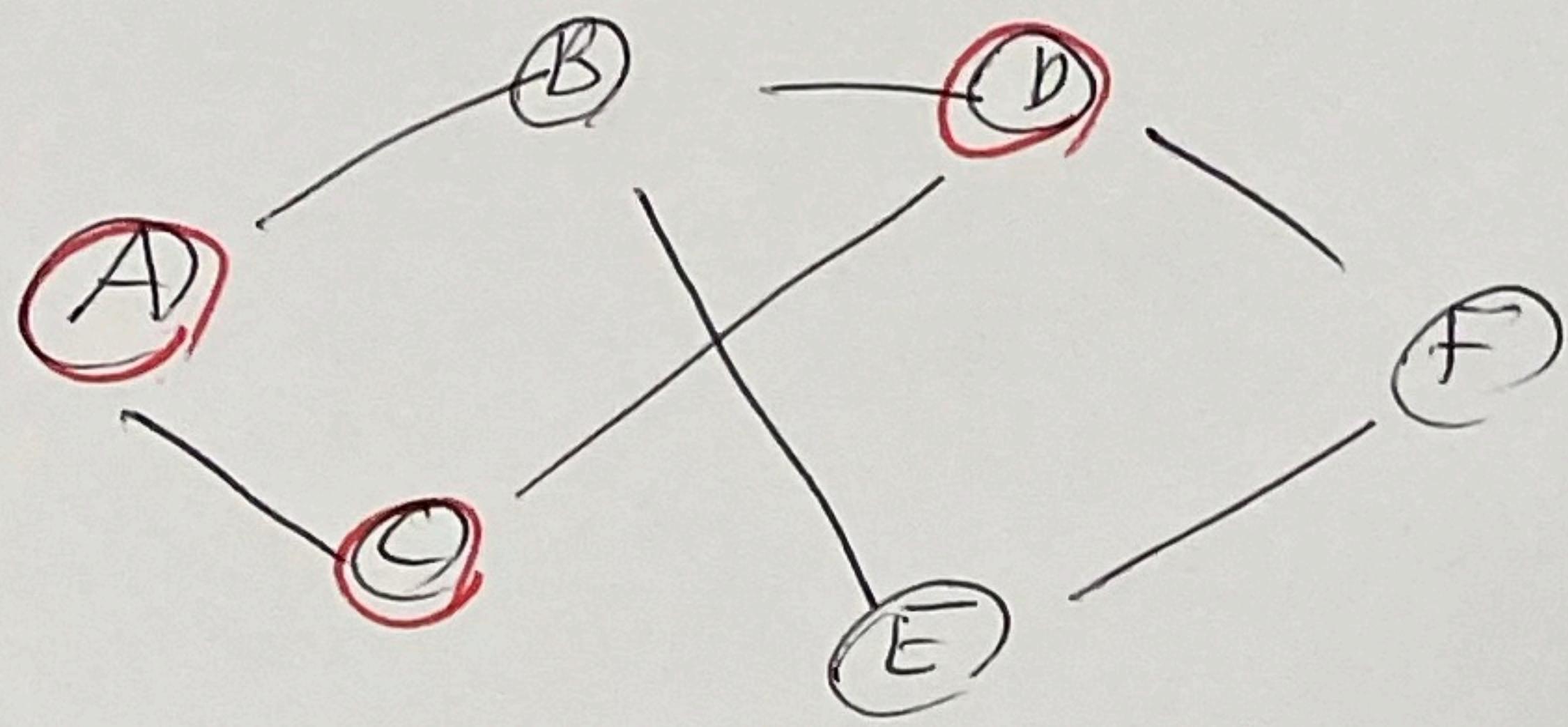


1)



$$p(x, y) = \frac{1}{Z} \prod_{c \in C} \psi_c(x_c, y_c) = \frac{1}{Z} \psi_{A,B}(a, b) \psi_{A,C}(a, c) \dots \psi_{E,F}(e, f)$$

$$p(y|x) \propto p(x, y) = \frac{1}{Z} \prod_{c \in C} \psi_c(x_c, y_c)$$

$$\therefore p(y_B, y_E, y_F | x_A, x_C, x_D)$$

$$= \frac{p(y_B, y_E, y_F, x_A=a, x_C=c, x_D=d)}{\int p(y_B, y_E, y_F, x_A=a, x_C=c, x_D=d) dy_B dy_E dy_F} \rightarrow \text{let } Z(a, c, d)$$

$$= \frac{1}{Z(a, c, d)} \cdot \left[\left(\psi_{A,B}(a, b) \cdot \psi_{A,C}(a, c) \cdot \psi_{B,D}(b, d) \cdot \psi_{C,D}(c, d) \cdot \psi_{D,F}(d, f) \right) \cdot \left(\psi_{B,E}(b, e) \cdot \psi_{E,F}(e, f) \right) \right]$$

$$= \frac{1}{Z(a, c, d)} \cdot \left[\left[\psi_B^a(b) \cdot p(a, c) \cdot \psi_B^d(d) \cdot p(c, d) \cdot \psi_F^d(f) \right] \cdot \psi_{BE}^{a,d}(b, e) \psi_{EF}^{d,f}(e, f) \right]$$

$\therefore x_A=a, x_C=c, x_D=d$ are given.

$$\therefore \frac{1}{Z(a, c, d)} \cdot \left[\psi_B^a(b) \cdot \psi_B^d(d) \cdot \psi_F^d(f) \cdot \psi_{BE}^{a,d}(b, e) \psi_{EF}^{d,f}(e, f) \right]$$

2) read

3) read

4) read.

5) python file.