

- This is a 2-dimensional representation of an information diagram for 4 r.v.'s.

- First check that there are  $2^4 - 1 = 15$  nonempty atoms.

- This is a correct representation because the “kidney shape” representing  $X_4$  splits each nonempty atom in  $\mathcal{F}_3$  into 2 nonempty atoms in  $\mathcal{F}_4$ .

- For example, the atom

$$\tilde{X}_1^c \cap \tilde{X}_2 \cap \tilde{X}_3^c$$

in  $\mathcal{F}_3$  is split into the two atoms

$$\tilde{X}_1^c \cap \tilde{X}_2 \cap \tilde{X}_3^c \cap \tilde{X}_4$$

and

$$\tilde{X}_1^c \cap \tilde{X}_2 \cap \tilde{X}_3^c \cap \tilde{X}_4^c$$

in  $\mathcal{F}_4$ .

- Exercise: Check that all the other 6 atoms of  $\mathcal{F}_3$  are split into two atoms in  $\mathcal{F}_4$ .

- Also there is an extra nonempty atom

$$\tilde{X}_1^c \cap \tilde{X}_2^c \cap \tilde{X}_3^c \cap \tilde{X}_4$$

which is not in  $\mathcal{F}_3$ .