

## In-class Exercises: Finding all keys

Consider a relation schema  $R$  with attributes  $ABCDEF$  with functional dependencies  $S$ :

$$S = \{AB \rightarrow C, \quad BF \rightarrow E, \quad C \rightarrow BE, \quad AC \rightarrow F\}$$

1. Recap: In terms of functional dependencies, what does it mean to be a key?
2. Find all keys for relation  $R$ .

3. What is the complexity of doing this by brute force? That is, how many things did you have to compute?
4. There is potential for some big speed-ups. What did you notice about the attributes? Are there any that you know will never be in any key? Any that must be in every key?
5. Can you define some general rules for speed-ups — rules that would hold for *any* relation?
6. With these in mind, now find all keys for  $R$ .
7. How many things did you have to compute?