Question 1

The task is to generate a random model on the basis of a set of entities E and a vocabulary, which is a mapping from names to arities. Arity is the number of empty slots in a function. Zero arity means a term, like a proper name; an arity of 1 indicates a property; an arity of 2 indicates a 2 place relation, and so on.[1]

You will need to bring together a domain of entities and a vocabulary and randomly generate a model: a structure that associates 0-arity names with individuals in the domain, 1-arity names with subsets of the domain, and 2-arity names with set of ordered pairs from the domain, and so on, all randomly.

If you haven't solved the last week's assignment totally, (i) try to complete it; but if you can't do so, you may (ii) use the solution for that assignment (please see `code/util/setutils.lisp`) in your solution for this week's assignment. In case you do (ii), please study the solutions carefully.

Here is a sample output of what is expected for the assignment. Of course, your solution may look different than this, depending on your language or strategy.

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The domain of entities: (G385 G386 G387 G388 G389 G390 G391)

0-place names:

JOHN:   G389
MARY:   G391
BILL:   G391
SUE:    G386

1-place names:

HAPPY:  (G386 G388 G389 G385)
GREEN:  (G390 G388 G389 G386 G387 G385)
BOOK:   NIL
DOG:    (G391 G387 G388 G385)
CAT:    (G391 G389 G390 G385 G386 G387 G388)
HUMAN:  (G390 G388)
SLEEPS: (G387 G385 G390 G391 G388 G386 G389)
WALKS:  (G385)

2-place names:

LOVES:  ((G390 G386) (G387 G391) (G391 G388) (G389 G387) (G389 G390) (G390 G387)
         (G387 G385) (G389 G385) (G386 G387) (G391 G391) (G391 G387) (G387 G386)
         (G388 G391) (G390 G389))
HATES:  ((G390 G389) (G391 G391))
CHASES: ((G387 G389) (G390 G389) (G385 G385) (G391 G391) (G388 G390)
          (G388 G391) (G389 G387) (G387 G386) (G388 G388) (G385 G390)
          (G388 G389))
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[1] The concept of arity applies to predicates and functions themselves; here, however, we are using it as it is a property of the names of predicates and functions. This is merely for convenience, things will get clear in due course.