Q1: Attached is a Data File

Data File Description : There are n keys and corresponding n values in the json file. Assume the keys and values are of URLs. The json has key value pairs (Dictionary).

Eg: A -> D
C-> B
D-> C
E-> F

Now for a given search of a key in dictionary find the corresponding end values.
Say I want to search for a Key A, the end value should be B (A -> D-> C ->B).
It has 3 hops in between before landing on to the end value.

Problem Statement : Write a function which reads data from a json file (attached) and transform the given data file json into a
new one which has keys and their corresponding end values only.

So for the above example, the transformed value is

A -> B
C-> B
D-> B
E-> F

Q2: Probability question:

There are two boxes. The first one with 5 blue and 7 red balls. The second one with 3 blue and 9 red balls. You pick a box at random and then pull a ball out at random. You notice that the ball is blue. What is the probability that the ball came from the first box?

Q3: Probability Question:

Consider a simple coin-flipping experiment in which we are given a pair of biased coins A and B. One of these coins are randomly chosen every time and a set of 10 tosses are made and the outcomes of the tosses are recorded. In the below experiment outcomes C refers to chosen coin, and 1 -- 10 refers to the coin outcomes.

C	1	2	3	4	5	6	7	8	9	10
A	H	H	H	T	H	H	H	H	H	T
A	T	H	H	H	T	H	H	H	H	T
B	T	T	T	H	T	H	H	T	T	H
A	H	H	H	T	H	T	H	H	H	T
B	T	T	T	H	T	H	T	T	T	T

How would you get values for the c1, c2, c3 given the experiment outcomes in the following table. ie., what are the values for P(c1=A|H H H T H T H H H T), P(c2=A|T T T H T H T T H T), P(c3=A|H H T H T H T T T T)?

C	1	2	3	4	5	6	7	8	9	10
c1	H	H	H	T	H	T	H	H	H	T
c2	T	T	T	H	T	H	T	T	H	T
c3	H	H	T	H	T	H	T	T	T	T

No need of fancy codes to solve the problem. If you can solve with pen and paper and get back with the solution (attach a photocopy of your solved problem) it would be great. You may ignore the following clue if you get the answer without it.

Clue: You may have to use https://en.wikipedia.org/wiki/Chain_rule_(probability) with independence assumption.