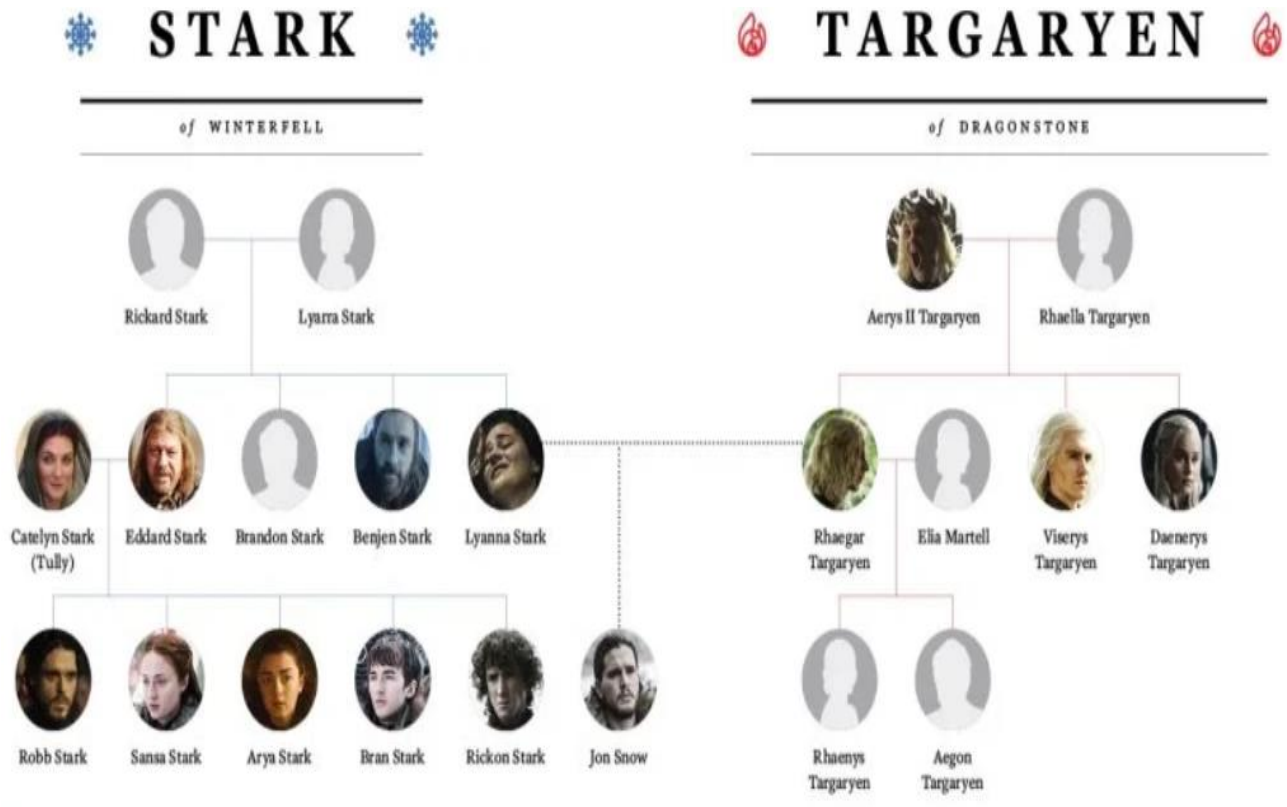
ARTIFICIAL INTELLIGENCE

ASSIGNMENT – 2

PROBLEMS:
For this assignment you will be writing simple prolog programs. Please submit the prolog file along with sample output.

> **Warning:** We will use random generator to pick and call 20 people. We will give them a simple prolog problem to solve, right in front of us. If you do the below assignments by yourself, it should take you 3 minutes or less to solve it. If you fail you will receive 0 for this assignment. Of course, in addition, you will receive a penalty of 20 towards your overall grade. The chances of you getting caught for plagiarism is 1/20. But I strongly recommend against rolling the dice.

1) Let us start with the tried and tested way of honing your prolog skills. Let us create the family tree from the famous HBO series Game of Thrones.
   You should create a set of facts of the form
   a. Child (name1, name2) (name1 is the child of name2).
   b. Spouse (name1, name2) (name1 is the spouse of name2).
   c. Male (name1) and Female (name2) for specifying gender of the characters
   d. Use the above predicates to define the following genealogical tree of the Starks and Targaryen. (The image is also attached separately)

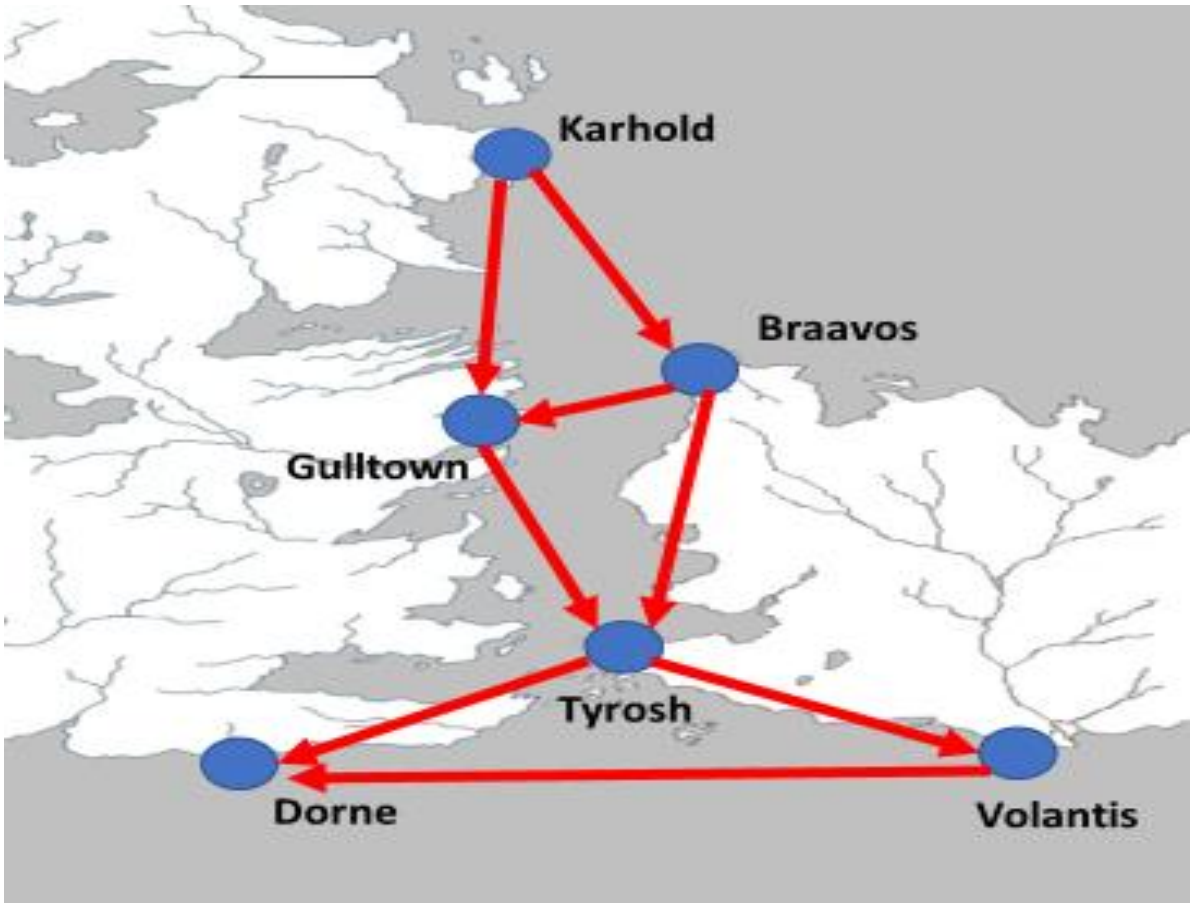


Define rules for the following predicates (self-explanatory). Some of them need to support symmetric conditions (For example: if X is brother of Y, then Y is brother of X)

e. Husband (X, Y) (where X is the husband of Y)
f. Wife(X, Y)
g. Brothers (X,Y)
h. Sisters (X,Y)
i. Siblings (X,Y) (only if X and Y are of opposite gender)
j. Mother (X,Y)
k. Father (X,Y)
l. Aunt (X, Y)
m. Uncle(X, Y)
n. Grandchild (X,Y) [gender neutral]
o. GrandSon (X, Y)
p. GrandDaughter (X,Y)
q. Descendant (X, Y) [gender neutral]

Please note that we will test your rules using a different GOT family. You will only receive points if your solution passes this test.

2) We are sailors in the Game of thrones world. Ocean currents and trade winds have a specific flow and pattern. Sometimes they make it easy to travel from A to B, but not necessarily from B to A. Please assume that our sea vessel is weak and cannot travel against the wind. Analyze the below map and represent it in prolog



You only need one predicate (max two) to represent the cities and routes. This time you get to choose the predicate(s). Remember the **Trade winds!** So, we can only consider traveling in the direction of the arrows in the map.

a. Define a predicate **reachable** (city1, city2) if city2 is reachable from city1 (of course, supported by the trade winds). Beware of cycles.
b. Improve **reachable** (city1, city2, X) where X is a list of cities in the route from city1 to city2. The first element is city1 and the last element is city2. Remember that there could be multiple paths.