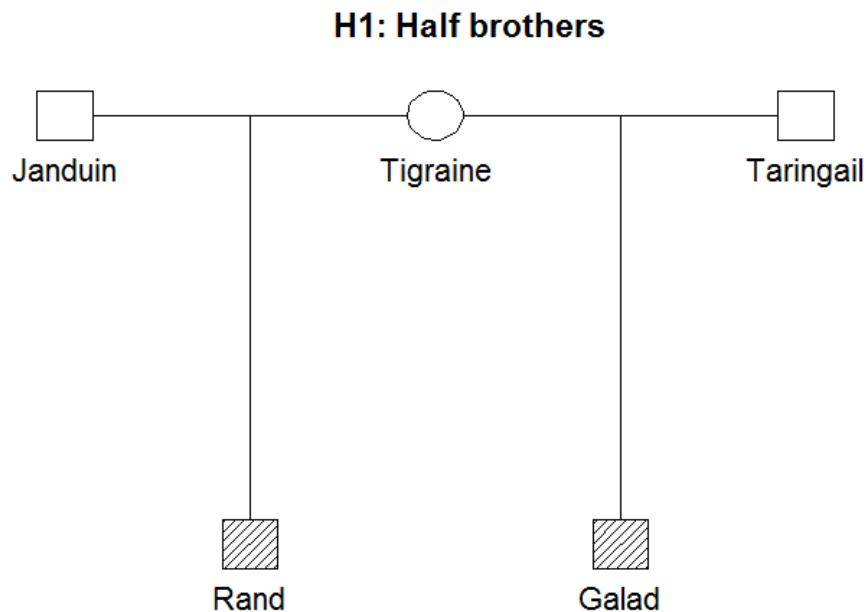


ESWG PAPER CHALLENGE 2019

Part 1: The wheel of time turns

In a distant world, legend has it a man who went by the name Rand al'Thor was a particularly powerful young man. He was raised as a farmer but later found out he truly was meant to be a great ruler. Further, according to myth he was related to the ancient noble house Damodred. In particular he allegedly shared the same mother as the valiant Galad Damodred.

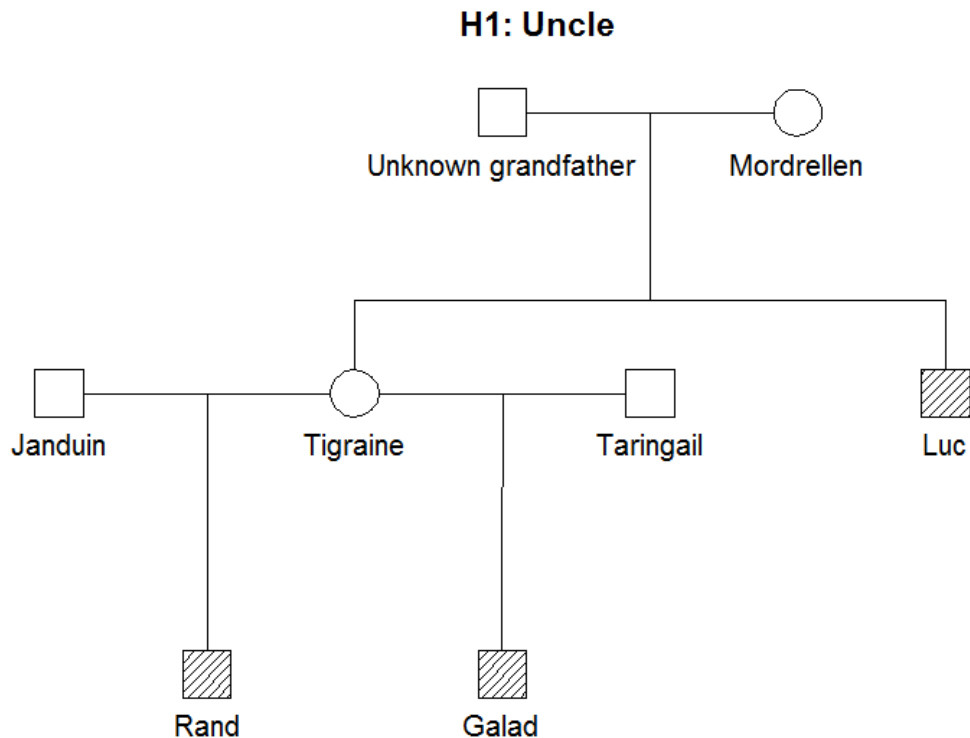
Through ancient scrolls and lore we have access to DNA data for Rand and Galad to shed light on the myths. The alleged relationship is depicted below.



Where H2 states that Rand and Galad are unrelated. Compute the likelihood ratio based on the available DNA data under the two competing hypotheses.

Part 2: The lost uncle

Further rumors have it an individual named Luc could be the maternal uncle of Rand and Galad. Given that Rand and Galad shared the same mother, test whether Luc was indeed their maternal uncle. The alleged relationship is depicted below.



Where H2 states that Rand and Galad are maternal half-brothers but unrelated to Luc. Compute the likelihood ratio based on the available DNA data under the two competing hypotheses.

Details

In Part 1 and 2 you should submit a likelihood ratio (LR) for each autosomal marker and the total LR combining the individual markers. Also, submit a LR for the results from the X chromosomal results. Present a conclusion based on the joint results from the autosomal and X chromosomal markers.

The autosomal [typing results](#) and frequency data ([Plain frequencies](#) and [Familias database](#)) are available in the given links. The X chromosomal [typing results](#) and frequency data ([haplotype data](#) and [FamLinkX database](#)) are available in the given links. All individuals can be assumed to be of Western European ancestry. The typing results are also collected into a single file available at http://familias.name/ESWG/ESWG_Collected_Data_2019.xlsx.

Please use the supplied Excel questionnaire to fill in your answers.