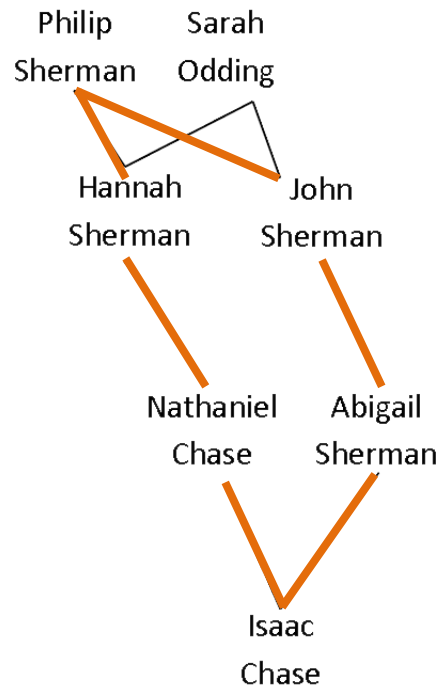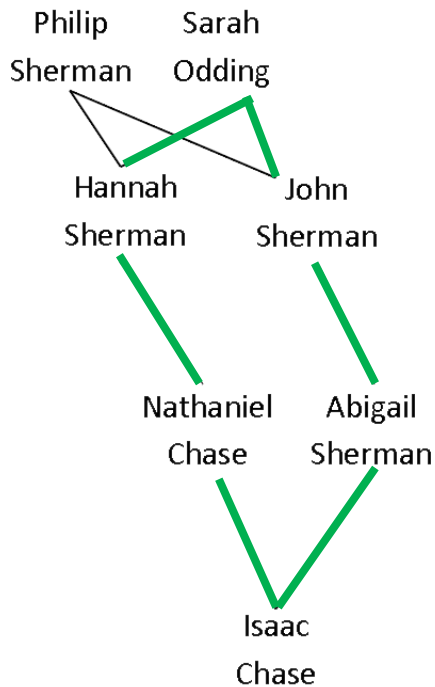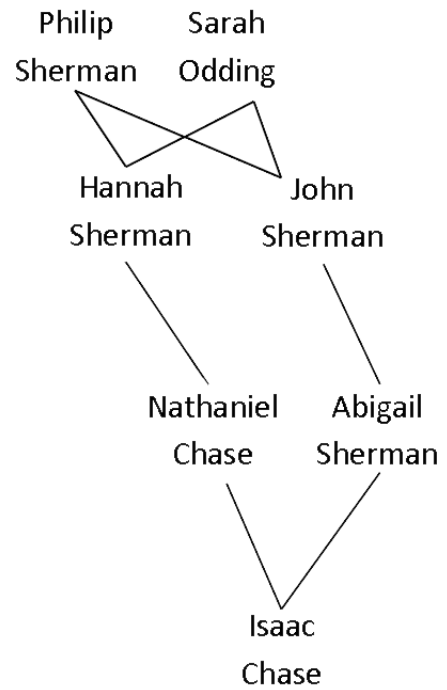# Example: Isaac Chase

Use the following excerpt from the Massachusetts Quakers family tree to calculate the coefficient of inbreeding for Isaac Chase.

$$F = 2\left(\frac{1}{2}\right)^6 + 2\left(\frac{1}{2}\right)^6 = 0.0625$$

Task 1: Henry Brayton Gifford I

A. Familiarize yourself with the Massachusetts Quakers family tree by answering the following questions.

   1. Henry Brayton Gifford I married Keziah Gifford. Who did they both inherit the name *Gifford* from?

   2. John Henry Gifford married Rebecca Ann Gifford. Who did they both inherit the name *Gifford* from?

   3. Identify two couples who are first-cousins.

B. Use the following excerpt from that family tree to calculate the coefficient of inbreeding for Henry Brayton Gifford I.

William Chase   Hannah Sherman

Eber Chase   Nathaniel Chase

Hannah Chase   Isaac Chase

Hannah Brayton   Abigail Chase

Rebecca Russell   Isaac Gifford

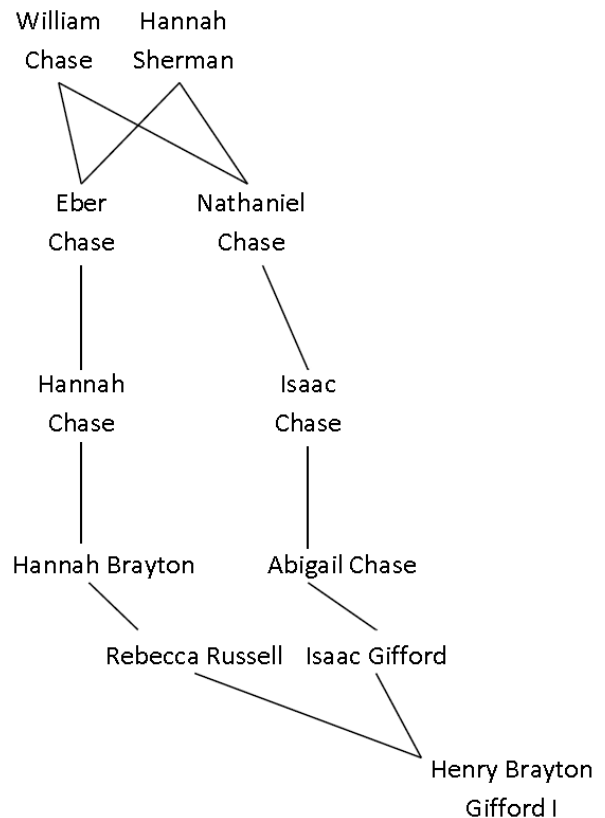Henry Brayton Gifford I

Task 2: John Henry Gifford

A. Familiarize yourself with the Massachusetts Quakers family tree by answering the following questions.

    1. Henry Brayton Gifford I married Keziah Gifford. Who did they both inherit the name *Gifford* from?

    2. John Henry Gifford married Rebecca Ann Gifford. Who did they both inherit the name *Gifford* from?

    3. Identify two couples who are first-cousins.

B. Use the following excerpt from that family tree to calculate the coefficient of inbreeding for John Henry Gifford.
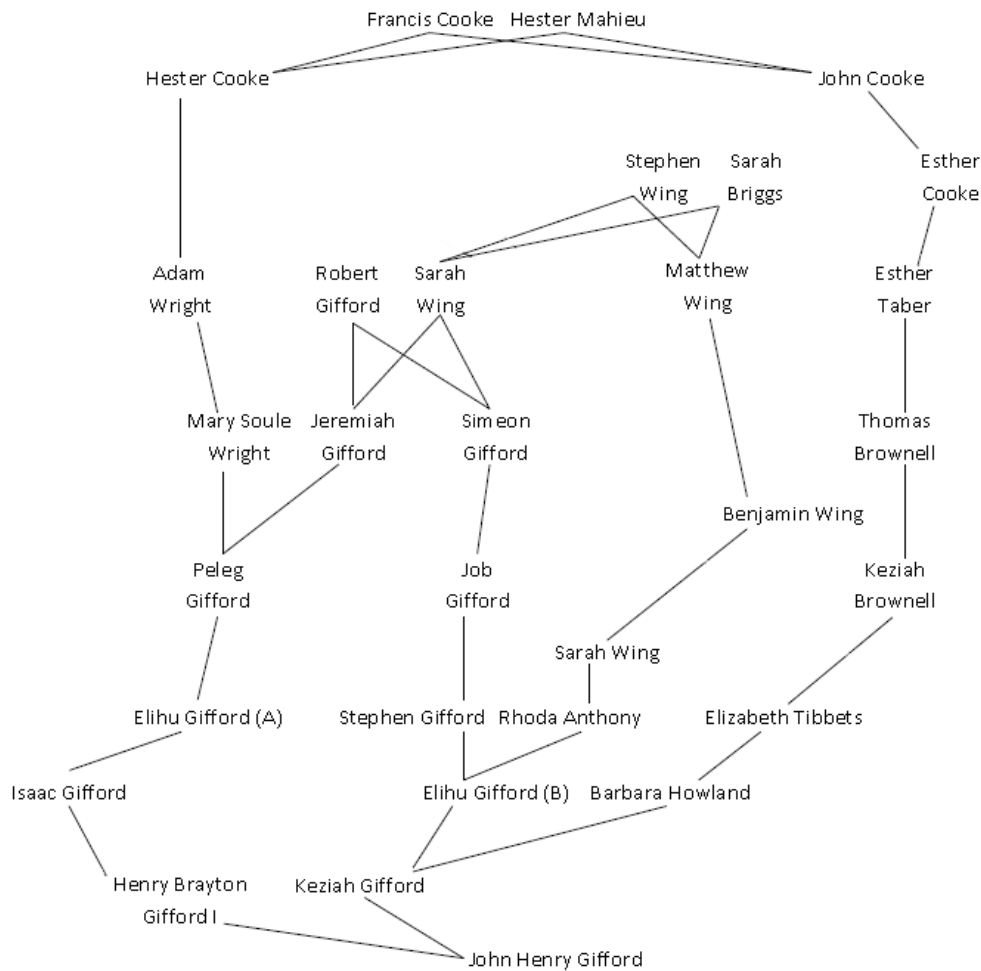
Task 3: Henry Brayton Gifford II

A. Familiarize yourself with the Massachusetts Quakers family tree by answering the following questions.
   1. Henry Brayton Gifford I married Keziah Gifford. Who did they both inherit the name *Gifford* from?

   2. John Henry Gifford married Rebecca Ann Gifford. Who did they both inherit the name *Gifford* from?

   3. Identify two couples who are first-cousins.

B. Use the following excerpt from that family tree to calculate the coefficient of inbreeding for Henry Brayton Gifford II. Why is there an even number of common ancestors but an odd number of closed loops?
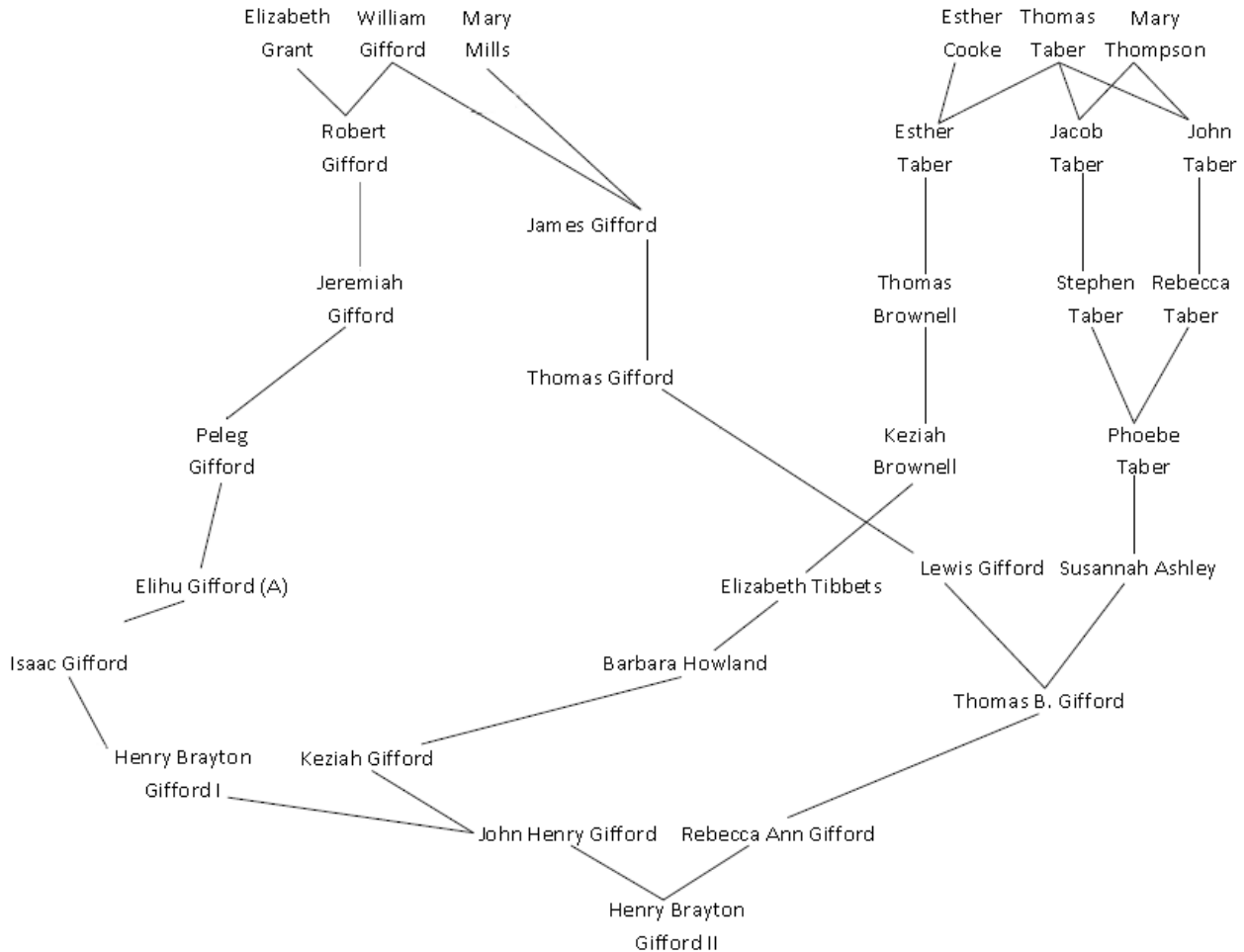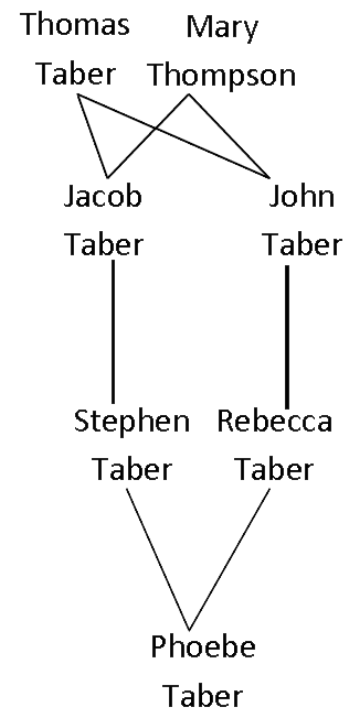
Task 4: Phoebe Taber

A. Familiarize yourself with the Massachusetts Quakers family tree by answering the following questions.

    1. Henry Brayton Gifford I married Keziah Gifford. Who did they both inherit the name *Gifford* from?

    2. John Henry Gifford married Rebecca Ann Gifford. Who did they both inherit the name *Gifford* from?

    3. Identify two couples who are first-cousins.

B. Use the following excerpt from that family tree to calculate the coefficient of inbreeding for Phoebe Taber.
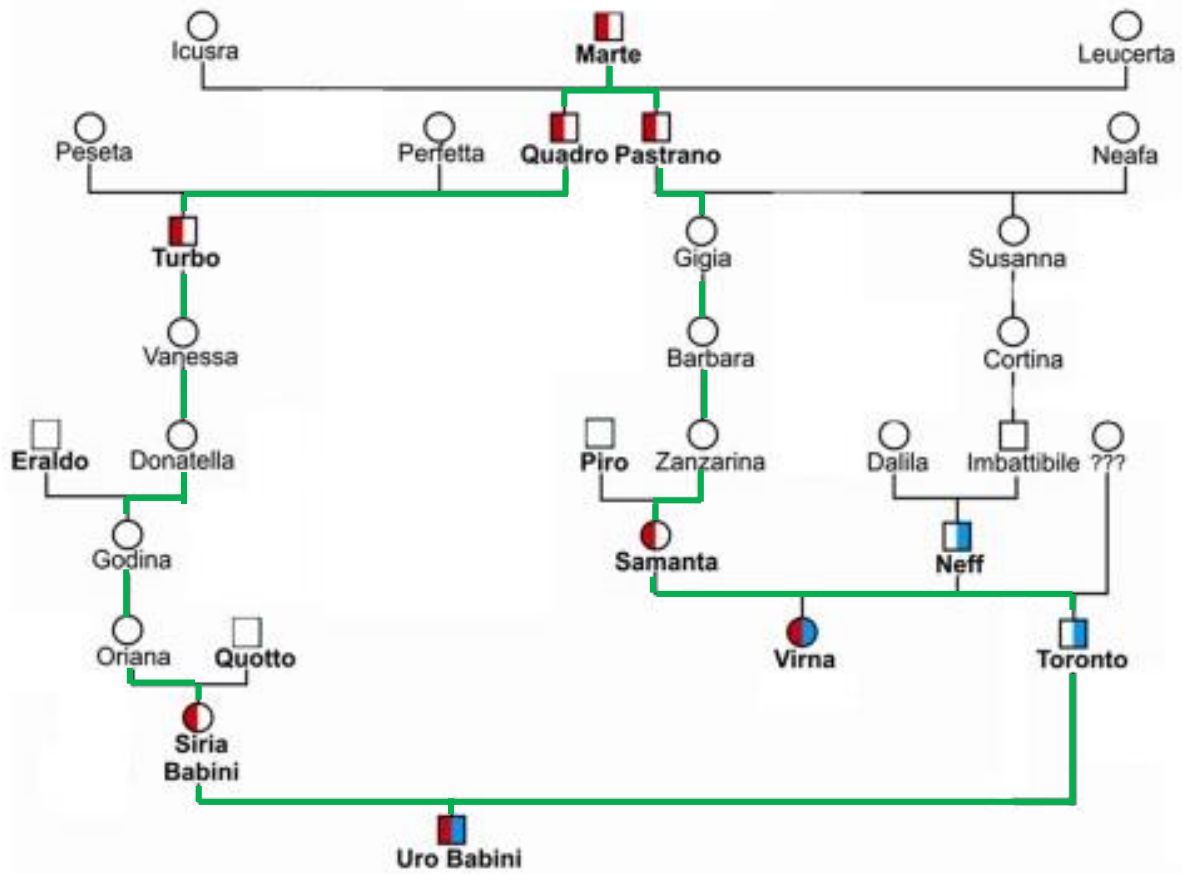
Task 5: Uro Babini

A. Familiarize yourself with the Cattle Breeding family tree by answering the following questions.

    1. Identify the two inbred individuals.

.

    2. Uro Babini inherited both the red and blue characteristics. Who could he have inherited the red from? Who could he have inherited the blue from?

    3. Identify the common ancestor of Uro Babini's parents.

B. Use the following highlighted version of the Cattle Breeding family tree to calculate the coefficient of inbreeding for Uro Babini.
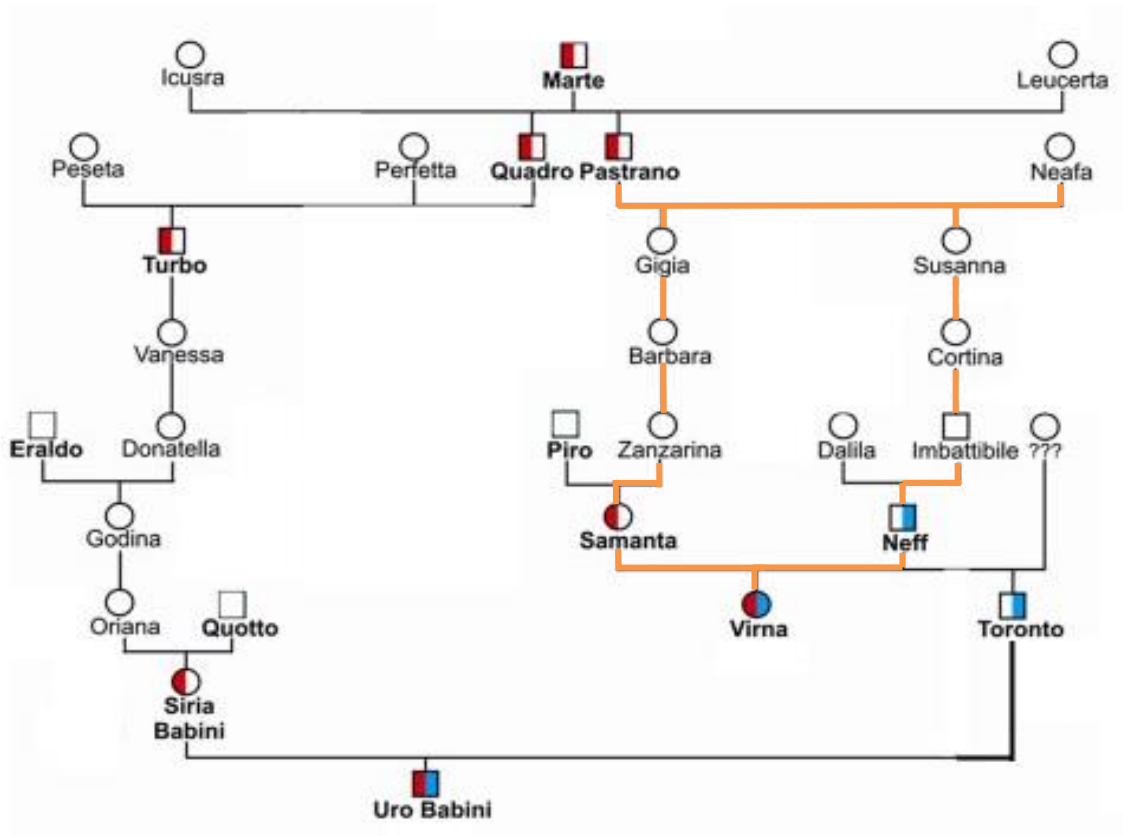
Task 6: Virna

A. Familiarize yourself with the Cattle Breeding family tree by answering the following questions.
   1. Identify the two inbred individuals.

.

   2. Uro Babini inherited both the red and blue characteristics. Who could he have inherited the red from? Who could he have inherited the blue from?

   3. Identify the common ancestor of Uro Babini's parents.

B. Use the following highlighted version of the Cattle Breeding family tree to calculate the coefficient of inbreeding for Virna.

Task 7: King Tut (Tutankhamun)

A. Familiarize yourself with *National Geographic*'s Ancient Egypt family tree by answering the following questions.

1. Which couple in this family tree is related?

.

2. How closely is that couple related? Why would the Egyptian royal family choose to marry relatives like this?

B. Use the following highlighted version of *National Geographic*'s Ancient Egypt family tree to calculate the coefficient of inbreeding for King Tut (Tutankhamun).

C. Suppose King Tut (Tutankhamun) and his wife were siblings. Determine the coefficient of inbreeding for one of their unborn children.
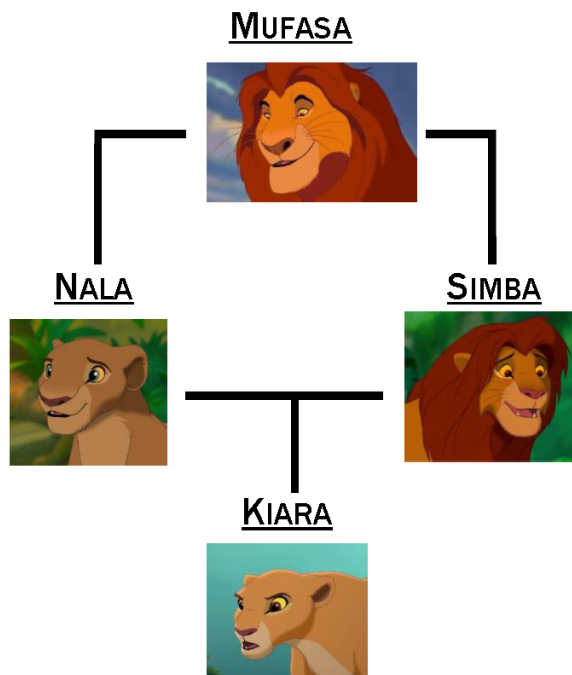
Task 8: Kiara

A. Familiarize yourself with Disney's *The Lion King* family tree by answering the following questions.

    1. Which two characters are inbred?

.

    2. Who is the common ancestor of Kiara's parents?

    3. Who is the common ancestor of Kiara and Kovu?

B. Use the following excerpt from Disney's *The Lion King* family tree to calculate the coefficient of inbreeding for Kiara.
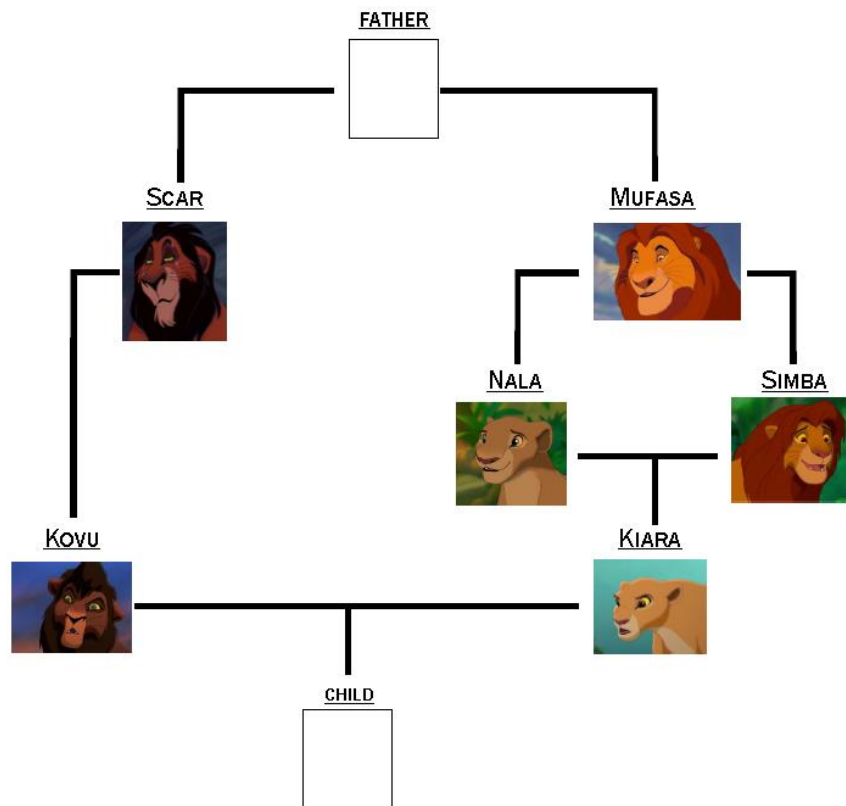
MUFASA

NALA

SIMBA

KIARA

C. What relationship would a couple need in order for their children to have 0.25 as the coefficient of inbreeding?

Task 8: Child of Kiara and Kovu

A. Familiarize yourself with Disney's *The Lion King* family tree by answering the following questions.
   1. Which two characters are inbred?

.

   2. Who is the common ancestor of Kiara's parents?

   3. Who is the common ancestor of Kiara and Kovu?

B. Use the following excerpt from Disney's *The Lion King* family tree to calculate the coefficient of inbreeding for the child of Kiara and Kovu.

C. Wild animals instinctively avoid inbreeding. How might a population of lions avoid inbreeding?