

## Probabilities

Assume that boys and girls have the same probability to be born and that the sex of the 2nd child does not depend on the sex of the 1st child.

Out of all the families in the world in which there are exactly 2 children, we select one family.

- 1) What is the probability that this family has 2 daughters if what you know about one of the children is that it is a girl? Justify.
- 2) What is the probability that this family has 2 daughters if what you know about one of the children is that it is a girl named Ingeborg? Justify. (Assume that there cannot be children with the same name in a family.)

Instructions: For each question, first construct the sample space (set of elementary events, i.e., possible outcomes). Select those outcomes that meet the condition. Are these outcomes equally likely? Determine the probabilities we ask for.

Bonus to think of and will be discussed during class. It is not counted for the 0.5 points:

- 3) Let us further assume that a child is equally likely to be born on individual days of week. It is possible that both children in the family were born on the same day. What is the probability that a family has 2 daughters if what you know about one of the children is that it is a girl born on Monday? Justify.