

The beginnings of probability

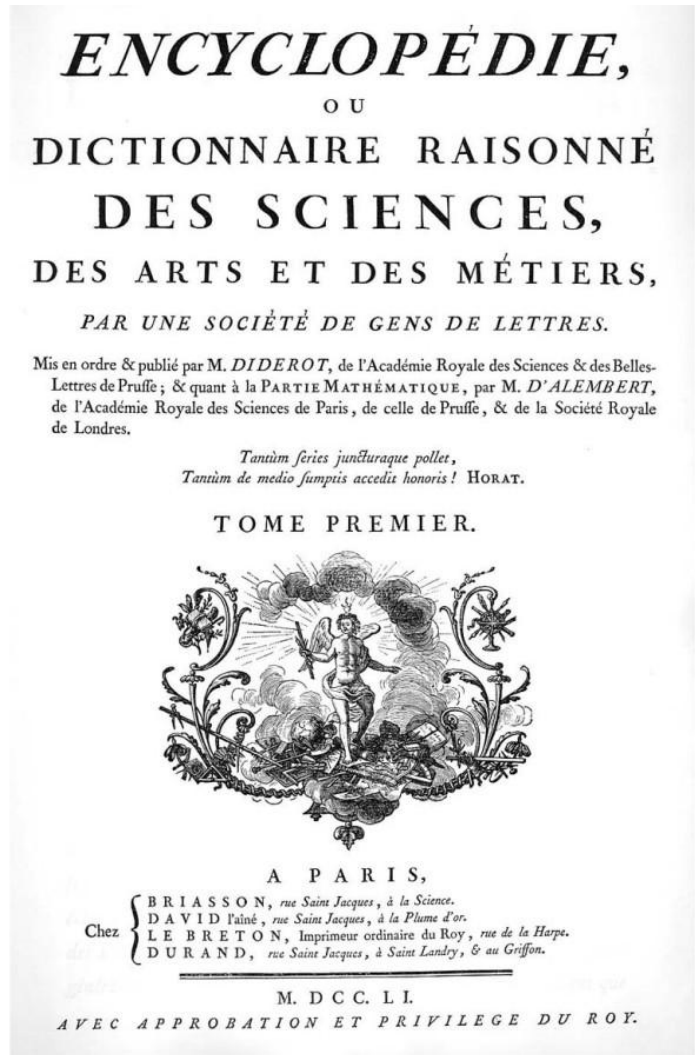
In the mid eighteenth century a craze for games of chance was sweeping across Europe.

Analysing such games inspired the new science of *probability*.

In this period, too, leading thinkers were working on a new kind of book - an *encyclopaedia*.

The French mathematician, d'Alembert, was asked to write a chapter on probability.

He had to decide what to say about probabilities still being debated at the time, such as...



..... the probability of at least one Head in two flips of a coin



*Which of these arguments should d'Alembert accept?
Should he add some further explanation when he writes his chapter?*

[B] The probability of a Head on the first flip is $\frac{1}{2}$.
The probability of a Head on the second flip is another $\frac{1}{2}$.
So the combined probability of at least one Head is 1.

[A] These are the combinations possible for two coin flips:
- Head & Head - Head & Tail
- Tail & Head - Tail & Tail
3 of these 4 cases include at least one Head.
So the probability is $\frac{3}{4}$.

[C] If the first flip gives a Head, then another flip isn't needed.
If a second flip is needed it will *either* produce a Head *or* not.
2 of these 3 cases result in at least one Head.
So the probability is $\frac{2}{3}$.