Last lecture

In the last lecture we looked at how to compute

- the expected value
- the variance

of a discrete random variable. In our example, we considered the experiment of throwing a fair die.

Crooked die

- Consider the random experiment of rolling a 'crooked' six-sided die, i.e. the outcomes of the throw occur with different probabilities.
- Suppose we have a die with which an outcome '5' or '6' is twice as likely to occur compared to the other numbers.
- What is the probability of each outcome?
  - Remark: The ratio of outcomes is 1:1:1:1:2:2
- The probability distributiion can be tabulated as follows

x_i	1	2	3	4	5	6
$p(x_i)$	1/8	1/8	1/8	1/8	2/8	2/8

- What is expected value and variance of the outcomes?

Variance of the crooked die

Recall the formula for computing the variance of a discrete random variable:

$$V(x) = E(X^2) - E(X)^2$$

We must compute $E(X^2)$

x_i	1	2	3	4	5	6
x_i^2	1	4	9	16	25	36
$p(x_i)$	1/8	1/8	1/8	1/8	2/8	2/8

$$E(X) = (0 \times 1/8) + (1 \times 1/8) + \ldots + (25 \times 2/8) + (36 \times 2/8) = \frac{32}{8} = 4$$

What is the variance?