

# Statistical Mechanics WS 2014/15 Sheet 0

Please hand in your solutions before the Monday lecture at 10:15.

## Problem 1 (20 points)

The following data set shows the monthly sunshine hours in Berlin:

Month $m$ [month]	Sunshine hours $h_m$ [hour]	$P(m)$ [1/month]
1	46.5	
2	73.5	
3	120.9	
4	159	
5	220.1	
6	222	
7	217	
8	210.8	
9	156	
10	111.6	
11	51	
12	37.2	

Table 1: The monthly sunshine hours in Berlin, data from <http://en.wikipedia.org/wiki/Berlin>

- Calculate the total sunshine hours per year  $H$ .
- Find the probability density  $P(m)$  where  $P(m)\Delta m$  is the probability to have sunshine hours in Berlin in the month  $m$ . Use  $\Delta m = 1$  [month].
- Calculate the mean monthly sunshine hours  $\langle h_m \rangle$  and the standard deviation  $\sigma = \sqrt{\langle (h_m - \langle h_m \rangle)^2 \rangle}$ .
- Calculate the probability to have sunshine hours in Berlin after September.

## Problem 2 (20 points)

There will be 12 exercise sheets in this semester. Some errors are found on the sheets by two per ten sheets, on average.

- What is the probability that there is an error on this particular sheet?
- What is the probability that only 1 of the sheets contains an error?
- What is the probability that all the sheets contains no errors?
- What is the probability that at least 25% of the sheets do not contain any error?
- What is the probability of 4 faulty sheets in a row if all other sheets are correct?