Probability Theory and Statistics
for Computer Science

Tutorial 4. - 3th October 2019

35. The number of calls arriving to a post office on a weekday afternoon is assumed to have $Poisson(10)$ distribution. What is the expected value and the standard deviations of the calls they get? What is the probability that they receive at most 2 calls in an hour?

36. At a company people were exposed to a dangerous virus because one of the employees was infected. It is known that everyone could get infected with 5% chance independently. What is the probability that the number of employees who got infected is 5 or 6 at the company of 79 people?

37. Compute the expected value and the variance of the outcome when we throw an irregular die that has number 1 on two sides, number 3 on one side and number 6 on 3 sides.

38. X and Y are two independent random variables with expected value 0. We know that $E(X^2) = 1$ and $E(Y^2) = 3$. Find $D(X - Y)$.

39. A book of 200 pages has 20 typos in it in random places. Find the probability that the 13. and 14. page combined has at most one typo!

40. For which n positive integer has the highest probability of resulting only one 6, if we throw n dices?

41. The number of 10, 20, 50 and 100 forints coins in my pocket is independent $Poisson(5)$ distributed. What is the expected value of the money I have?

42. We throw a die 5 times and let X denote the number of the times the outcome was 6. Compute the expected value and the variance of this experiment.

43. Suppose that we flip 2 regular coins. After that we throw a dice as many times as the number of heads. Let random variable X denote the sum of numbers thrown with the dice. What is the distribution of X?

44. We throw 2 dice. We call such a throw successful, if we have thrown at least one 6. What is the expected value of successful throws, if we try n times?

45.[HW] The number of typos in a text is Poisson distributed with parameter t. The publisher's reader recognizes each typo with probability p independently, and with probability $q = 1 - p$ does not, respectively. What is the distribution of the number of unrecognized typos in the text? How large is the probability that the number of unrecognized typos is even?

46.[HW] An ant is walking around on the real line starting from 0. At every step with equal probability it will walk left or right one unit. (If it's in -5 then with probability 1/2 it goes to -4 and with probability 1/2 it goes to -6). What it the distribution of the ant's position after 20 steps?