Introduction to Probability, Statistics and Data Handling	Conditional Probability, Bayes' Theorem
Tutorial 2	

Subjects for discussion:
1. What is *conditional probability*? How would you calculate the probability of the event knowing all the outcomes it consists of?
2. How can you test if events are *independent*?
3. What is the difference between the *prior* and *posterior probability*?

Problem Set 2:
1. In a factory four machines produce the same product. Machine A produces 10% of the output, but 0.1% of them may be defective, machine B 20% of the output with 0.05% of defects, machine C 30% with 0.5% with problems, machine D 40% with 0.2% defective. An item selected at random is found to be defective. What is the probability that it was produced by factory A? B? C? D?

2. Are students more likely to smoke when theirs parents smoke? The smoking habits among students and parents is shown in the Table. The "smoke" in case of a student means that she/he smokes, even occasionally, whereas in case of parents means, that at least one parent smokes.

   a) If at least one parent smoked, what is the chance their child (student) smokes?

   b) A student is randomly selected from the study and she/he does not smoke. What is the probability that at least one of her parents smoked?

Students	Parents	
	smoked	**not**
smoke	125	94
not	85	141

3. As you know, Covid-19 tests are common nowadays, but some results of tests are not true. Let's assume; sample size is 100, a diagnostic test has 99% accuracy and 60% of all people have Covid-19. If a patient tests positive, what is the probability that they actually have the disease? What is the meaning of: **false negative, false positive, true negative, true positive?**