

**TMA1201 Tutorial 11 -
T9.1 Probability**

1. A letter is randomly selected from the word 'COMPUTER'. Find the probability that the selected letter is
 - (a) a vowel;
 - (b) a consonant.
2. Consider randomly selecting a student at a certain university and let A denote the event that the selected individual has a Visa credit card and B be the analogous event for a MasterCard. Suppose that $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cap B) = 0.25$.
 - (a) Compute the probability that the selected individual has at least one of the two types of cards.
 - (b) What is the probability that the selected individual has neither type of cards?
3. The population of a particular country consists of three ethnic groups. Each individual belongs to one of four major blood groups. The accompanying joint probability table gives the proportions of individuals in the various ethnic group-blood group combinations.

		Blood Group			
Ethnic Group		O	A	B	AB
	1	0.082	0.106	0.008	0.004
	2	0.135	0.141	0.018	0.006
	3	0.215	0.200	0.065	0.020

Suppose that an individual is randomly selected from the population, and define events by $A = \{\text{type A selected}\}$, $B = \{\text{type B selected}\}$, and $C = \{\text{ethnic group 3 selected}\}$.

- (a) Calculate $P(A)$, $P(C)$ and $P(A \cap C)$.
 - (b) Calculate both $P(A | C)$ and $P(C | A)$.
 - (c) If the selected individual does not have type B blood, what is the probability that he or she is from ethnic group 1?
4. At a certain fuel station, 40% of the customers use regular unleaded fuel (A_1), 35% use extra unleaded fuel (A_2) and 25% use premium unleaded fuel (A_3). Of those customers using regular fuel, only 30% fill their tanks (event B). Of those customers using extra unleaded fuel, 60% fill their tanks, whereas of those using premium, 50% fill their tanks.
 - (a) What is the probability that the next customer will request extra unleaded fuel and fill the tank ($A_2 \cap B$)?
 - (b) What is the probability that the next customer fills the tank?
 - (c) If the next customer fills the tank, what is the probability that regular fuel is requested?

5. Two different suppliers Supplier A and Supplier B, provide a manufacturer with the same kind of battery for a particular smart phone. All suppliers of this battery are kept in a large bin.

In the past, 5% of the batteries supplied by Supplier A and 9% of batteries supplied by Supplier B have been defective. Supplier A supplies four times as many batteries as Supplier B.

Suppose you reach into the bin and select a battery, and find that it is non-defective, what is the probability that it was supplied by Supplier A?

6. In a magic show, there are 10 adults and 8 kids as audiences. The magician wants to select 5 audiences to participate in his magic show.
- Find the number of ways of selecting the 5 audiences.
 - What is the probability that there are at least 2 adults and at least 2 kids from the audience selected?