

## Lab-session 6

- 1) The body mass index is a quantity which is often considered when evaluating whether a person has normal weight, overweight etc. It is computed as

$$\text{body mass index} = \frac{\text{weight in kilograms}}{(\text{height in meters})^2}.$$

Write a user-defined function which computes the body mass index according to the formula above. Declare the variable types of the input (weight and height) and output (body mass index) of the function, as well as of any variables that may be used inside the programme.

Modify your function to produce two other functions that compute the body mass index and either return a value with exactly one decimal digit or return always an integer value.

**Hint:** for the first function you should use the VBA function **ROUND** that rounds up a number up a given number of decimal places.

- 2) As mentioned above, the body mass index (bmi) is a quantity that is often used to determine whether or not someone has a healthy weight in relation to their height. The classification for male and female is presented in the table below:

male	bmi <20	$20 \leq \text{bmi} \leq 24.9$	$24.9 < \text{bmi} \leq 29.9$	$29.9 \leq \text{bmi} \leq 39.9$	bmi >39.9
female	bmi <19	$19 \leq \text{bmi} \leq 23.9$	$23.9 < \text{bmi} \leq 28.9$	$28.9 \leq \text{bmi} \leq 38.9$	bmi > 38.9
	underweight	normal weight	overweight	obese	extreme obese

- (a) Write a user-defined function which taking a man's body mass index as input, returns one of the messages in the last row of the table above as output. For example, if the bmi < 20 then the function should return the message "underweight" etc. Your function should use an IF...ELSEIF structure that would take into account the various outputs possible, according to the table above.
- (b) Write a similar user-defined function to case (a) which will do the same when the body mass index of a woman (instead of a man) is entered as input.
- (c) Write a user-defined function which combines the two functions of parts (a) and (b) together. The function should take body mass index and gender as input and again return one of the messages in the last row of the table as output. Your function should now use two (nested) IF...ELSEIF structures, one for the bmi and one for the gender. Design your function so that if a gender different from male or female is entered, the function would return the message: "sorry, I do not have information for this case".

For all three functions define the variable type of the input and output.

- 3) Write a user-defined function which returns the appropriate greeting depending on the time of the day:
- Use the VBA-function “Hour” to obtain the hour from a date/time entered into some particular cell. Call your function “hello1”. When the time is 0:00-12:00 your function should return “Good Morning!”, for 12:00-18:00 it should return “Good Afternoon!”, for 18:00-22:00 it should return “Good Evening!” and for 22:00-23:00 it should return “Good Night!”.
  - Write now a new function called “hello2” which is more suitable for winter time. When the time is 0:00-12:00 your function should return “Good Morning!”, for 12:00-16:00 it should return “Good Afternoon!”, for 16:00-21:00 it should return “Good Evening!” and for 21:00-23:00 it should return “Good Night!”.
  - Write a new function called “hello” which uses the autumn-winter greeting “hello2” from November to April and otherwise “hello1”.

Once more, your functions should use **IF...ELSEIF** structures and define the variable type of the input and output, as well as any variables that may be used in your programmes.

- 4) Use an **IF...THEN** structure (as seen in page 14 of last lecture) to produce a user-defined function called **whichday**. The function should take a date as input and produce the following output:
- If the date falls on a weekday (that is Monday to Friday, both included), then it should output the name of the day (that is, if the day was a Monday, then the output of the function should be the word “Monday”).
  - If the date falls on a weekend (that is Saturday or Sunday) then your program should produce the output: “This date falls on a weekend”
  - In the program you should define all variable types, both for the input and for the output of your function.
  - Obtain the value of the function for the input date 20/11/1945