Statistics for Intelligent Systems 07.03.2022

Exercise 1. Create a function that writes out "The current date is " and gives the current date.

Exercise 2. Create a function with two arguments, BASE and POWER, which takes the number from the BASE and puts it to the power of POWER. BASE by default should equal to 2 and POWER to 1.

Exercise 3. Create a function which takes a number NUM and a vector VEC and returns TRUE if NUM is inside VEC. NUM by default equals to 0.

Exercise 4. Create a function that takes in a vector VEC and if the length of VEC is even squares every even index value, otherwise it squares every odd index value. Create a second function that takes in a vector VEC and if the length of VEC is odd squares every even index value, otherwise it squares every odd index value. Try to use the edit function when creating the second function.

Exercise 5. Create a function that takes a vector and prints out a sorted subsequence of the vector. By default it should print out the three smallest values.

Exercise 6. Create a function that takes a square matrix and returns that matrix to the power of the size of that matrix. The default matrix should be a square matrix of zeros of size 2.

Exercise 7. Define the following operators:

- %=>% which takes two values a and b and returns the logical result of an implication $a => b$
- %+2% that returns the sum of two values given squared.
- %ev% that if the second value given is odd returns the sum of the two values, and if the second value is even returns the multiplication of the two values.

Exercise 8. Create a function truthcount() which takes a vector and returns how many of its values were TRUE. Create a second function falsecount() which does the same but counts FALSE values. Use those functions to to create the function randlett(). This function should take a number NUM (by default equal to 10), sample NUM number of letters with possible replacement. If the number of different letters in the sample is equal to NUM, or all letters are in the sample the function should stop. Otherwise it should print out the sample, draw a new sample and repeat.

Exercise 9. Create a function that takes two vectors and prints out "1" for each index on which at least one of the values is positive. Also, in the case where the first value was negative, it should create a global variable VIM which stores the second value. This should be done in one step using lazy evaluation.

Exercise 10. Create a function that will return the length of an object by default, write out the logical values if the argument is logical, write out the square of all values if the argument is numerical, and write out the dimension of the matrix if the argument is a matrix.