

Computer Skills (AY 2015/16)

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Homework 2 (lessons from 6 to 9)

Exercise 1)

Consider a row vector V and the problem to find the minimum element of V and its index in the vector.

- Define the algorithm to solve the problem and represents the algorithm using a flow chart.
- Write a MATLAB script that prints as output the minimum element of V and its index in the vector (in case of more than one occurrence of the minimum, return the index of the first occurrence). V can be randomly generated within the code.

Example: if $V = [3, 5, 4, 2, 6, 1, 1]$, then the minimum element of V is 1 and its index in the vector is 6.

Exercise 2)

Consider a value x and a row vector V and the problem to find if x is contained in V and if found which is its index in the vector.

- Define the algorithm to solve the problem and represents the algorithm using a flow chart.
- Write a MATLAB script that prints 0 as output if the given value x is not contained in V , otherwise its index in V (in case of more than one occurrence of the value x , return the index of the first occurrence). The value of x must be entered by the user and V can be randomly generated within the code.

Example: if $V = [3, 5, 4, 2, 6, 1, 1]$ and $x=6$, then the result is 5. if $V = [3, 5, 4, 2, 6, 1, 1]$ and $x=7$, then the result is 0.

Exercise 3)

Consider a row vector V and the problem to find the mean value of the elements of V .

- Define the algorithm to solve the problem and represents the algorithm using a flow chart.
- Write a MATLAB script that prints as output the mean value of a given vector V . V can be randomly generated within the code. Do not use the sum and mean built-in functions in MATLAB.

Example: if $V = [3, 5, 4, 2, 6, 1, 1]$, then the result is $22/7=3.14286$.

Exercise 4)

Consider a row vector V and the problem to find the minimum and maximum elements of V and their index in the vector.

- Define the algorithm to solve the problem and represents the algorithm using a flow chart.
- Write a MATLAB script that prints as output the minimum and maximum elements of V and their indexes in the vector (in case of more than one

occurrence of the minimum/maximum, return the index of the first occurrence). V can be randomly generated within the code.

Example: if $V = [3, 5, 4, 2, 6, 1, 1]$, then the minimum and maximum elements of V are 1 and 6, respectively, and their indexes in the vector are 6 and 5, respectively.

Exercise 5)

Consider a row vector V and the problem to find the mean value of the elements of V and the index of the element closest to the mean.

- a) Define the algorithm to solve the problem and represents the algorithm using a flow chart.
- b) Write a MATLAB script that prints as output the mean value of a given vector V and the index of the element closest to the mean. V can be randomly generated within the code. Do not use the `sum`, `mean` and `find` built-in functions in MATLAB.

Example: if $V = [3, 5, 4, 2, 6, 1, 1]$, then the mean is $22/7=3.14286$ and the index of the element closest to the mean is 1.

Exercise 6-10)

Solve the above exercises (1-5) for a matrix A (rather than vector V). You do not need to write the flow chart.