Lab 4 – Vectors and Matrices.

4.1 Sum of selected elements

Specify function s = sum_smaller(M,k) that returns the sum of all elements in matrix M that are smaller than value k.

Can you specify this function with Boolean filters?

4.2 Search for elements

Specify function [i,j] = find(M,k) that returns the row i and col j where value k occurs in matrix M. What happens if k never occurs? And if it occurs more than once?

Can you specify this function with Boolean filters?

4.3 Indices of Vectors elements

Specify function I = index_1(M,k) that returns a vector I with the positions of the elements of vector M that are greater than k.

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Specify function I = index_2(M,k) that returns a matrix with 2 columns, where the rows indicates the positions (row and column) of the elements of vector M that are greater than k.

4.5 Perimeter of a Triangle

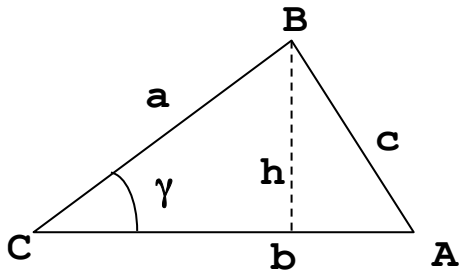
Given a triangle in 2D space, specified by a 3*2 matrix T, where each row corresponds to the x-y coordinates of one of the vertices, specify function **p = perimeter(T)** that returns the perimeter of the triangle.

Suggestion: Consider the vectors that are obtained by subtracting the coordinates.

4.6 Area of a Triangle

Given a triangle in 2D space, specified by a 3*2 matrix T, where each row corresponds to the x-y coordinates of one of the vertices, specify function **a = area(T)** that returns the area of the triangle.

Suggestion: Consider the trigonometry functions associated to a triangle as shown in the figure.



4.6 Area of a Poligon

Given a polygon in 2D space, specified by a n*2 matrix P, where each row corresponds to the x-y coordinates of one of the vertices, specify function [a,p] = area_perimeter(P) that returns the area and the perimeter of the poligon.

Suggestion: For the area, decompose the polygon n triangles and use the previous functions.