

# Geometrical Procedures with Spatial Coordinates

Cadastral Engineer and Geodesist Training

August 2, 2024

## Exercises

### Exercise 1

Given two points in 3D space  $A(x_1, y_1, z_1)$  and  $B(x_2, y_2, z_2)$ , write a C++ program to calculate the Euclidean distance between them.

### Exercise 2

Write a C++ program to find the midpoint  $M$  between two points  $A(x_1, y_1, z_1)$  and  $B(x_2, y_2, z_2)$  in 3D space.

### Exercise 3

Given three points  $A(x_1, y_1, z_1)$ ,  $B(x_2, y_2, z_2)$ , and  $C(x_3, y_3, z_3)$  in 3D space, write a C++ program to determine if these points form a right triangle.

### Exercise 4

Write a C++ program to calculate the area of a triangle formed by three points  $A(x_1, y_1, z_1)$ ,  $B(x_2, y_2, z_2)$ , and  $C(x_3, y_3, z_3)$  in 3D space using the cross product.