

*For the programming task you have to use C++  
A pull request has to be made for the solutions(C++ code and generated images).  
The pull request is in your repository from the github classroom assignment:*

<https://classroom.github.com/a/zh9ighUI>

*For questions and help refer to the course's discord server:*

<https://discord.gg/kkr83dZS>

*Or the course's e-mail:*

[raytracingcourse@chaos.com](mailto:raytracingcourse@chaos.com)

### **Task 1.**

Add a triangle representation to your C++ projects. It should consist of 3 vertices, each of which can be represented by a 3D vector. The order of the vertices matters.

### **Task 2.**

- Calculate the cross product ( $A \times B$ ) between two vectors:
  - $A = (3.5, 0, 0)$  and  $B = (1.75, 3.5, 0)$
- Calculate the cross product ( $A \times B$ ) between two vectors:
  - $A = (3, -3, 1)$  and  $B = (4, 9, 3)$
- Calculate the area of the parallelogram formed by vectors:
  - $A = (3, -3, 1)$  and  $B = (4, 9, 3)$
- Calculate the area of the parallelogram formed by vectors:
  - $A = (3, -3, 1)$  and  $B = (-12, 12, -4)$

### **Task 3.**

- Find the normal vector for a triangle with the following vertices:
  - $A = (-1.75, -1.75, -3)$
  - $B = (1.75, -1.75, -3)$
  - $C = (0, 1.75, -3)$
- Find the normal vector for a triangle with the following vertices:
  - $A = (0, 0, -1)$
  - $B = (1, 0, 1)$
  - $C = (-1, 0, 1)$
- Find the normal vector for a triangle with the following vertices:
  - $A = (0.56, 1.11, 1.23)$
  - $B = (0.44, -2.368, -0.54)$
  - $C = (-1.56, 0.15, -1.92)$
- Calculate the areas of these triangles.