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## Assignment Nr. 3

### 3.1 Reflection Rays

In general, the direction of a ray reflected at a normal is

$$d_{ref} = 2(n \cdot d)n - d$$

We have to keep in mind that the ray that is reflected should point in the correct (therefore reversed) direction and that it starts at the new time  $t_{hit}$ . therefore the complete formula for the new ray is:

$$r_{ref}(t) = o + t_{hit}d - (t - t_{hit})(2(n \cdot d)n - d)$$

### 3.2 Front/Back-side of a triangle

The scalar product is  $< 0$  for angles between two vectors greater than  $90^\circ$  and  $> 0$  for angles between two vectors smaller than  $90^\circ$ .

So the ray hits the triangle from the front, if  $n \cdot d > 0$  and it hits it from the back if  $n \cdot d < 0$ .