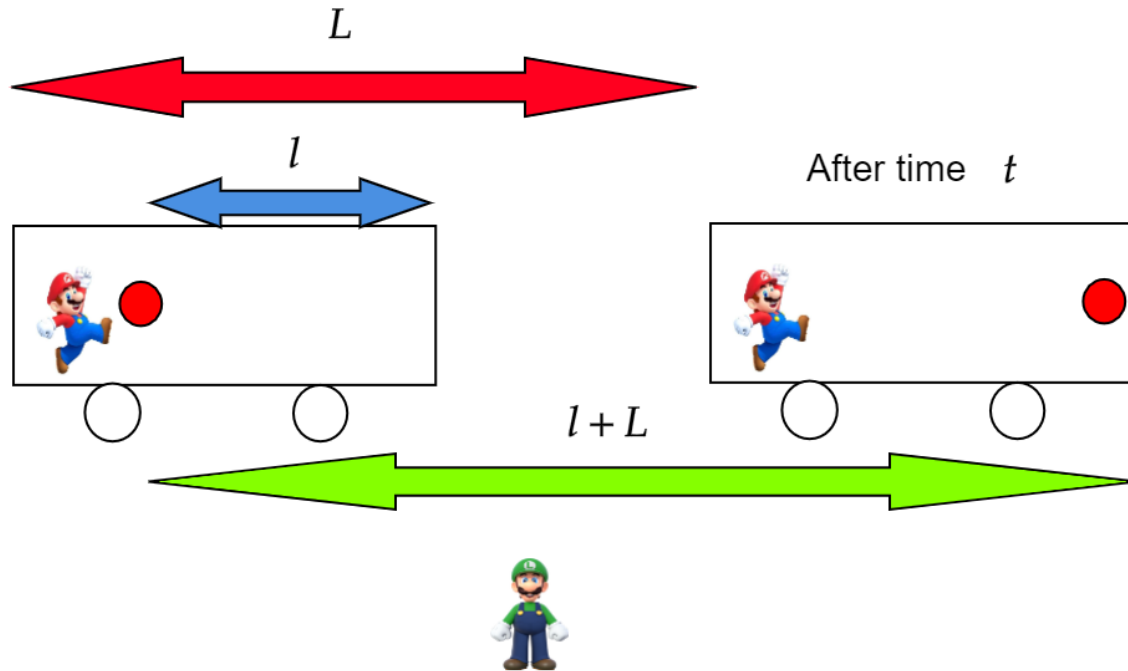


# Relativity of Motion



$$l = v_1 \cdot t, \quad L = v \cdot t,$$



$$v_2 = \frac{l + L}{t} = v_1 + v$$

# Homework 6

## Problem 1.

The Earth moves around the Sun with a speed of  $30 \frac{km}{s}$ . The Moon moves around the Earth with a speed of  $1 \frac{km}{s}$ . Find the maximal and minimal speed of the Moon with respect to the Sun. Draw a picture supporting your answer.

## Problem 2.

River flows with speed  $v_r = 2 \frac{m}{s}$ . A fisherman uses his boat to get to a village situated at a distance  $d = 2 km$  down the river and returns to his home. During the whole trip, the speed of the boat is  $V = 3 \frac{m}{s}$  with respect to the water. Find the total time of the two-way trip. Does river flow make it longer or shorter?

## Problem 3\* (bonus problem).

If an elastic ball hits a motionless wall at  $90^\circ$ , its velocity switches direction to the opposite, and the speed stays the same. Now imagine that a ball with speed  $v = 5 \frac{m}{s}$  hits at  $90^\circ$  a wall moving with speed  $u = 3 \frac{m}{s}$  towards the ball. What will the speed of the ball be after the collision?

