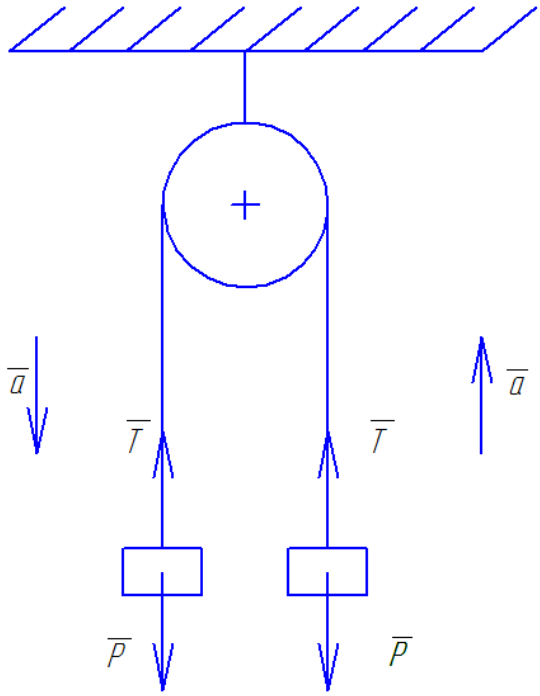
Task:

A massless frictionless pulley is held up by a single rope from the ceiling. Two 100 N weight hang from the sides of the pulley (balanced). Sketch a free-body diagram of the pulley, and determine the tension in the ropes.

Solution:



Due to Newton's second law:

$ma = T - P$ (for the right side)

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Solve the system of equations:

$ma - ma = T + T - P - P$

$0 = 2T - 2P$

$T = P = 100\ N$

Answer:

$T = 100\ N$