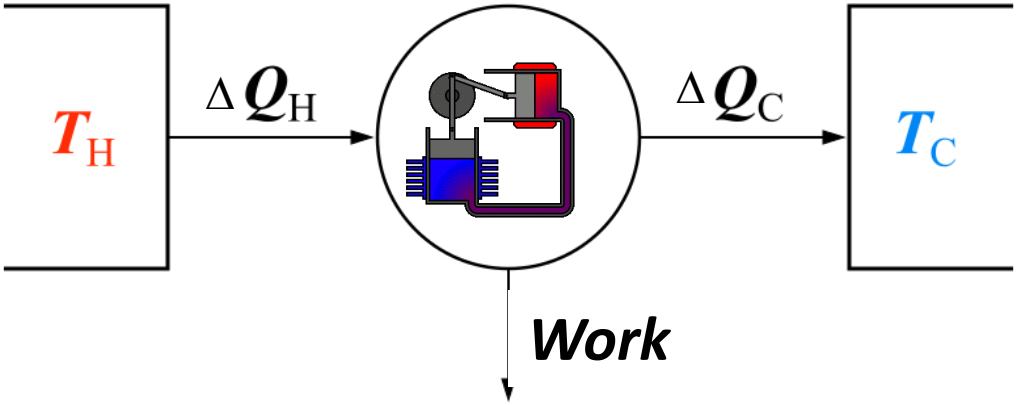
Efficiency of Heat Engine



Heat Engine has to take heat ΔQ_H from "heat bath", and return heat ΔQ_C to a "cooler".

$$Work = \Delta Q_H - \Delta Q_C$$

Efficiency of a heat engine is $\frac{Work}{\Delta Q_H} = \frac{\Delta Q_H - \Delta Q_C}{\Delta Q_H} = 1 - \frac{\Delta Q_C}{\Delta Q_H}$

Homework

Problem 1. As you know, when it is really hot, people start sweating. This is our way of cooling ourselves. When the sweat evaporates, it takes a lot of energy. Typically, a human consumes about 100 Watts of energy from food, most of which ends up in the form of heat that has to be removed.

Calculate, how much sweat needs to be evaporated per hour to remove all the heat generated by a person. You will need to find the heat of evaporation of water, per kg (called latent heat)

Problem 2. A typical midsize car uses about 5 liter of gasoline per 100 km. 1 liter of gasoline produces about 31.5 MJ of heat when burned. Assuming that car runs at 30% efficiency, estimate the mean force with which the engine "propels" the car on the road (of course, technically the force comes from friction).