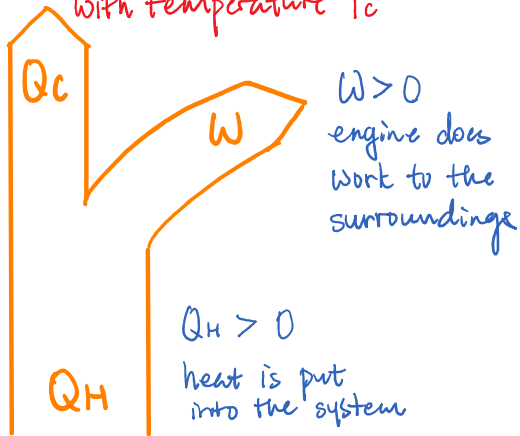


# Heat Engine

$Q_c < 0$  wasted heat  
leaves the system

Cold reservoir  
with temperature  $T_c$



$W > 0$   
engine does  
work to the  
surroundings

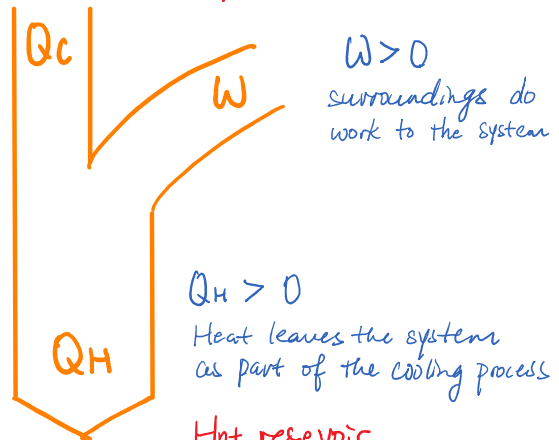
$Q_H > 0$   
heat is put  
into the system

Hot reservoir  
with temperature  $T_H$

# Refrigerators

$Q_c > 0$  Heat is removed from  
the cold region and  
enter the system

Cold reservoir  
with temperature  $T_c$



$W > 0$   
surroundings do  
work to the system

$Q_H > 0$   
Heat leaves the system  
as part of the cooling process

Hot reservoir  
with temperature  $T_H$