

Write a code to simulate a process obeying the ideal gas model

$$PV = mRT$$

for the following cases,

(a) given inputs for mass, temperature and pressure, find volume of the following gases

- Air
- Helium
- Nitrogen
- Hydrogen
- Carbon Monoxide

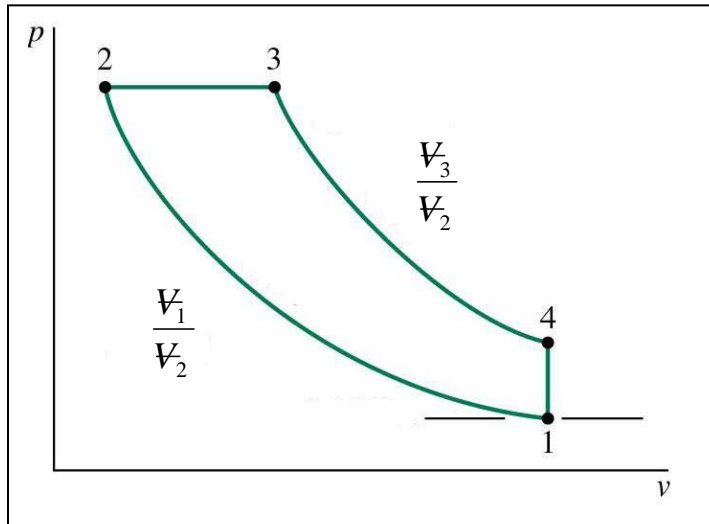
(b) Find the work done by the system for a volume change of  $V_2 - V_1$  as input and for the pressure given in part (a) by the user.

(c) Using  $C_p$  correlations given in Table A-21, find the heat transfer for a change in temperature from  $T_1$  to  $T_2$ , using the mass given by user in part (a) .

(d) For an Air cycle consisting of the following processes

- Isentropic from state 1 to 2
- Isobaric from state 2 to 3
- Isentropic from 3 to 4
- Isometric from 4 to 1

User inputs are  $T_1$ ,  $P_1$ ,  $\frac{V_1}{V_2}$  and  $\frac{V_3}{V_2}$ . Find the net work, the net heat transfer and the total change in internal energy for this cycle.



(e) Plot the P-v diagram for the cycle in part (d).

Note: A short description for your calculations is needed. For all sections above, run your code and print the results in tabular and graphical format.