Exercise 1—Interpolation:

We have already seen that it is sometimes necessary to linearly interpolate to find values of properties in property tables. In some cases linear interpolation is even more involved, as in the case of finding properties for a superheated vapor in which neither the temperature nor pressure of interest appear as a table entry. As an example, consider the following:

Given: water, $P = 2.0$ bar, $T = 215°C$
Find: v (spec. vol.)

Here we must perform a **bi-linear interpolation**. This proceeds as follows.

Step 1
Linearly interpolate to find v at $P = 1.5$ bar and $T = 215°C$. (Ans. 1.491 m³/kg)

Step 2
Linearly interpolate to find v at $P = 3.0$ bar and $T = 215°C$. (Ans. 0.740 m³/kg)

Step 3
Using the results from steps 1 and 2, linearly interpolate to find v at $P = 2.0$ bar and $T = 215°C$. (Ans. 1.241 m³/kg)

Exercise 2—Table lookup practice:

Provide the information requested in the table for *water*. Use the following abbreviations where needed:

- CL – compressed (subcooled) liquid
- SL – saturated liquid
- SM – saturated mixture
- SV – saturated vapor
- SHV – superheated vapor
- NA – not applicable
- INSUF – insufficient information given

State	Phase	Pressure, P [MPa]	Temperature, T [°C]	Specific volume, v [m³/kg]	Specific enthalpy, h [kJ/kg]	Quality, x
1	SV		250			
2			250			0.70
3		3.0	250			
4		3.0		0.02500		
5		3.0	100			
6		3.0			3145.1	

Student 1: _____   Student 2: _____

Exercise 3—Table lookup practice:

Exercise 3 is the only deliverable part of this exercise that is to be turned in as homework. It is to be done in teams of two, both students receiving the same grade for the assignment.

Provide the information requested in the table for *refrigerant R134a*. Use the following abbreviations where needed:
- CL – compressed (subcooled) liquid
- SL – saturated liquid
- SM – saturated mixture
- SV – saturated vapor
- SHV – superheated vapor
- NA – not applicable
- INSUF – insufficient information given

State	Phase	Pressure, P [kPa]	Temperature, T [°C]	Specific volume, v [m³/kg]	Specific internal energy, u [kJ/kg]	Specific enthalpy, h [kJ/kg]	Specific entropy, s [kJ/(kg-K]	Quality, x
1		240	-12					
2		240				266.85		
3	SL	240						
4		240				150		
5	SV	240						
6			30					0.4
7			30	0.0188				
8			30		90.84			
9	SV		30					
10		1400	30					

CM _____