Example problem number 4:

Analyze the flow in the external wall with the air cavity and develop the model which calculates the change of the air temperature in the room (internal air). Assume that all internal surfaces have the same temperatures equal to the air temperature.

- Write your assumptions and justify them.
- Define all physical properties and boundary conditions which you need for the modeling.
- Write the model equations in explicit and implicit form. For implicit form show the matrix form.

You do not need to substitute values for physical properties. Just explain (by writing general equations) how to use them.
Example problem number 5:

Repeat the problem 4 with an infiltration. The amount \( m \) [kg/s] of outdoor air flows through the air cavity and gets into the indoor space.

Specify and justify new assumptions and write the model equations.