The heating of the Clore lecture theatre can be modelled as a two-dimensional square region heated by two radiators on the left wall held at a fixed temperature $T_0 = 1$ with the two doors at the back essentially open to the outside where the temperature is zero. Apart from the radiator and doors, heat cannot penetrate the walls.

It is required to find an estimate of the temperature profile along the centreline of the theatre (see dotted line) to get an idea of the heat distribution in the room. We can assume that the room is empty and that heat is transferred by a process of thermal conduction.
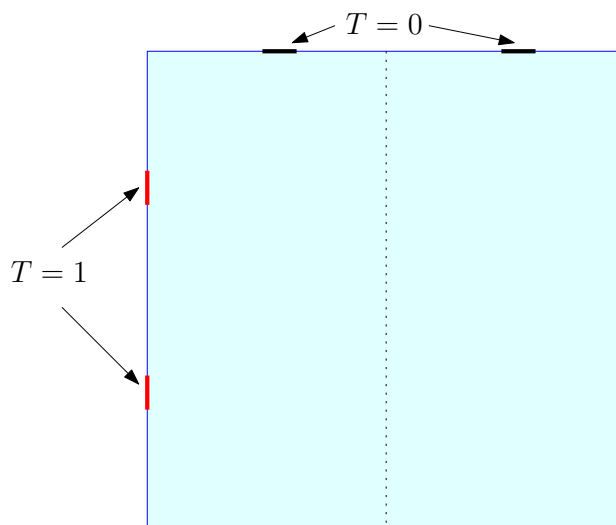
A useful fact is **Fourier's Law** of heat conduction which says that the heat flux q between two points joined by a material of thermal conductance k is given by

$$q = -k(T_1 - T_2),$$

where T_1 is the temperature at node 1 and T_2 is the temperature at node 2.
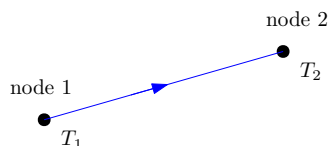
Another useful fact is that unless there is a source or sink of heat (such as a radiator or a door open to a room of different temperature as in the Clore theatre problem) then heat energy is conserved (any heat flux into a point must equal the heat flux out). This is **conservation of energy**.

Can you propose a simple model to find an estimate, or approximation, of the temperature profile along the dotted centreline of the Clore? Explain your assumptions.