Thermal comfort is defined in BS EN ISO 7730 as ‘...that condition of mind which expresses satisfaction with the thermal environment.’, i.e. the condition when someone is not feeling either too hot or too cold.
Humans are looking for a stability in the temperature: they have to find the place where these temperatures exist, or create an environment that can protect them from the extreme temperatures. Thus, it is architect’s aim to create spaces that correspond to humans need, once that comfort is totally connected with human’s wellbeing.
During the 20th century we gained unprecedented control over our thermal environment, mainly thanks to energy-consuming equipment.

As we advance into the 21st century, world population, urbanized areas and expectations of comfort continue to grow...

Striving to reduce energy dependency in buildings, while satisfying comfort demands, is more important than ever.

Designing efficient building envelopes is one of the first steps to consider.
Although our basic thermal comfort requirements are likely to remain the same in the future, our outdoor environment is likely to change. Climate change will play an increasingly important role in the design of the built environment. New systems and materials will continue to be developed and refined.

These changes, as well as a new approach to energy consumption, will require buildings to be capable of evolving over time in order to be both comfortable and energy efficient. A key factor in this evolution will be an increased critical reflection of what levels of thermal comfort will be considered acceptable: should we just put on a jacket rather than turn up the heat?
The basic principles behind thermal comfort are largely universal, but thermal sensitivity varies from one person to another.

Many factors influence thermal perception.
Thermal Comfort is combination of distinct

- Air temperature
- Air velocity
- Relative humidity
- Temperature of the walls
- Personal factors (Clothing, Metabolic Heat and Wellbeing or sickness)
The building envelope can greatly affect the interior thermal environment through the management of these parameters.
Figure 1. Comparison of requirements for indoor temperature (left) and relative air velocity (right). Markers in yellow colour designate the recommended values from EN 15251:2007 (category II).
Indoor air temperature

summer:
25 - 28°C bedrooms
23º common areas
70% humidity

Winter:
20 - 23° bedrooms
20º common areas
15° - 18° kitchen
30% humidity
Others factors for Comfort in a building:

- Noise Nuisance-Acoustique
- Indoor Air Quality-Ventilation
- Visual Confort-Natural Light
Figure 2. Comparison of requirements for limit noise levels. Markers in red colour designate the recommended values from EN 15251:2007. LAFmax, Leq, NR
In order to have good acoustic indoor, the choice of materials, at different scales, are the main influence to cope with this topic.
INFLUENCE OF THE ACTIVITIES ON THE ACOUSTIC COMFORT
ARCHITECTURAL WAYS TO CONTROL THERMAL COMFORT
THE CEILING

The floor is gonna be recovered by a coating, which enables it to be more efficient, contrary to the ceiling.
The ceiling is going to have an influence on:

- Room temperature
- Wall temperature
- Air speed
THE CEILING

The architect will have to think ahead about:

- Highness of the ceiling
- The shape
- The materials
- The technical connection with the surrounding walls (thermal bridges)
THE CEILING

- Interior thermal insulation = Thermal bridge
- Outside thermal insulation = No thermal Bridge
- Clay blocks with thermal insulation = No thermal Bridge
THE CEILING

- Hide conducts and system’s facilities.
- Provides easy method to solve acoustic issues.
- Strategy for creating dynamic spaces.
THE WINDOWS

The main functions of a window:

- Provide natural light inside
- Offer the view on the outside
- Ventilate the air inside
THE WINDOWS

Influence on the architect’s choices:

- The orientation
- The size
- The closing system
- The solar mask
THE WINDOWS

Louis Kahn, Fisher House, 1967, Pennsylvania

- Distinction between the different functions of the window
- Design which incorporate the furnitures
MATERIALS OF THE WALLS

The main functions of a wall:

- use of materials with very low conductivity for isolation.
- use of materials with low sonoric refraction, like textiles or foam.
MATERIALS OF THE WALLS

Herzog & De Meuron, Dominicus winery, 1995 - 1998, California

- Winery: needs thermal stability to keep the wine in good conditions
- Choice of the architects: gabion
- Massive construction
- Design of the light atmosphere inside
SITES EFFECT
LOGODI UTCA 56, BUDAPEST

- 1st district of Budapest
- Buda side
- Behind the castle and the Fisherman’s bastion
- Connection with the tunnel which goes under the Gellert hill
LOGODI UTCA 56, BUDAPEST
The main facing problems:

- Very angular and narrow view
- Obstructed by surrounding buildings
- Close by habitational building
Thermal comfort is the outcome of a well-balanced combination of building systems adapted to the local climate & the type of activity performed.