WEEK_4 Againi

you should complete the modified example of simplified wall calculations that you went through in the assignment of week 3 and find the total heat transfer through wall

	WOOD	INSULATION
Outside Air winter	0.030 $\frac{m2\ C}{W}$	0.030 $\frac{m2\ C}{W}$
Wood bevel	0.14 $\frac{m2\ C}{W}$	0.14 $\frac{m2\ C}{W}$
Playwood 13mm	0.011 $\frac{m2\ C}{W}$	0.011 $\frac{m2\ C}{W}$
Urethane rigid foam 90mm	--	3.52 $\frac{m2\ C}{W}$
Wood stud	0.63 $\frac{m2\ C}{W}$	--
Gypsum board	0.079 $\frac{m2\ C}{W}$	0.079 $\frac{m2\ C}{W}$
Inside air	0.12 $\frac{m2\ C}{W}$	0.12 $\frac{m2\ C}{W}$
R value	**1.01** $\frac{m2\ C}{W}$	**3.9** $\frac{m2\ C}{W}$

$U_{tot} = 0.25\ Uw_{ood} + 0.75\ U_{ins}$

$U_{tot} = 0.25 \times 0.99 \frac{W}{m2C} + 0.75 \times 0.256 \frac{W}{m2C}$

$U_{tot} = 0.2475 \frac{W}{m2C} + 0.192 \frac{W}{m2C}$

$\mathbf{U_{tot} = 0.4395 \frac{W}{m2C}}$

$U_{wood} = \frac{1}{Rwood}$

$U_{wood} = \frac{1}{1.01 \frac{m2\ C}{W}}$

$\mathbf{U_{wood} = 0.99 \frac{W}{m2C}}$

$U_{ins} = \frac{1}{Rins}$

$U_{ins} = \frac{1}{3.9 \frac{m2\ C}{W}}$

$\mathbf{U_{wood} = 0.256 \frac{W}{m2C}}$

$Q_{tot} = U\ As\ (T_1 - T_2)$

$A_{wall} = 50 \times 0.8 = 100\ m2$

$Q_{tot} = 0.4395 \frac{W}{m2C} \times 100\ m^2 \times 24°C$

$\mathbf{Q_{tot} = 1054.8\ W}$

In 2 pages you should write a summary (in your own word!, in your own words !!) of what you have learnt in this session about radiation and radiative heat transfer

RADIATION SUMMARY

Radiation is the heat transfer mechanism in which the objects get the thermal equilibrium with its surrounding through electromagnetic waves.
It is not necessary to have a physical medium to his propagation; due to that it can be propagated on vacuum. For instance, the heat transfer from the sun. (This is opposite in conduction and convection.)
This propagation is possible because the electromagnetic waves and the energy transported by them and it depends on the wavelength that is defined by the speed of propagation and the

frequency.
For us, the thermal radiation is the important in the electromagnetic wave spectrum because is the one in which temperature is produced. It is produced by three different kind of waves: infrared, visible and ultraviolet.
The light and the thermal radiation are directly related, because the visible waves, and the colors, are contained between the thermal radiation range. The color of the different objects that the human eye can see is due to the reflection produced by that material. On the other hand, a material that can emit radiation in the visible range is considered a light source. For instance, the sun and the light of the classroom are light sources and the colors you can see in the environment are because the light reflection of the different materials.
The surfaces between 800 K and 1000 K emit light and are visible to the human eye, defining them as light sources while the surfaces under 800 K do not emit any light and are not visible unless they reflect the light from other light sources.
In other words Bodies can emit different amount of the energy. The body that absorbs energy will also emit it. Every body can emit and absorb the energy, and the emotion depends on a temperature of the surface that is source of the energy.
The one that absorbs all the energy and emits all et the given temperature is called black body.
Radiation heat transfer rate, q [W/m2], from a body (e.g. a black body) to its surroundings is proportional to the fourth power of the absolute temperature and can be expressed by the following equation's = $\varepsilon\sigma T4$ - this is Stefan–Boltzmann Law.
σ is a fundamental physical constant called the Stefan–Boltzmann constant, which is equal to 5.6697×10-8 W/m2K4. Radiation can be natural or artificial. The natural one that we are exposed to it every day is the one from the Sun and soil. The artificial one, or the one that is made by a human, can be the one emitted by television, microwave, medical procedures. Radiation can also be dangerous sometimes, but that depends on the strength and the distance (length)