WEEK 4

Task 1: 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	0.03	0.03
wood bevel (13mm)	0.14	0.14
Plywood	0.11	0.11
Urethane Rigi Foam (90mm)	no	0.98*90/25= 3,53
Wood Stud	0.63	no
Gypsum Board	0.079	0.079
Inside air	0.12	0.12

Rwood=0,03+0.14+0,11+0,63+0,079+0,12= 1,11

Rinsulation= 0,03+0,14+0,11+3,53+0,079+0,12= 4,009

UWood=1/R'with wood= 0.9017 Wm2°C

UInsulation=1/R'with wood=0.2496 Wm2°C

1/RTotal=1/RWood+1/RInsulation,

Atotal/R'Total= (Awood/R'Wood)+(Ainsulation/R'Insulation)

ATotal∗UTotal=AWood∗UWood+AInsulation∗UInsulation
Then divided by ATotal:

UTotal=UWood∗Awood/ATotal+UInsulation∗Ainsulation/ATotal
= (21%+4%)×Uwood + 75%×UInsulation
= 25%×0.9017 W m2°C+ 75%×0.2496 Wm2°C
= 0.4126 Wm2°C

The overall unit thermal resistance :

Rvalue= 1/Utotal
= 1/0.4126 Wm2°C
= 2.4237 m2°CW

The rate of heat loss through the walls

$$Q.Total = UTotal * ATotal * \Delta T$$
$$= 0.4126\ \frac{W}{m^2 °C} \times 50\ m \times 2.5\ m \times (1 - 20\%) \times 22\ °C - (-2\ °C)$$
$$= 990.24\ W$$