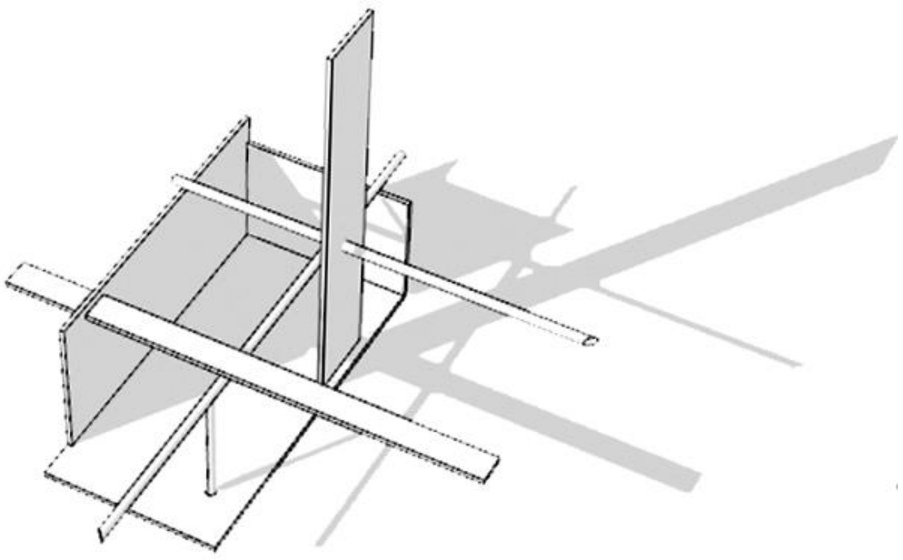
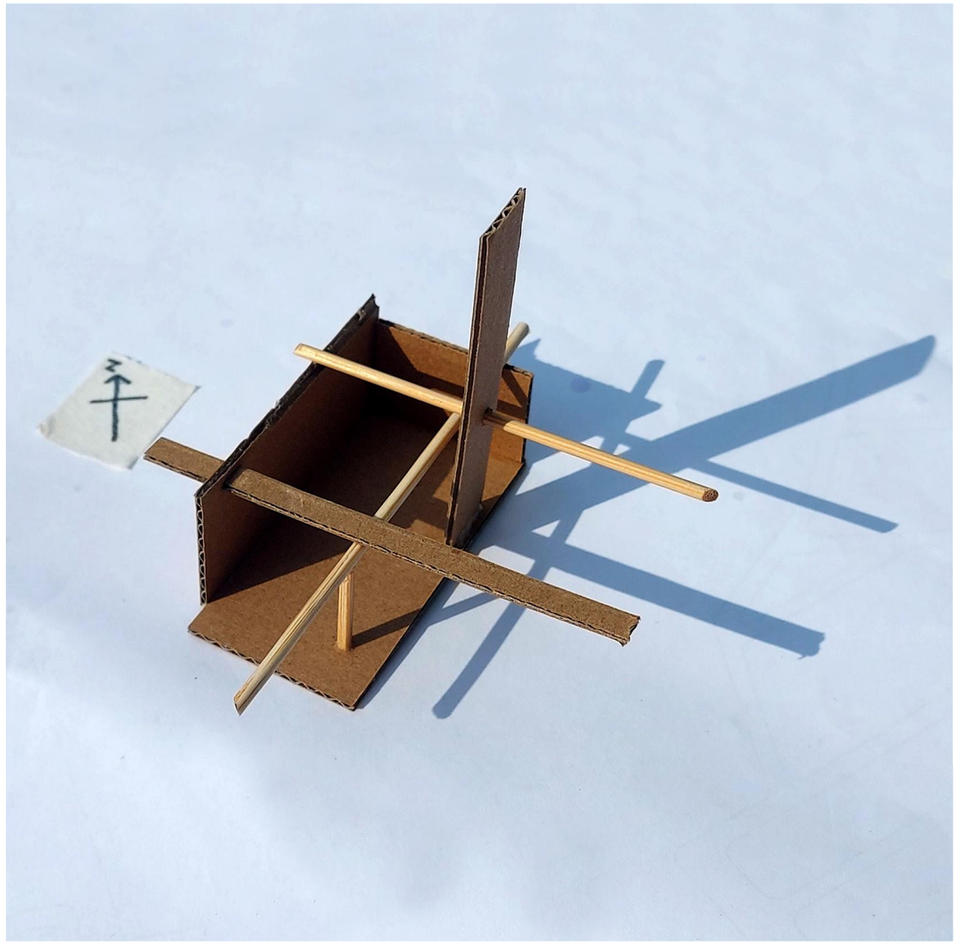
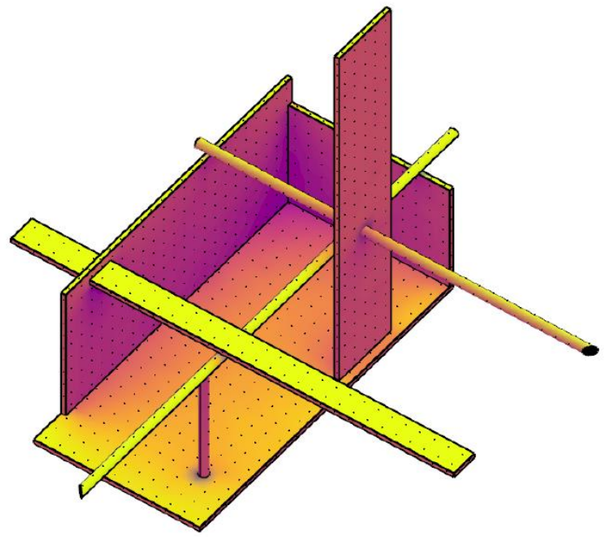






Assignment 1 – Climate & Benchmarking

Component 1 – Shading Simulation vs Experiment

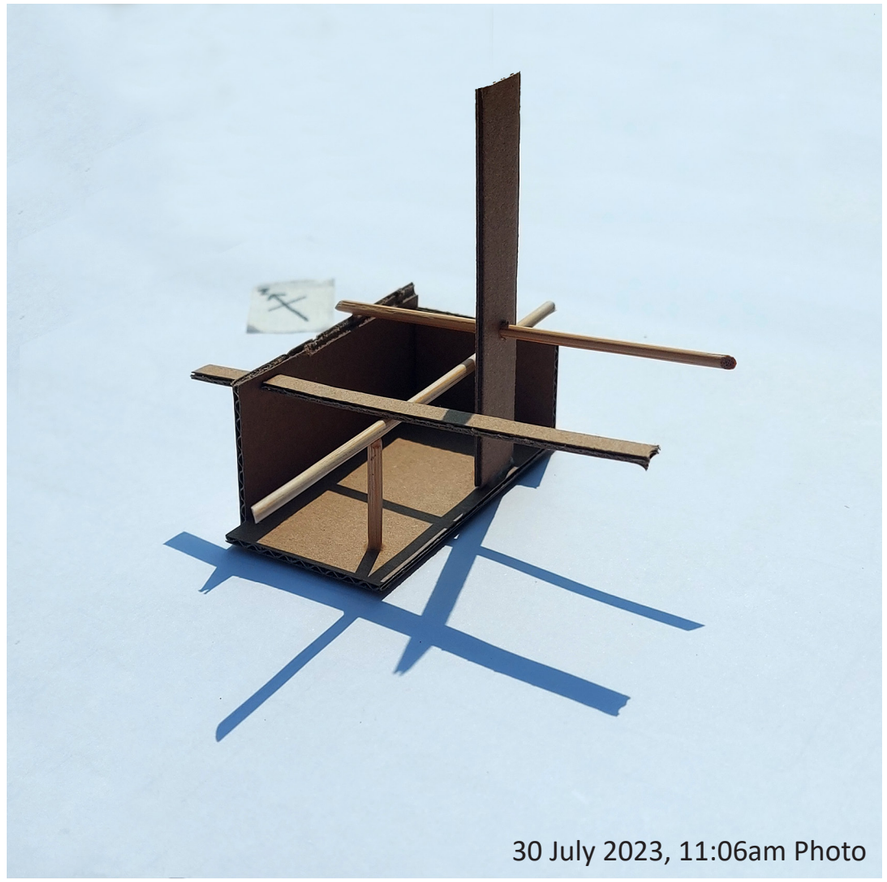
UCSI University

School of Architecture and Built Environment
UCSI University

Master of Architecture
AM523 Computer Aided Modelling & Simulation
July 2023

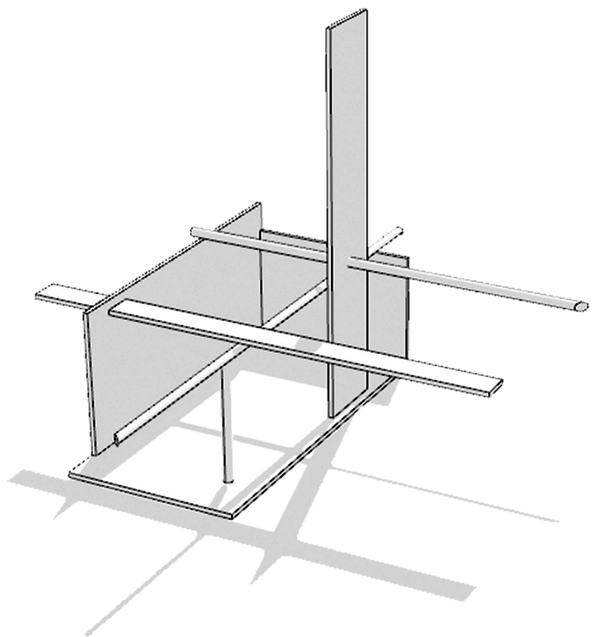
Lecturer:
Dr. Taki Eddine Seghier

Prepared by:
Koon Si Qi 1002266298

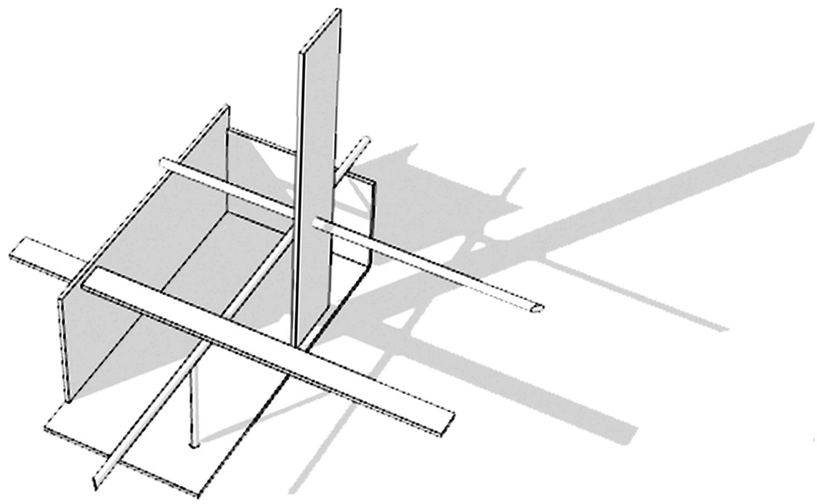


30 July 2023, 11:06am Photo

30 July 2023, 17:02pm Photo



30 July 2023, 11:06am Rhino/Climate Studio

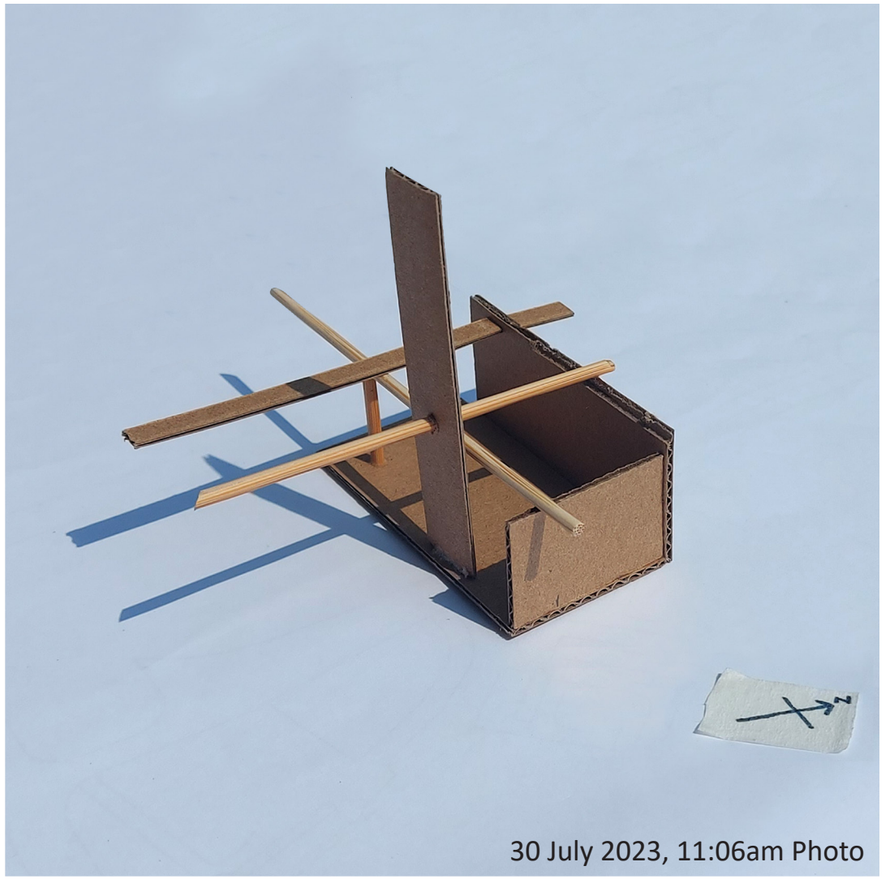


30 July 2023, 17:02pm Rhino/Climate Studio

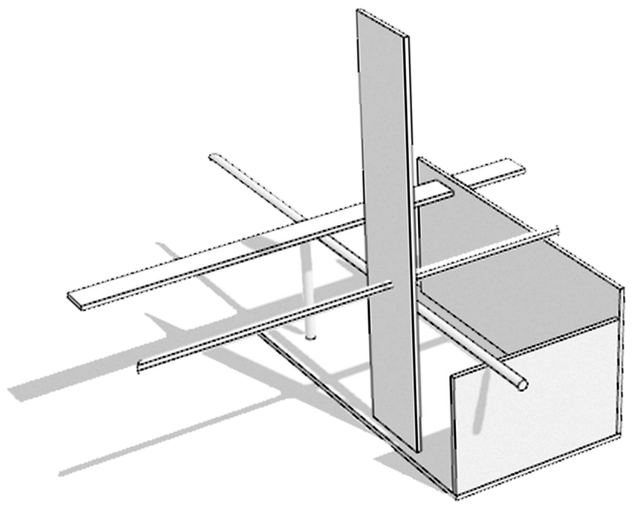
Shading Simulation vs Experiment - View 1

Assignment 1 - Component 1

Koon Si Qi 1002266298
AM523 Computer Aided Modelling and Simulation (CAMS)
Master of Architecture
School of Architecture & Built Environment, UCSI University

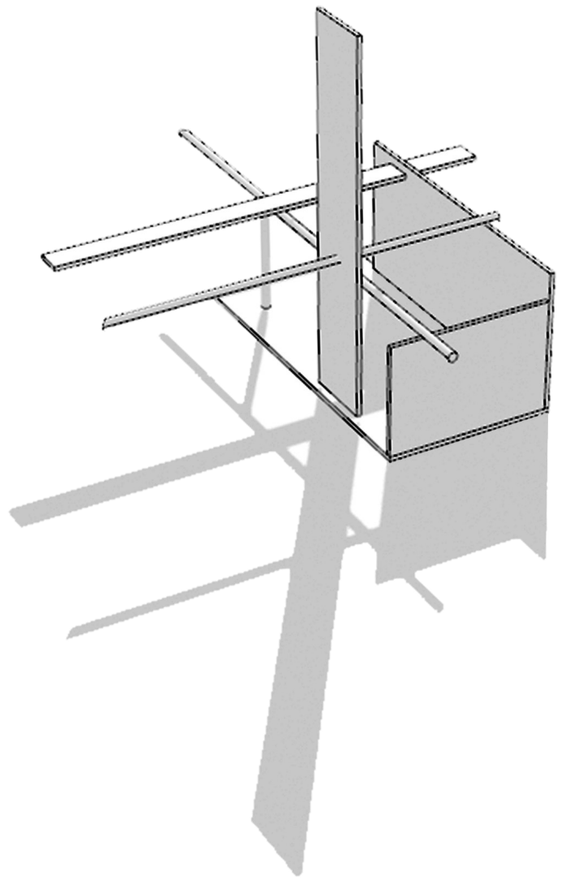


30 July 2023, 11:06am Photo



30 July 2023, 11:06am Rhino/Climate Studio

30 July 2023, 17:02pm Photo

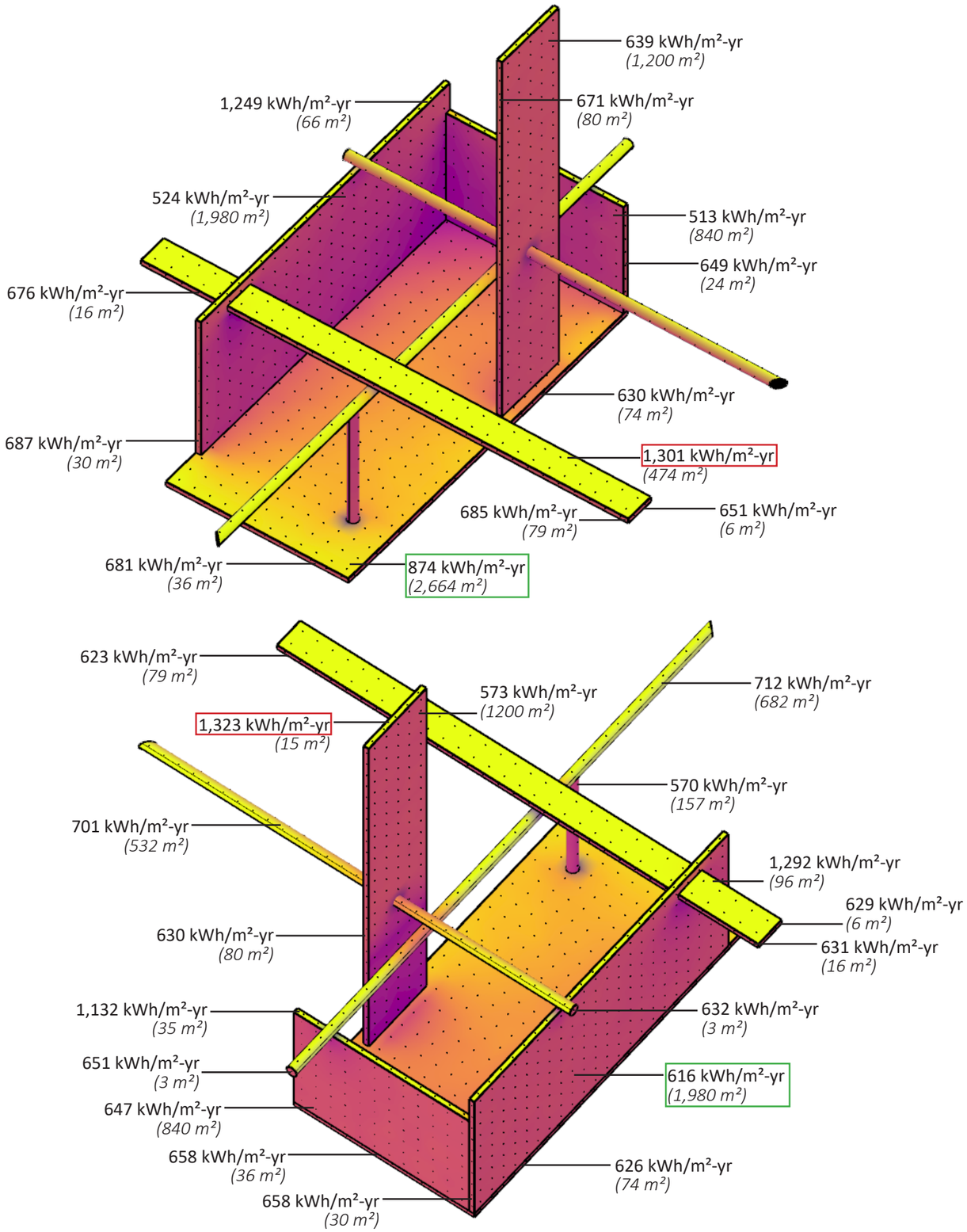


30 July 2023, 17:02pm Rhino/Climate Studio

Shading Simulation vs Experiment - View 2

Assignment 1 - Component 1

Koon Si Qi 1002266298
AM523 Computer Aided Modelling and Simulation (CAMS)
Master of Architecture
School of Architecture & Built Environment, UCSI University



Average annual solar radiation: **603 kWh/m²-yr**
Total surface area: **13,433 m²**

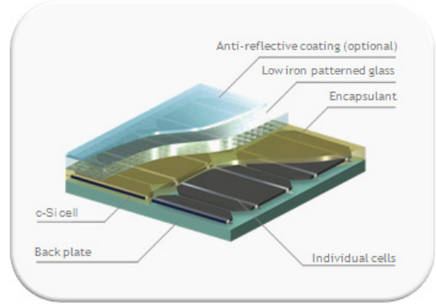
Annual Solar Radiation Simulation

Scenario 1: Select the 2 areas with the highest amount of solar radiation

Total surface area = 474 + 15 = 489 m²
70% of surface area = **342.3 m²**
Total solar radiation = 1,301 + 1,323 = **2624 kWh/m²-yr**

Total Power = 54.8 kWp

Total Energy = A * r * H * PR
= 342.3 * 16% * 2624 * 0.75
= **107,718 kWh/an**



All scenarios assume using Crystalline silicon (c-Si) solar panel, efficiency (r) = 16%

Scenario 2: Select the 2 largest areas with the highest amount of solar radiation

Total surface area = 2,664 + 1,980 = 4,644 m²
70% of surface area = **3250.8 m²**
Total solar radiation = 874 + 616 = **1490 kWh/m²-yr**

Total Power = 520.1 kWp

Total Energy = A * r * H * PR
= 3250.8 * 16% * 1490 * 0.75
= **580,890 kWh/an**

Scenario 3: Select 70% of the entire area

Total surface area = 13,433 m²
70% of surface area = **9403.1 m²**
Total solar radiation = **603 kWh/m²-yr**

Total Power = 1504.5 kWp

Total Energy = A * r * H * PR
= 9403.1 * 16% * 603 * 0.75
= **679,995 kWh/an**

Solar Photovoltaic Potential

Assignment 1 - Component 1

Koon Si Qi 1002266298
AM523 Computer Aided Modelling and Simulation (CAMS)
Master of Architecture
School of Architecture & Built Environment, UCSI University