Task 1: Building-Environment Analysis (Student A)

Scenario Selection and Justification *Based on your group number (see "Group Information" page), select the most effective scenario from your assigned category (Group S1 for odd-numbered groups, Group S2 for even-numbered groups). State your choice below and provide a detailed justification based on theoretical principles.*

Selected Scenario:

Justification:

A. Analysis of Environmental Conditions (T_{air}, MRT, RH, V_{air})

Insert supporting figures (e.g., contour or time-series plots) below. You may insert a composite figure with multiple panels (up to 6); if so, please label them (a), (b), etc., and describe each panel in your caption. Refer to all figures in your analysis (e.g., "As shown in Figure 1.1(A)...").

Insert figure(s) for Environmental Conditions analysis
(Use a PDF editor to insert your image(s) here)

Figure 1.1:

*Provide a comprehensive analysis of the changes in environmental conditions. Compare the mitigation scenario to the baseline (S0) for both **daytime** and **nighttime**. Explain the physical mechanisms driving these changes (e.g., how building height affects shading and reduces MRT, or how green facades increase RH through evapotranspiration).*

B. Analysis of Surface Fluxes

Insert supporting figures, provide captions, and refer to them in your analysis.

Insert figure(s) for Surface Flux analysis
(Use a PDF editor to insert your image(s) here)

Figure 1.2:

Analyze how your chosen mitigation strategy alters the surface energy balance of the urban canyon. Focus on the key fluxes that are modified (e.g., for a green façade, discuss the increase in Q_E and decrease in Q_H; for a tall canyon, discuss changes in the radiation budget and stored heat ΔQ_S). Compare the magnitude and diurnal pattern of these fluxes to the baseline scenario.

C. Analysis of Thermal Comfort (PET)

Insert supporting figures, provide captions, and refer to them in your analysis.

Insert figure(s) for Thermal Comfort analysis
(Use a PDF editor to insert your image(s) here)

Figure 1.3:

Analyze the impact on human thermal comfort by comparing the Physiological Equivalent Temperature (PET) between the scenarios. Discuss where and when the greatest improvements in comfort are achieved. ***Importantly, link the calculated PET values to the corresponding thermal sensation and/or heat stress levels (e.g., "heat stress was reduced from 'Extreme Heat Stress' to 'Strong Heat Stress'" or thermal sensation was shifted from 'warm' to 'slightly warm').*** *Relate the changes in PET to the underlying changes in* T_{air}, MRT, RH, *and* V_{air} *you analyzed in Part A.*