1) Obtain the ground acceleration component of Kocaeli earthquake measured in Duzce. Then, determine the ground velocities and the ground displacements from the given accelogram. Finally, plot the ground acceleration (a_g), the ground velocity (v_g) and the ground displacement (u_g) versus time.

**Hint:** The displacement, velocity and acceleration are related to each other by the below formulas.

$$a = \frac{dv}{dt} \Rightarrow a * dt = dv$$

$$\int_{a_1}^{a_2} a * dt = \int_{v_1}^{v_2} dv$$

$$\Delta v = v_2 - v_1 = \int_{a_1}^{a_2} a * dt \qquad\qquad \textbf{\textit{Equation 1}}$$

$$v = \frac{du}{dt} \Rightarrow v * dt = du$$

$$\int_{v_1}^{v_2} v * dt = \int_{u_1}^{u_2} du$$

$$\Delta u = u_2 - u_1 = \int_{v_1}^{v_2} v * dt \qquad\qquad \textbf{\textit{Equation 2}}$$

Utilize the trapezoidal rule to solve the integrals. Moreover, the ground is at rest when the earthquake hits, i.e. u(t=0)=0 m and v(t=0)=0 m/s.