Assignment 3
Fuzzy Membership Function and Fuzzy Inference System (FIS)

1. Apply your intuition to develop fuzzy numbers "approximately equals to 4" using the following membership functions having shapes:
   i.   Trapezoidal
   ii.   Triangular
   iii. Gaussian

2. Design Mamdani Fuzzy Inference System to control the FAN-SPEED of a furnace by inputting TEMPERATURE of a thermostat of a household.

   Frame the If-Then rules using Linguistic variables input TEMPERATURE and output FAN-SPEED.

   Sample rule:

   "If TEMPERATURE is 85, THEN increase the furnace FAN_SPEED to 3000 RPM"

   i.   Write fuzzy rules (as many as possible) using the linguistic variable TEMPERATURE and FAN-SPEED.
         Consider Fuzzy variables for TEMPERATURE like "Risky", "Average", "Excellent" and FAN-SPEED like "Slow", "High", "Moderate", etc.
   ii.   Fuzzify the input and output fuzzy variables with appropriate membership functions.
   iii. Aggregate the rules using the Mamdani model.
   iv.   Apply Centroid defuzzification method to calculate the crisp value of FAN-SPEED.