# Function to calculate the triangular membership value

def triangular\_membership(x, a, b, c):

if x < a or x > c:

return 0

elif a <= x < b:

return (x - a) / (b - a)

elif b <= x <= c:

return (c - x) / (c - b)

return 0

# Defuzzification function (Centroid Method)

def defuzzify(low\_membership, high\_membership, low\_centroid, high\_centroid):

# Using the centroid formula: (Sum of membership values \* centroids) / Sum of membership values

numerator = (low\_membership \* low\_centroid) + (high\_membership \* high\_centroid)

denominator = low\_membership + high\_membership

return numerator / denominator if denominator != 0 else 0

# Input: Age

age = 35

# Membership function for Young (0, 50, 70)

young\_membership = triangular\_membership(age, 0, 50, 70)

# Membership function for Old (30, 70, 100)

old\_membership = triangular\_membership(age, 30, 70, 100)

# Activity membership function centroids (Low: 0, 2, 4 and High: 6, 8, 10)

low\_centroid = (0 + 2 + 4) / 3 # Centroid of Low Activity

high\_centroid = (6 + 8 + 10) / 3 # Centroid of High Activity

# Calculate activity membership values

low\_membership = young\_membership # Low activity is based on Young membership

high\_membership = old\_membership # High activity is based on Old membership

# Get the defuzzified Activity value

activity = defuzzify(low\_membership, high\_membership, low\_centroid, high\_centroid)

# Output the result

print(f"Input Age: {age}")

print(f"Defuzzified Activity: {activity:.2f}")