TEI OF CRETE
DEPARTMENT OF INFORMATICS ENGINEERING
Msc in Informatics & Multimedia

COMPUTATIONAL INTELLIGENCE

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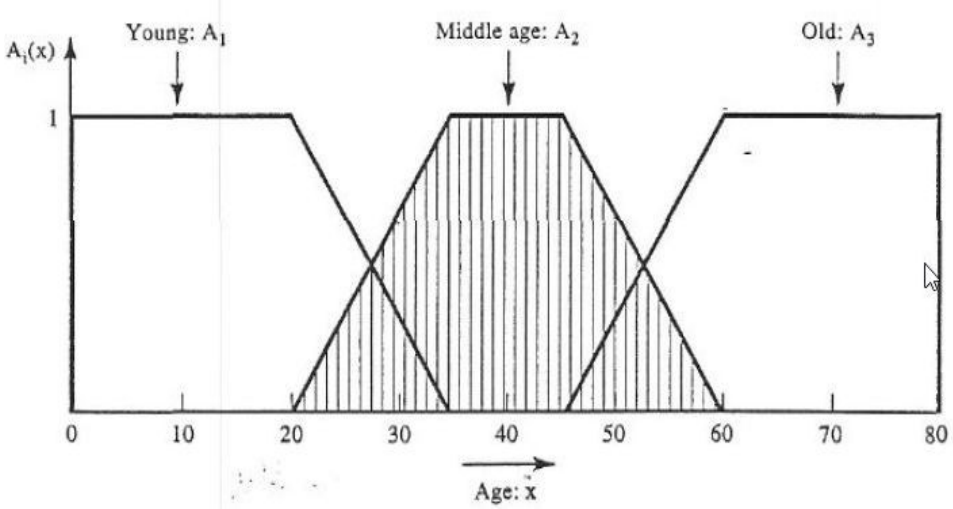
ASSIGNMENT 3: Fuzzy Systems

1. Express the membership functions illustrated in the diagram as membership function points.



2. Fuzzy sets V and W are defined on the same universe of five individuals as follows:

$$V = \left\{ \frac{1.0}{q} + \frac{0.8}{r} + \frac{0.6}{s} + \frac{0.20}{t} + \frac{0}{u} \right\}$$

$$W = \left\{ \frac{1.0}{q} + \frac{0.6}{r} + \frac{0.45}{s} + \frac{0.15}{t} + \frac{0}{u} \right\}$$

For V and W, find: (a) $V \cap W$, (b) $V \cup W$, (c) $\widetilde{V}$, (d) $\widetilde{W}$, (e) $\widetilde{V} \cap W$, (f) $V \cup \widetilde{W}$.

3. For the Furnace example (textbook starts page 291) a) redefine the function *InTemp*, *OutTemp* and *DeltaInTemp* to approximate Celsius degrees b) draw the new membership functions of *InTemp*, *OutTemp* and *DeltaInTemp* c) Let's assume that the indoor temperature is 18 C, the change in indoor temperature over the past five minutes is 0.5 C and the outdoor temperature is 12 C. Determine the resulting membership values for the fuzzy sets and apply them to the four rules, d) perform defuzzification using the **clipped center of gravity** approach and calculate the flow change.