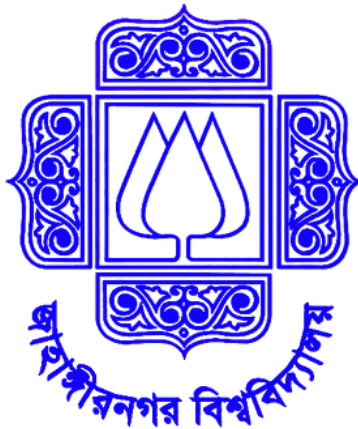


JAHANGIRNAGAR UNIVERSITY

Institute of Information Technology



Assignment 1 | Fall 2023 Semester
PMIT 6107 Artificial Intelligence & Neural Network
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Submitted by
HASAN TAHSIN RAFSAN
Professional Masters in Information Technology (PMIT) Program
2nd Trimester Regular Batch - Section A
ID **232137**

Submitted to
DR. M. SHAMIM KAISER
Professor
Institute of Information Technology

In the given problem,
Inputs are "rice quantity" & "time"
Output is "temperature"

Here rice quantity is calculated through cups based on kg.
time is calculated as min.

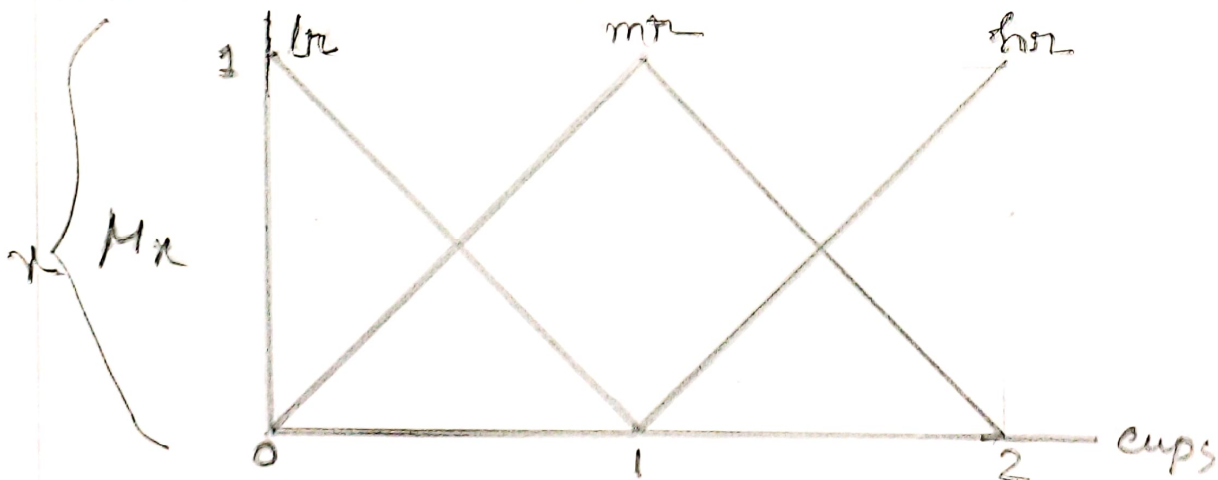
temperature is calculated in degrees celsius

For inputs & output the given fuzzy linguistic variables are
rice quantity : low, medium, high.
time : short, medium, long
temperature : cool, warm, hot

Now, diagrams for each inputs & output variables which is individually known as the "membership function" (M.F.)

For, membership functions. For rice quantity.
we will take the values as, l_r , m_r & h_r . For time
it will be s_t , m_t , l_t & for temperature we will take
as c_c , w_c & h_c .

M.F. for rice quantity

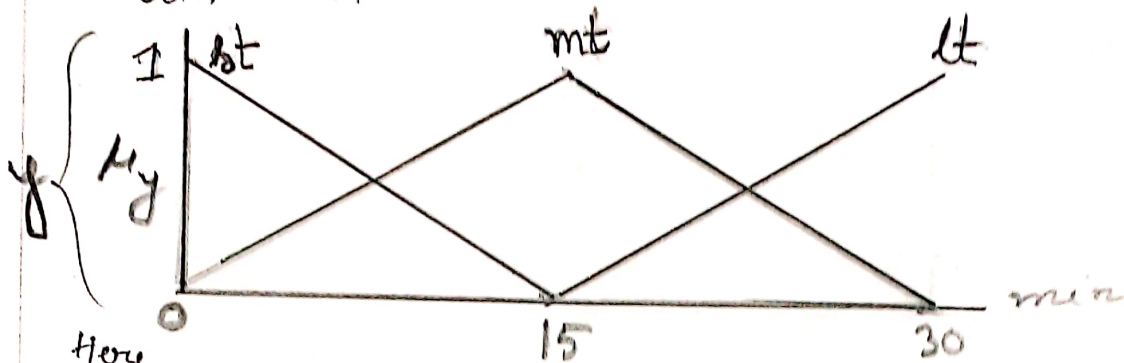


$$\text{Here, } \mu_{l_r}(x) = \frac{1-x}{1} ; 0 \leq x \leq 1$$

$$\mu_{m_r}(x) = \begin{cases} \frac{x}{1} & ; 0 \leq x \leq 1 \\ \frac{2-x}{1} & ; 1 \leq x \leq 2 \end{cases}$$

$$\mu_{h_r}(x) = \frac{x-1}{1} ; 1 \leq x \leq 2$$

MF. Born time:

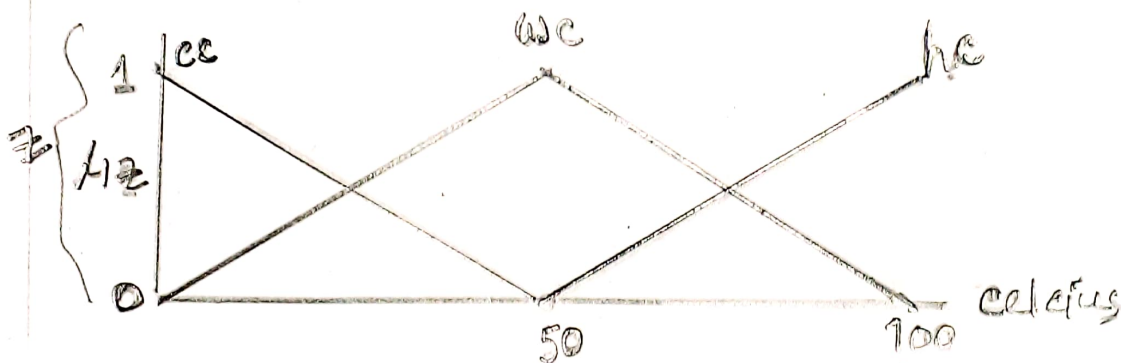


Here, $\mu_{st}(y) = \frac{15-y}{15} ; 0 \leq y \leq 15$

$$\mu_{mt}(y) = \begin{cases} \frac{y}{15} ; & 0 \leq y \leq 15 \\ \frac{30-y}{15} ; & 15 \leq y \leq 30 \end{cases}$$

$$\mu_{lt}(y) = \frac{y-15}{15} ; 15 \leq y \leq 30$$

MF. Born temperature



Here, $\mu_{cc}(z) = \frac{50-z}{50} ; 0 \leq z \leq 50$

$$\mu_{wc}(z) = \begin{cases} \frac{z}{50} ; & 0 \leq z \leq 50 \\ \frac{100-z}{50} ; & 50 \leq z \leq 100 \end{cases}$$

$$\mu_{hc}(z) = \frac{z-50}{50} ; 50 \leq z \leq 100$$

Rule Based System according to the given problem.

x	st	mt	lt
lr	cc	wc	hc
mr	wc	hc	hc*
hr	wc	hc	hc*

As described in the problem, there are three linguistic variables instead of four. So, I took both hot & very hot temperature variables for calculating MF of Rule based system.

$\Rightarrow x =$