UAS PRAKTIKUM
SISTEM PENDUKUNG KEPUTUSAN
HITUNGAN MANUAL

Oleh :

Rifqi Daffa Ariyana (G.241.20.0009)

PROGRAM STUDI S1 TEKNIK INFORMATIKA

FAKULTAS TEKNOLOGI INFORMASI DAN KOMUNIKASI

UNIVERSITAS SEMARANG

2023

1. Mengklasifikasikan Kriteria berdasarkan fuzzy
   a. Matriks perbandingan antar kriteria

	C1	C2	C3	C4
C1	1	5	2	3
C2	0	1	3	7
C3	0	0	1	3
C4	0	0	0	1

   b. Mencari matriks pairwise comparison antar kriteria

	C1			C2			C3			C4		
	l	**m**	**u**	**l**	**m**	**u**	**l**	**m**	**u**	**l**	**m**	**u**
C1	1	1	1	2	2,5	3	0,5	1	1,5	1	1,5	2
C2	0,333	0,4	0,5	1	1	1	1	1,5	2	3	3,5	4
C3	0,667	1	2	0,5	0,667	1	1	1	1	1	1,5	2
C4	0,5	0,667	1	0,4	0,268	0,333	0,5	0,667	1	1	1	1

   c. Mencari fuzzy tringular number

- $C1\ (l) = 1 + 2 + 0{,}5 + 1 = 4{,}5$
- $C1\ (m) = 1 + 2{,}5 + 1 + 1{,}5 = 6$
- $C1\ (u) = 1 + 3 + 1{,}5 + 2 = 7{,}5$
- $C2\ (l) = 0{,}333 + 1 + 1 + 3 = 5{,}333$
- $C2\ (m) = 0{,}4 + 1 + 1{,}5 + 3{,}5 = 6{,}4$
- $C2\ (u) = 0{,}5 + 1 + 2 + 4 = 7{,}5$
- $C3\ (l) = 0{,}667 + 0{,}5 + 1 + 1 = 3{,}167$
- $C3\ (m) = 1 + 0{,}667 + 1 + 1{,}5 = 4{,}167$
- $C3\ (u) = 2 + 1 + 1 + 2 = 6$
- $C4\ (l) = 0{,}5 + 0{,}4 + 0{,}5 + 1 = 2{,}4$
- $C4\ (m) = 0{,}667 + 0{,}268 + 0{,}667 + 1 = 2{,}607$
- $C4\ (u) = 1 + 0{,}333 + 1 + 1 = 3{,}333$

	l	m	u
C1	4,5	6	7,5
C2	5,333	6,4	7,5
C3	3,167	4,167	6
C4	2,4	2,602	3,333
Total	**15,4**	**19,169**	**24,333**

   d. Nilai sintesis fuzzy

$$\tilde{S}i = \sum_{j=1}^{m} \tilde{M}_{ci}^{j} \odot \left[\sum_{i=1}^{n}\sum_{j=1}^{m} \tilde{M}_{ci}^{j}\right]^{-1}$$

- $C1 = (4{,}5\ ;\ 6\ ;\ 7{,}5) * \left(\frac{1}{24{,}333}, \frac{1}{19{,}169}, \frac{1}{15{,}4}\right) = (0{,}184934\ ;\ 0{,}313005\ ;\ 0{,}487013)$
- $C2 = (5{,}333\ ;\ 6{,}4\ ;\ 7{,}5) * \left(\frac{1}{24{,}333}, \frac{1}{19{,}169}, \frac{1}{15{,}4}\right) = (0{,}219167\ ;\ 0{,}333872\ ;\ 0{,}487013)$
- $C3 = (3{,}167\ ;\ 4{,}167\ ;\ 6) * \left(\frac{1}{24{,}333}, \frac{1}{19{,}169}, \frac{1}{15{,}4}\right) = (0{,}130152\ ;\ 0{,}217382\ ;\ 0{,}38961)$
- $C4 = (2{,}4\ ;\ 2{,}602\ ;\ 3{,}333) * \left(\frac{1}{24{,}333}, \frac{1}{19{,}169}, \frac{1}{15{,}4}\right) = (0{,}098631\ ;\ 0{,}13574\ ;\ 0{,}216429)$

e. Menentukan derajat keanggotaan dari masing-masing kriteria

$$V(M_2 \geq M_1) = \begin{cases} 1 & ,jika\ m_2 \geq m_1 \\ 0 & ,jika\ l_1 \geq u_2 \\ \dfrac{(l_1 - u_2)}{(m_2 - u_2) - (m_1 - l_1)} & ,yang\ lainnya. \end{cases}$$

	l	m	u
C1	0,184934	0,313005	0,487013
C2	0,219167	0,333872	0,487013
C3	0,130152	0,217382	0,38961
C4	0,098631	0,13574	0,216429

- C1 ≥ C2

$$C1 \geq C2 = \frac{(l_2 - u_1)}{(m_1 - u_1) - (m_2 - l_2)} = \frac{(0{,}219167 - 0{,}487013)}{(0{,}313005 - 0{,}487013) - (0{,}333872 - 0{,}219167)}$$

$$= 0{,}927723892$$

- C1 ≥ C3

$$C1 \geq C3 = m_1 \geq m_3 = 0{,}313005 \geq 0{,}217382 = 1$$

- C1 ≥ C4

$$C1 \geq C4 = m_1 \geq m_4 = 0{,}313005 \geq 0{,}13574 = 1$$

- C2 ≥ C1

$$C2 \geq C1 = m_2 \geq m_1 = 0{,}333872 \geq 0{,}313005 = 1$$

- C2 ≥ C3

$$C2 \geq C3 = m_2 \geq m_3 = 0{,}333872 \geq 0{,}217382 = 1$$

- C2 ≥ C4

$$C2 \geq C4 = m_2 \geq m_4 = 0{,}333872 \geq 0{,}13574 = 1$$

- C3 ≥ C1

$$C3 \geq C1 = \frac{(l_1 - u_3)}{(m_3 - u_3) - (m_1 - l_1)} = \frac{(0{,}184934 - 0{,}38961)}{(0{,}217382 - 0{,}38961) - (0{,}313005 - 0{,}184934)}$$

$$= 0{,}681574081$$

- C3 ≥ C2

$$C3 \geq C2 = \frac{(l_2 - u_3)}{(m_3 - u_3) - (m_2 - l_2)} = \frac{(0{,}219167 - 0{,}38961)}{(0{,}217382 - 0{,}38961) - (0{,}333872 - 0{,}219167)}$$

$$= 0{,}594016382$$

- C3 ≥ C4

$$C3 \geq C4 = m_3 \geq m_4 = 0{,}217382 \geq 0{,}13574 = 1$$

- C4 ≥ C1

$$C4 \geq C1 = \frac{(l_1 - u_4)}{(m_4 - u_4) - (m_1 - l_1)} = \frac{(0{,}184934 - 0{,}216429)}{(0{,}13574 - 0{,}216429) - (0{,}313005 - 0{,}184934)}$$

$$= 0{,}150864846$$

- C4 ≥ C2

$$C4 \geq C2 = l_2 \geq u_4 = 0{,}219167 \geq 0{,}216429 = 0$$

- C4 ≥ C3

$$C4 \geq C3 = \frac{(l_3 - u_4)}{(m_4 - u_4) - (m_3 - l_3)} = \frac{(0{,}130152 - 0{,}216429)}{(0{,}13574 - 0{,}216429) - (0{,}217382 - 0{,}130152)}$$

$$= 0{,}513797983$$

f. Menentukan bobot vector dari kriteria

$$W' = (d'(A_1), d'(A_2), \dots, d'(A_n))^T$$

- C1 = (0,927723892 ; 1 ; 1)
  $d'(C1) = MIN(0{,}927723892\ ;\ 1\ ;\ 1) = 0{,}927723892$

- C2 = (1;1;1)
  $d'(C2) = MIN(1\ ;\ 1\ ;\ 1) = 1$

- C3 = (0,681574081 ; 0,594016382 ; 1)
  $d'(C3) = MIN(0{,}681574081\ ;\ 0{,}594016382\ ;\ 1) = 0{,}594016382$

- C4 = (0,150864846 ; 0 ; 0,513797983)
  $d'(C3) = MIN(0{,}150864846\ ;\ 0\ ;\ 0{,}513797983) = 0$

  $Total = 0{,}927723892 + 1 + 0{,}594016382 + 0 = 2{,}521740275$

g. Menentukan bobot vector ternormalisasi dari kriteria

$\boldsymbol{W'} = (0{,}927723892\ ;\ 1\ ;\ 0{,}594016382\ ;\ 0)$

$$W = \left(\frac{C1}{Total}\ ;\ \frac{C2}{Total}\ ;\ \frac{C3}{Total}\ ;\ \frac{C4}{Total}\right)$$

$$W = \left(\frac{0{,}927723892}{2{,}521740275}\ ;\ \frac{1}{2{,}521740275}\ ;\ \frac{0{,}594016382}{2{,}521740275}\ ;\ \frac{0}{2{,}521740275}\right)$$

$$W = (0{,}367890342;\ 0{,}396551544\ ;\ 0{,}235558114;\ 0)$$

$$Total = 0{,}367890342 + 0{,}396551544 + 0{,}235558114 + 0 = 1$$

Kriteria	C1	C2	C3	C4	Total
W\'	0,927724	1	0,594016	0	2,52174
W	0,36789	0,396552	0,235558	0	1

2. Proses Perankingan

a. Alternatif tanaman

Alternatif	Tanaman
A1	Bambu Cina
A2	Bambu Kuning
A3	Kaktus Minima Blue
A4	Oxalis (Kupu-kupu)

b. Matriks pembobotan masing-masing alternatif

Alternatif	Ukuran (C1)	Daya Tahan (C2)	Pencahayaan (C3)	Harga (C4)
A1	3	3	2	2
A2	5	3	2	2
A3	1	1	3	1
A4	2	1	3	1

c. Menentukan bobot kriteria dengan alternatif

- **A1 (Bambu Cina)**

$C1 = W_{C1} * A1_{C1} = 0{,}36789 * 3 = 1{,}103671026$
$C2 = W_{C2} * A1_{C2} = 0{,}396552 * 3 = 1{,}189654633$
$C3 = W_{C3} * A1_{C3} = 0{,}235558 * 2 = 0{,}471116228$
$C4 = W_{C4} * A1_{C4} = 0 * 2 = 0$
$Nilai = 1{,}103671026 + 1{,}189654633 + 0{,}471116228 + 0 = 2{,}764441886$

- **A2 (Bambu Kuning)**

$C1 = W_{C1} * A2_{C1} = 0{,}36789 * 5 = 1{,}83945171$
$C2 = W_{C2} * A2_{C2} = 0{,}396552 * 3 = 1{,}189654633$
$C3 = W_{C3} * A2_{C3} = 0{,}235558 * 2 = 0{,}471116228$
$C4 = W_{C4} * A2_{C4} = 0 * 2 = 0$
$Nilai = 1{,}83945171 + 1{,}189654633 + 0{,}471116228 + 0 = 3{,}50022257$

- **A3 (Kaktus Minima Blue)**

$C1 = W_{C1} * A3_{C1} = 0{,}36789 * 1 = 0{,}367890342$
$C2 = W_{C2} * A3_{C2} = 0{,}396552 * 1 = 0{,}396551544$
$C3 = W_{C3} * A3_{C3} = 0{,}235558 * 3 = 0{,}706674341$
$C4 = W_{C4} * A3_{C4} = 0 * 1 = 0$
$Nilai = 0{,}367890342 + 0{,}396551544 + 0{,}706674341 + 0 = 1{,}471116228$

- **A4 (Oxalis (Kupu-kupu))**

$C1 = W_{C1} * A4_{C1} = 0{,}36789 * 2 = 0{,}735780684$
$C2 = W_{C2} * A4_{C2} = 0{,}396552 * 1 = 0{,}396551544$
$C3 = W_{C3} * A4_{C3} = 0{,}235558 * 3 = 0{,}706674341$
$C4 = W_{C4} * A4_{C4} = 0 * 1 = 0$
$Nilai = 0{,}735780684 + 0{,}396551544 + 0{,}706674341 + 0 = 1{,}83900657$

d. Menentukan ranking

Alternatif	Tanaman	Nilai	Ranking
A1	Bambu Cina	2,764442	2
A2	Bambu Kuning	3,500223	1
A3	Kaktus Minima Blue	1,471116	4
A4	Oxalis (Kupu-kupu)	1,839007	3

Bila dilihat dari Nilai yang didapat, maka dapat disimpulkan bahwa **A2 (Bambu Kuning)** merupakan alternatif tumbuhan terbaik yang dapat digunakan saat ini