Nama: Isep Lutpi Nur
NPM: 2113191079
Tugas: Minggu 5 - WEIGHT AGGREGATED SUM PRODUCK ASSESMENT (WASPAS)

Buatlah kasus dengan penyelesaian waspas

Studi Kasus: Penentuan asisten laboratorium menggunakan metode WASPAS

Data:

Bobot Kriteria:

Nilai Ujian = 0.6
IPK = 0.25
Semester = 0.15

Cost (Min) = {Nilai Ujian, IPK}
Benefit (Max) = {Semester}

Table data:

No.	Nama	NU	IPK	Smstr
1	Rivan kurnia	70	3.20	6
2	Adistia Ramadhani	80	3.30	6
3	Akbar Maulana	85	3.50	4
4	Alam Nurzaman	75	3.10	6
5	Dara Atria	85	3.70	6
6	Deri Kurniawan	80	3.30	4
7	Farhan Aziz	70	3.30	4
8	Iman Faturahman	75	3.20	6
9	Irfan Ramdani	80	3.40	4
10	Isep Lutpi Nur	90	3.70	4

Implementasi:

1. Membuat Matriks Keputusan

No.	Nama	NU	IPK	Smstr
1	Rivan kurnia	70	3.20	6
2	Adistia Ramadhani	80	3.30	6
3	Akbar Maulana	85	3.50	4
4	Alam Nurzaman	75	3.10	6
5	Dara Atria	85	3.70	6
6	Deri Kurniawan	80	3.30	4
7	Farhan Aziz	70	3.30	4
8	Iman Faturahman	75	3.20	6
9	Irfan Ramdani	80	3.40	4
10	Isep Lutpi Nur	90	3.70	4

$$X = \begin{bmatrix} 70 & 3.20 & 6 \\ 80 & 3.30 & 6 \\ 85 & 3.50 & 4 \\ 75 & 3.10 & 6 \\ 85 & 3.70 & 6 \\ 80 & 3.30 & 4 \\ 70 & 3.30 & 4 \\ 75 & 3.20 & 6 \\ 80 & 3.40 & 4 \\ 90 & 3.70 & 4 \end{bmatrix}$$

2. Menghitung nilai normalisasi Matriks setiap kriteria

   a. Kriteria Nilai Ujian -> Cost(Min) -> $X_{ij} = \frac{Min_i X_{ij}}{X_{ij}}$

i	**NU**	IPK	Smstr
1	**70**	3.2	6
2	**80**	3.3	6
3	**85**	3.5	4
4	**75**	3.1	6
5	**85**	3.7	6
6	**80**	3.3	4
7	**70**	3.3	4
8	**75**	3.2	6
9	**80**	3.4	4
10	**90**	3.7	4
	Min	Min	Max
	70	3.1	6
	0.60	0.25	0.15

X=

$$X_{1,1} = \frac{70}{70} = 1$$
$$X_{2,1} = \frac{70}{80} = 0.875$$
$$X_{3,1} = \frac{70}{85} = 0.824$$
$$X_{4,1} = \frac{70}{75} = 0.933$$
$$X_{5,1} = \frac{70}{85} = 0.824$$
$$X_{6,1} = \frac{70}{80} = 0.875$$
$$X_{7,1} = \frac{70}{70} = 1$$
$$X_{8,1} = \frac{70}{75} = 0.933$$
$$X_{9,1} = \frac{70}{80} = 0.875$$
$$X_{10,1} = \frac{70}{90} = 0.778$$

   b. Kriteria IPK -> Cost(Min) Cost(Min) -> $X_{ij} = \frac{Min_i X_{ij}}{X_{ij}}$

i	NU	**IPK**	Smstr
1	70	**3.2**	6
2	80	**3.3**	6
3	85	**3.5**	4
4	75	**3.1**	6
5	85	**3.7**	6
6	80	**3.3**	4
7	70	**3.3**	4
8	75	**3.2**	6
9	80	**3.4**	4
10	90	**3.7**	4
	Min	**Min**	Max
	70	**3.1**	6
	0.60	**0.25**	0.15

X=

$$X_{1,2} = \frac{3.1}{3.2} = 0.969$$
$$X_{2,2} = \frac{3.1}{3.3} = 0.939$$
$$X_{3,2} = \frac{3.1}{3.5} = 0.886$$
$$X_{4,2} = \frac{3.1}{3.1} = 1$$
$$X_{5,2} = \frac{3.1}{3.7} = 0.838$$
$$X_{6,2} = \frac{3.1}{3.3} = 0.939$$
$$X_{7,2} = \frac{3.1}{3.3} = 0.939$$
$$X_{8,2} = \frac{3.1}{3.2} = 0.969$$
$$X_{9,2} = \frac{3.1}{3.4} = 0.912$$
$$X_{10,2} = \frac{3.1}{3.7} = 0.838$$

c. Kriteria Semester -> Benefit(Max) -> $X_{ij} = \frac{X_{ij}}{\text{Max}_i X_{ij}}$

X=

i	NU	IPK	**Smstr**
1	70	3.2	**6**
2	80	3.3	**6**
3	85	3.5	**4**
4	75	3.1	**6**
5	85	3.7	**6**
6	80	3.3	**4**
7	70	3.3	**4**
8	75	3.2	**6**
9	80	3.4	**4**
10	90	3.7	**4**
	Min	Min	**Max**
	70	3.1	**6**
	0.60	0.25	**0.15**

$$X_{1,3} = \frac{6}{6} = 1$$
$$X_{2,3} = \frac{6}{6} = 1$$
$$X_{3,3} = \frac{4}{6} = 0.667$$
$$X_{4,3} = \frac{6}{6} = 1$$
$$X_{5,3} = \frac{6}{6} = 1$$
$$X_{6,3} = \frac{4}{6} = 0.667$$
$$X_{7,3} = \frac{4}{6} = 0.667$$
$$X_{8,3} = \frac{6}{6} = 1$$
$$X_{9,3} = \frac{4}{6} = 0.667$$
$$X_{10,3} = \frac{4}{6} = 0.667$$

d. Didapatlah normalisasi dari setiap kriteria

X=

i	NU	IPK	Smstr
1	70	3.2	6
2	80	3.3	6
3	85	3.5	4
4	75	3.1	6
5	85	3.7	6
6	80	3.3	4
7	70	3.3	4
8	75	3.2	6
9	80	3.4	4
10	90	3.7	4
	Min	Min	Max
	70	3.1	6
	0.60	0.25	0.15

X=

1.000	0.969	1.000
0.875	0.939	1.000
0.824	0.886	0.667
0.933	1.000	1.000
0.824	0.838	1.000
0.875	0.939	0.667
1.000	0.939	0.667
0.933	0.969	1.000
0.875	0.912	0.667
0.778	0.838	0.667

3. Menghitung nilai Qi dari Normalisasi dan Bobot WASPAS dalam pengambilan keputusan

$$\text{Qi} = 0{,}5 \sum_{j=1}^{n} Xijw + 0{,}5 \prod_{j=1}^{n} (xij)^{wj}$$

a. Perhitungan Qi

1. Qi(Rivan kurnia)

$$QiA_1 = \left(0.5 * \left((1 * 0.6) + (1 * 0.25) + (1 * 0.15)\right)\right) + \left(0.5 * \left((1^{0.6}) + (1^{0.25}) + (1^{0.15})\right)\right) = 1.992$$

2. Qi(Adistia Ramadhani)

$$QiA_2 = \left(0.5 * \left((0.875 * 0.6) + (1 * 0.25) + (1 * 0.15)\right)\right) + \left(0.5 * \left((0.875^{0.6}) + (1^{0.25}) + (1^{0.15})\right)\right) = 1.909$$

3. Qi(Akbar Maulana)

$$QiA_3 = \left(0.5 * \left((0.824 * 0.6) + (1 * 0.25) + (0.667 * 0.15)\right)\right) + \left(0.5 * \left((0.824^{0.6}) + (1^{0.25}) + (0.667^{0.15})\right)\right) = 1.808$$

4. Qi(Alam Nurzaman)

$$QiA_4 = \left(0.5 * \left((0.933 * 0.6) + (1 * 0.25) + (1 * 0.15)\right)\right) + \left(0.5 * \left((0.933^{0.6}) + (1^{0.25}) + (1^{0.15})\right)\right) = 1.96$$

5. Qi(Dara Atria)

$$QiA_5 = \left(0.5 * \left((0.824 * 0.6) + (1 * 0.25) + (1 * 0.15)\right)\right) + \left(0.5 * \left((0.824^{0.6}) + (1^{0.25}) + (1^{0.15})\right)\right) = 1.85$$

6. Qi(Deri Kurniawan)

$$QiA_6 = \left(0.5 * \left((0.875 * 0.6) + (1 * 0.25) + (0.667 * 0.15)\right)\right) + \left(0.5 * \left((0.875^{0.6}) + (1^{0.25}) + (0.667^{0.15})\right)\right) = 1.854$$

7. Qi(Farhan Aziz)

$$QiA_7 = \left(0.5 * \left((1 * 0.6) + (1 * 0.25) + (0.667 * 0.15)\right)\right) + \left(0.5 * \left((1^{0.6}) + (1^{0.25}) + (0.667^{0.15})\right)\right) = 1.93$$

8. Qi(Iman Faturahman)

$$QiA_8 = \left(0.5 * \left((0.933 * 0.6) + (1 * 0.25) + (1 * 0.15)\right)\right) + \left(0.5 * \left((0.933^{0.6}) + (1^{0.25}) + (1^{0.15})\right)\right) = 1.952$$

9. Qi(Irfan Ramdani)

$$QiA_9 = \left(0.5 * \left((0.875 * 0.6) + (1 * 0.25) + (0.667 * 0.15)\right)\right) + \left(0.5 * \left((0.875^{0.6}) + (1^{0.25}) + (0.667^{0.15})\right)\right) = 1.847$$

10. Qi(Isep Lutpi Nur)

$$QiA_{10} = \left(0.5 * \left((0.778 * 0.6) + (1 * 0.25) + (0.667 * 0.15)\right)\right) + \left(0.5 * \left((0.778^{0.6}) + (1^{0.25}) + (0.667^{0.15})\right)\right) = 1.767$$

b. Perangkingan dan hasil perhitungan.

No.	Nama	Nilai Qi	Rangking
1	Rivan kurnia	1.992	1
2	Adistia Ramadhani	1.909	5
3	Akbar Maulana	1.808	9
4	Alam Nurzaman	1.96	2
5	Dara Atria	1.85	7
6	Deri Kurniawan	1.854	6
7	Farhan Aziz	1.93	4
8	Iman Faturahman	1.952	3
9	Irfan Ramdani	1.847	8
10	Isep Lutpi Nur	1.767	10

4. Perhitungan

Perhitungan menggunakan Microsoft Excel