DECISION SUPPORT SYSTEM

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PROGRAM STUDI D-IV TEKNIK INFORMATIKA

JURUSAN TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

CASE STUDY

A software developer makes a Decision Support System to choose an apartment with the SAW and WP methods. There are 3 alternative locations, namely: Location 1, Location 2, and Location 3. There are 5 criteria used in decision making, namely:

c1: Supporting facilities in the apartment (weight: 30)

c2: Building price per square meter (weight: 20)

c3: Year of construction of apartment building (weight: 20)

c4: Distance from workplace (in kilometers) (weight: 20)

c5: Apartment security system (weight: 10)

Criteria c1 and c5 have a range of scores as follows:

Condition of Support Facilities / Security System	Score
Less	1
Medium	2
Good	3
Very Good	4

The score of each alternative on each criteria is shown in the following decision matrix:

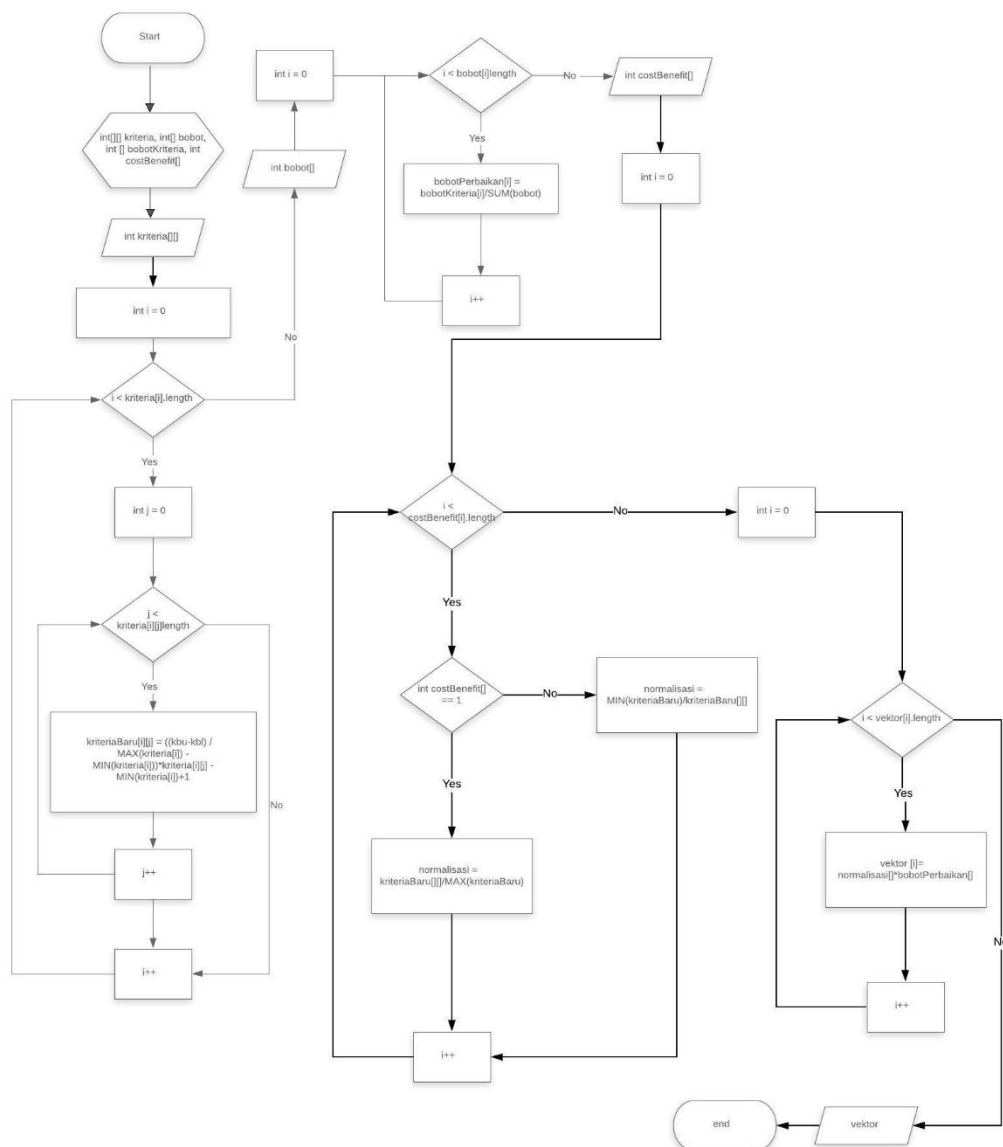| Alternative / Criteria	Apartement 1	Apartement 2	Apartement 3
Supporting facilities	2	4	3
Building price / m2	7.000.000	10.000.000	8.500.000
Year of building construction	2012	2015	2010
Distance from work	7 km	2 km	4 km
Apartment security system	3	3	4

PRACTICUM PROCEDURE

1. Based on the case study described above, describe the decision-making steps with flowchart (SAW and WPM methods)!
2. Group the criteria included in the benefit attribute and cost attribute!
3. Calculate the final score for each alternative using Excel so that it becomes semi-automatic and determine the best alternative for the case!
4. Write a simple pseudocode to describe the problem solving algorithm for the case study using the SAW and WP methods!
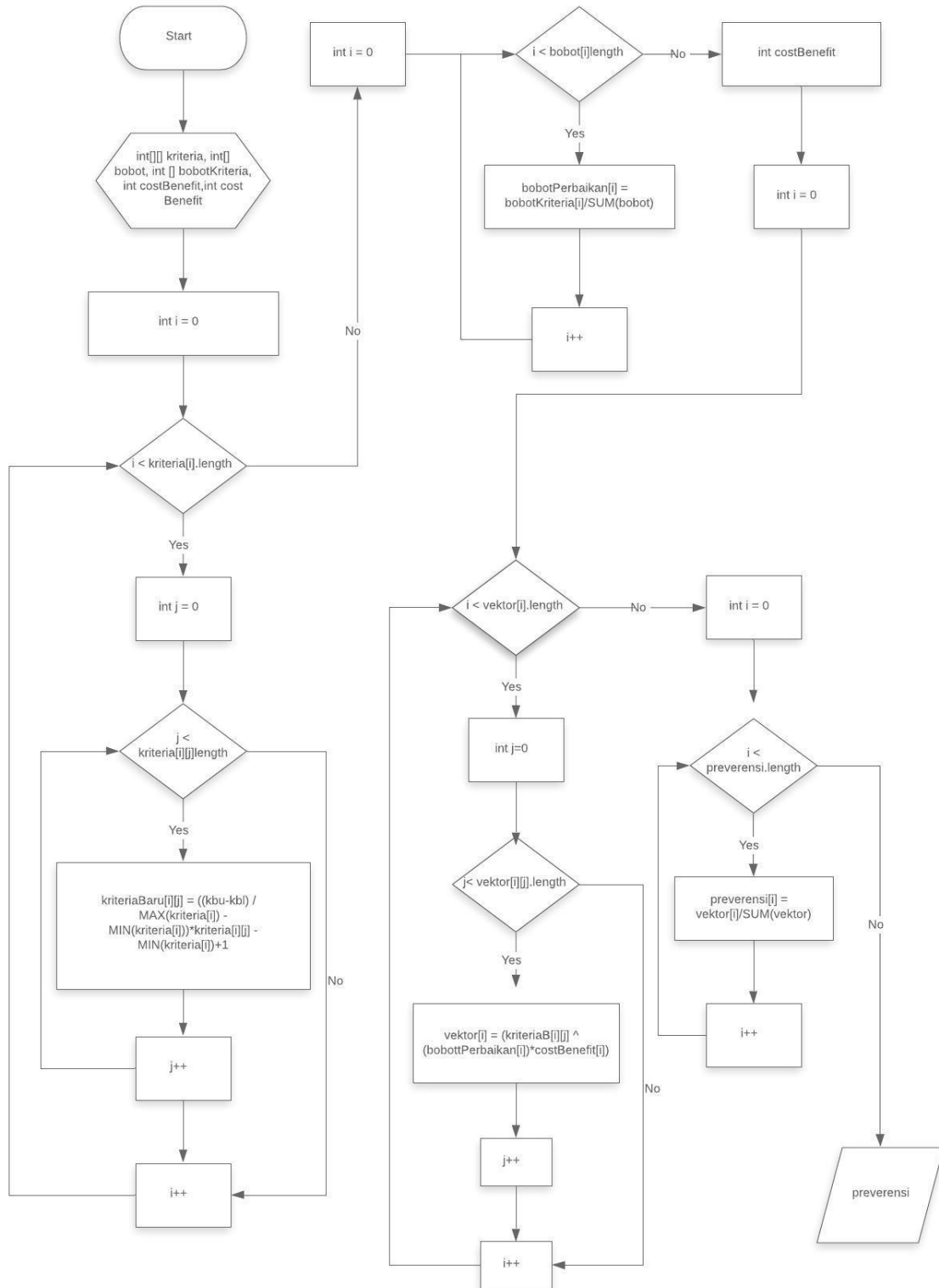
ANSWER

1. **DMS With Flowchart (SAW & WPM Methods**
   SAW Flowchart

WPM Flowchart

2. **Group the criteria included in the benefit attribute and cost attribute!**

   Group criteria SAW

   Cost : Building price / m2, Distance from work place.

   Benefit : Supporting Facilities, Apartment Security System, Year of building construction.

   Group criteria WP

   Cost : Building price / m2, Distance from work place, Year of building construction

   Benefit : Supporting Facilities, Apartment Security System

3. **Calculate the final score for each alternative using Excel so that it becomes semi-automatic and determine the best alternative for the case!**

   WP Method

Metode WP

Bobot Baru

Kriteria	c1	c2	c3	c4	c5
A 1	2	3	3	4	3
A 2	4	4	4	1	3
A 3	3	4	2	3	4
Bobot	30	20	20	20	10
Bobot Baru	0,3	0,2	0,2	0,2	0,1

Kriteria

Kriteri	c1	c2	c3	c4	c5
A 1	2	7000000	2012	7	3
A 2	4	10000000	2015	2	3
A 3	3	8500000	2010	4	4
Bobot	30	20	20	20	10

Vektor

Kriteria	c1	c2	c3	c4	c5	Hasil
A1	1,23	0,8	1,25	0,8	1,1	1
A2	1,52	0,8	1,32	1	1,1	1,7
A3	1,39	0,8	1,15	0,8	1,1	1,1

PREVENSI

Kriteria	Hasil
A1	0,27
A2	0,44
A3	0,29

SAW Method

Metode SAW								Kriteria					
	Bobot Baru		b	c	b	c	b		Kriteri ▾	c1 ▾	c2 ▾	c3 ▾	c4 ▾	c5 ▾
	Kriteria	c1	c2	c3	c4	c5		A 1	2	7000000	2012	7	3
	A 1	2	3	3	4	3		A 2	4	10000000	2015	2	3
	A 2	4	4	4	1	3	←	A 3	3	8500000	2010	4	4
	A 3	3	4	2	3	4		Bobot	30	20	20	20	10
	Bobot		30	20	20	20	10							
	Bobot Baru		0,3	0,2	0,2	0,2	0,1							

Normalisasi						
Kriteria	c1	c2	c3	c4	c5
A1	0,5	1	0,75	0,3	0,8
A2	1	0,8	1	1	0,8
A3	0,75	0,8	0,5	0,3	1
Bobot Baru	0,3	0,2	0,2	0,2	0,1

Vektor V	
Kriteria	
A1	0,63
A2	0,93
A3	0,64

4. **Write a simple pseudocode to describe the problem solving algorithm for the case study using the SAW and WP methods!**

Metode WP adalah cara pengambilan keputusan dengan perkalian untuk menghubungkan rating atribut,dimana rating setiap atribut harus dipangkatkan terlebih dahulu dengan bobot atribut yang bersangkutan (Yoon, 1989)

Metode SAW adalah memperoleh jumlah peringkat kinerja terbobot untuk masing-masing alternatif pada semua atribut (Adriyendi, 2015). Metode SAW adalah salah satu contoh dari metode MultiAttribute Desicion Making (MADM) dan Weighted Sum Model (WSM) yang paling sederhana.

SAW Pseudocode

```
//SAW PSEUDOCODE RAJENDRA
START
    ARRAY bobot[]
    ARRAY kriteria[][]
    ARRAY cost[]
    j = 0
    i = 0
    IF(i<kriteria[i].length) then
        FOR j < kriteria[i][j].legth
            calculate normaalisasi
        ENDFOR

    ELSE
        FOR j < bobot[i].length
            calculate bobot baru
            bobot[i]=bobotkritera[i]/SUM(bobot)
        ENDFOR
        calculate Vektor V
    END IF
END
```

WP Pseudocode

QUESTION

1. **Change the scores on criteria c1 and c2 as follows:**
   - Apartement 2: c1 = 2
   - Apartement 1: c2 = 8. 500.000

QUESTION													

A 2 : C1 = 2
A 1: C2 = 8.5jt

WP Method

Kriteria	c1	c2	c3	c4	c5
A 1	2	8500000	2012	7	3
A 2	2	10000000	2015	2	3
A 3	3	8500000	2010	4	4
Bobot	30	20	20	20	10

Bobot Baru

Kriteria	c1	c2	c3	c4	c5
A 1	2	4	3	4	3
A 2	2	4	4	1	3
A 3	3	4	2	3	4
Bobot	30	20	20	20	10
Bobot Baru	0,3	0,2	0,2	0,2	0,1

SAW method

Bobot Baru

Kriteria	c1	c2	c3	c4	c5
A 1	2	4	3	4	3
A 2	2	4	4	1	3
A 3	3	4	2	3	4
Bobot	30	20	20	20	10
Bobot Baru	0,3	0,2	0,2	0,2	0,1

Vektor

Kriteria	c1	c2	c3	c4	c5	Hasil
A1	1,231144413	0,757858283	1,2	0,8	1,1	1
A2	1,231144413	0,757858283	1,3	1	1,1	1,4
A3	1,39038917	0,757858283	1,1	0,8	1,1	1,1

Normalisasi

Kriteria	c1	c2	c3	c4	c5
A1	0,66667	1	0,75	0,25	0,3
A2	0,66667	1	1	1	0,75
A3	1	1	0,5	0,33333	1
Bobot Baru	0,3	0,2	0,2	0,2	0,1

Prevensi/Vektor

Kriteria	Hasil WP Method	Hasil SAW Method
A1	0,28	0,63
A2	0,40	0,88
A3	0,32	0,77

2. **The effect of changes in the criteria score for the results of decision making**
   make a different decision if the value changes
3. **The difference between the benefit attribute and the cost attribute.**
   advantages and disadvantages