# Penerapan Fuzzy Inference System Mamdani Untuk Mengukur Tingkat Kemewahan Hotel

Disusun untuk memenuhi tugas besar matakuliah

Kecerdasan Buatan

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DESEMBER 2021

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#### BAB I

#### **PENDAHULUAN**

#### 1.1 Latar Belakang

Di era revolusi industri 4.0 ini sektor pariwisata sangat mengalami pertumbuhan pesat. Era globalisasi menuntut semua pihak untuk berkembang dan berinovasi dalam segala aspek, salah satu industri yang mempunyai prospek menjanjikan untuk meningkatkan perekonomian adalah industri perhotelan kareana keberadaan tempat-tempat wisata tak dapat terlepas dari penginapan agar suasana pariwisata dapat lebih nyaman karena hal itu bisnis perhotelan dapat menghasilkan keuntungan yang besar.

Pariwisata adalah rangkaian kegiatan rekreasi, pariwisata, dan pariwisata yang berkaitan dengan pariwisata. Pariwisata adalah pariwisata, yaitu kegiatan wisata bagi seseorang untuk melakukan perjalanan dari tempat tinggalnya semula ke suatu tempat di kota lain atau negara lain dalam jangka waktu tertentu dengan tujuan untuk bersenang-senang. Hotel adalah sebuah perusahaan yang dikelola oleh pemiliknya yang menyediakan makanan, minuman dan fasilitas kamar bagi para pelancong, dan dapat membayar biaya yang wajar berdasarkan layanan yang diperoleh tanpa kesepakatan khusus.

Pengembangan sektor ekonomi diharapkan dapat menarik pengusaha/investor, sedangkan sektor pariwisata diharapkan dapat menarik wisatawan, dan jaminan keamanan membuat wisatawan hotel dan wisatawan lebih nyaman selama berwisata. Sekarang adalah langkah awal bagi negara kita untuk lebih meningkatkan ketiga sektor di atas. Trik industri perhotelan adalah mereka harus bekerja lebih keras untuk membangun kembali bisnis mereka.

Klasifikasi hotel untuk saat ini terbilang penting karena dapat menyesuaikan dan mempermudah pengunjung untuk memilih hotel sesuai dengan apa yang mereka mau, masalahnya terkadang pihak hotel asal mengklasifikasi hotel miliknya dengan kelas lebih tinggi dari yang sebenarnya sehingga hotel tersebut memiliki keuntungan dari hal tersebut. Dari latar belakang tersebut peniliti memilih judul Penerapan Fuzzy Inference System Mamdani Untuk Mengukur

Tingkat Kemewahan Hotel agar nantinya dapat membantu pengunjung dalam menemukan hotel yang benar-benar sesuai.

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## 1.2 Rumusan Masalah dan Tujuan

Berdasarkan latar belakang di atas, maka rumusan masalah yang akan dibahas adalah bagaimana teknik reasoning metode mamdani dapat menyelesaikan permasalahan terkait klasifikasi kelas pada tingkat kemewahan hotel.

Tujuan yang ingin dicapai dalam penelitian ini adalah peneliti berhasil mengklasifikasikan kelas tingkat kemewahan hotel dengan algroritma reasoning dan metode mamdani sehingga hal ini dapat bermanfaat bagi calon pengunjung hotel untuk mendapatkan hotel atau penginapan yang sesuai dengan kemuan mereka.

#### 1.3 Manfaat

Manfaat yang ingin dicapai peneliti terkait penelitian implementasi algoritma reasoning untuk mengklasifikasi tingkat kemewahan hotel hal ini dapat menjadi suatu yang bermanfaat bagi kehidupan masyarakat, seperti membantu masyarakat untuk memilih hotel sesuai apa yang mereka inginkan lalu penelitian ini juga diharapkan bisa menjadi acuan penelitia-penelitian lainya dalam bidang yang sama, atau bahkan penelitian dapat dikembangkan oleh masyarakat yang mempunya kemampuan lebih kompeten daripada peneliti saat ini.

#### **BAB II**

#### TINJAUAN PUSTAKA

## 2.1 Teknik Reasoning

Salah satu kemajuan teknologi yang sangat terasa manfaatnya adalah kecerdasan buatan. Kecerdasan buatan sendiri mempunyai arti menciptakan komputer agar dapat menyelesaikan pekerjaan manusia yang dalam hal pandangan manusia adalah cerdas. Jadi ilmu ini membutuhkan logika yang kuat untuk menciptakanya, dengan kata lain kecerdasan buatan merupakan sistem komputer yang dapat melakukan pekerjaan-pekerjaan yang biasanya memerlukan tenaga manusia atau kecerdasan manusia untuk menyelesaikan pekerjaan tersebut. AI sendiri merupakan teknologi yang memerlukan data untuk dijadikan pengetahuan, sama seperti manusia. AI membutuhkan pengalaman dan data supaya kecerdasannya bisa lebih baik lagi. Poin penting dalam proses AI adalah learning, reasoning dan *self correction*. AI perlu belajar untuk memperkaya pengetahuannya. Proses belajar AI pun tidak selalu disuruh oleh manusia, melainkan AI akan belajar dengan sendirinya berdasarkan pengalaman AI saat digunakan oleh manusia.

Salah satu teknik penyelesaian masalah dalam kecerdasan buatan adalah reasoning. Reasoning adalah Teknik penyelesaian masalah dengan cara mempresentasikan masalah ke dalam basis pengetahuan menggunakan logic atau Bahasa formal atau bahasa yang mudah dipahami komputer. Jika ruang masalah sangat besar penggunaan logic dan teknik penalaran akan lebih efisien dibanding penggunaan teknik searching. Reasoning merepresentasikan masalah kedalam basis pengetahuan dan merupakan proses penalaran untuk menemukan solusi.

Terdapat beberapa jenis logic dalam algoritma reasoning, logic itu diantaranya adalah proporsition logic, first-order logic, temporal logic, probability logic dan fuzzy logic. Dalam penelitian ini saya akan lebih menggunakan fuzzy logic untuk membantu menyelesaikan masalah. Fuzzy logic sendiri menggunakan derajat kebenaran dengan tingkat kepercayaan antara 0 dan 1. Misalkan, 'Bandung adalah kota yang nyaman' mungkin benar tingkat kepercayaan 0.4.

#### 2.2 Metode Mamdani

Fuzzy mamdani adalah metode yang juga sering di kenal dengan metode max-min atau max-product. Metode Mamdani dikenal juga sebagai metode min-max, diperkenalkan oleh Ebrahim Mamdani pada tahun 1975. Metode fuzzy mamdani banyak digunakan untuk penelitian tentang sistem cerdas. Sistem cerdas tersebut dapat berupa sistem pakar atau juga sistem pendukung keputusan (SPK).

Dalam metode mamdani diperlukan 4 langkah untuk mendapatkan keluaran yang diinginkan, yaitu;

### 1. Pembentukan himpunan fuzzy

Proses fuzzifikasi yang pertama adalah menentukan variabel fuzzy dan himpunan fuzzi-nya. Kemudian menentukan derajat kesepadanan (degree of match) antara data masukan fuzzy dengan himpunan fuzzy yang telah didefenisikan untuk setiap variabel masukan sistem dari setiap aturan fuzzy.

### 2. Aturan/fungsi implikasi

Fungsi implikasi yang digunakan adalah min dan max. Lakukan implikasi fuzzy berdasar pada kuat penyulutan dan himpunan fuzzy terdefinisi untuk setiap variabel keluaran di dalam bagian konsekuensi dari setiap aturan. Hasil implikasi fuzzy dari setiap aturan ini kemudian digabungkan untuk menghasilkan keluaran.

#### 3. Komposisi Aturan

Tidak seperti penalaran monoton, apabila sistem terdiri dari beberapa aturan, maka inferensi diperoleh dari kumpulan dan korelasi antar aturan.

#### 4. Penegasan (defuzzy)

Input dari proses defuzzifikasi adalah suatu himpunan fuzzy yang diperoleh dari komposisi aturan-aturan fuzzy, sedangkan output yang dihasilkan merupakan suatu bilangan pada domain himpunan fuzzy tersebut.

Logika fuzzy mamdani merupakan salah satu metode yang sangat fleksibel dan memiliki toleransi pada data yang ada. Fuzzy mamdani memiliki kelebihan yakni, lebih intuitif, diterima oleh banyak pihak. Penggunaan fuzzy mamdani ini sama halnya dengan penggunaan metode peramalan pada bidang statistik. Penentuan analisis berdasarkan pendekatan fuzzy lebih efisien dalam pendekatan menggunakan angka dibanding dengan metode peramalan.

Peramalan dalam statistik dapat menghasilkan galat error lebih besar dari pendekatan fuzzy. Dengan melakukan pendekatan fuzzy menghasilkan out put yang lebih dekat dengan keadaan sebenarnya.

#### 2.3 State of Art

Logika fuzzy dapat dianggap sebagai kotak hitam yang menghubungkan antara ruang input menuju ke ruang output. Kotak hitam tersebut berisi cara atau metode yang dapat digunakan untuk mengolah data input menjadi output dalam bentuk informasi yang baik.

Ada beberapa hal yang perlu diketahui dalam memahami sistem fuzzy, yaitu:

#### 1. Variabel fuzzy

Variabel fuzzy merupakan suatu lambang atau kata yang menunjukkan kepada suatu yang tidak tertentu dalam sistem fuzzy.

### 2. Himpunan fuzzy

Himpunan fuzzy memiliki 2 atribut, yaitu:

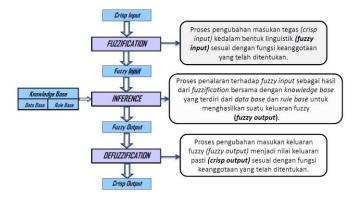
- a. Linguistik, yaitu persaamaan suatu grup yang memiliki suatu keadaan atau kondisi tertentu dengan menggunakan bahasa.
- b. Numeris, yaitu suatu nilai (angka) yang menunjukkan ukuran dari suatu variabel.

#### 3. Semesta Pembicaraan

Semesta pembicaraan adalah keseluruhan nilai yang diperbolehkan untuk dioperasikan dalam suatu variabel fuzzy.

#### 4. Domain

Domain himpunan fuzzy adalah keseluruhan nilai yang diijinkan dalam semesta pembicaraan dan boleh dioperasikan daalam suatu himpunan fuzzy.



#### **BAB III**

#### **METODOLOGI**

## 3.1 Blok Diagram

Proses pengambilan kesimpulan atau keputusan dengan menggunakan Metode Fuzzy Mamdani dilakukan melalui beberapa tahapan, yaitu pembentukan himpunan fuzzy; aplikasi fungsi implikasi; komposisi aturan; defuzzifikasi. Fuzzifikasi merupakan proses yang dilakukan dengan mengtransformasi input himpunan tegas (crisp) ke dalam himpunan fuzzy. Hal ini dilakukan karena input yang digunakan awalnya adalah dalam bilangan tegas (real) dari suatu himpunan tegas (crisp).

Fungsi implikasi merupakan struktur logika yang terdiri atas kumpulan premis dan satu konklusi. Fungsi implikasi berguna untuk mengetahui hubungan antara premis-premis dan konklusinya. Bentuk dari fungsi implikasi ini adalah dengan pernyataan IF x is A THEN y is B, dengan x dan y adalah skalar, serta A dan B adalah himpunan fuzzy.

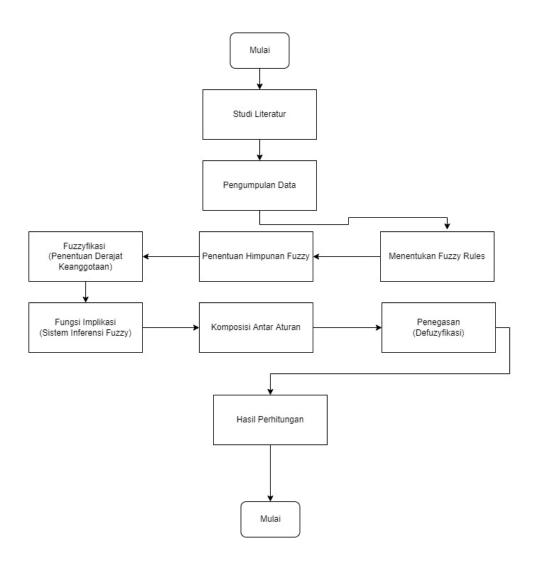
Solusi himpunan fuzzy diperoleh dengan cara mengambil nilai maksimum aturan, kemudian menggunakannya untuk memodifikasi daerah fuzzy dan mengaplikasikannya ke dalam output (keputusan akhir) dengan menggunakan operator OR (union). Apabila semua proposisi telah dievaluasi, maka output akan berisi suatu himpunan fuzzy yang merefleksikan kontribusi dari setiap proposisi.

Proses defuzzifikasi dipergunakan untuk menafsirkan nilai keanggotaan fuzzy menjadi keputusan tertentu atau bilangan real (Bova, 2010). Hal ini berarti mengembalikan nilai besaran fuzzy menjadi nilai crisp (bilangan real), dan mengubah fuzzy output menjadi nilai crisp berdasarkan fungsi keanggotaan yang telah ditentukan. Proses defuzzifikasi ini perlu dilakukan, karena keputusan fuzzy atau output adalah tetap variabel linguistik dan variabel linguistik ini membutuhkan untuk dikonversi ke dalam variabel crisp.

Rancangan penelitian terdiri dari beberapa tahapan, antara lain yaitu studi literatur, pengumpulan data, menentukan fuzzy rules, penentuan himpunan

fuzzy, fuzzyfikasi (Penentuan Derajat Keanggotaan), fungsi implikasi (sistem inferensi fuzzy), komposisi akhir aturan, penegasan (defuzyfikasi) lalu tahap terakhir akan ditemukan hasil perhitungan.

Blok diagram ini merupakan gambaran dasar mengenai sistem yang akan dirancang. Adapun blok diagram yang akan dirancang seperti dicantumkan pada gambar dibawah ini



## 3.2 Rancangan Metode Reasoning

#### a. Reasoning

Reasoning adalah Teknik penyelesaian masalah dengan cara mempresentasikan masalah ke dalam basis pengetahuan menggunakan logic atau Bahasa formal atau bahasa yang mudah dipahami komputer. Jika ruang masalah sangat besar penggunaan logic dan teknik penalaran akan lebih efisien dibanding penggunaan teknik searching. Reasoning merepresentasikan masalah kedalam basis pengetahuan dan merupakan proses penalaran untuk menemukan solusi.

Terdapat 3 metode dalam reasoning, yaitu metode tsukamoto, metode mamdani dan metode sugeno. Pada penelitian ini saya akan menggunakan metode mamdani. Fuzzy mamdani adalah metode yang juga sering di kenal dengan metode max-min atau max-product. Metode Mamdani dikenal juga sebagai metode min-max, diperkenalkan oleh Ebrahim Mamdani pada tahun 1975. Metode fuzzy mamdani banyak digunakan untuk penelitian tentang sistem cerdas. Sistem cerdas tersebut dapat berupa sistem pakar atau juga sistem pendukung keputusan (SPK).

b. Fuzzy Rules

Dibawah ini adalah fuzzy rules dari penelitin ini

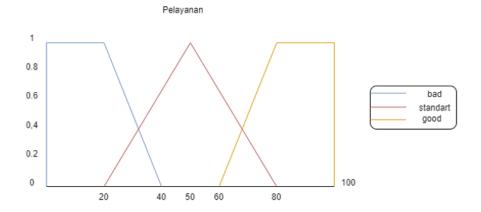
Pelayanan	Harga	Kelas
Bad	Cheap	Bintang 3
Bad	Average	Bintang 3
Bad	Expensive	Bintang 4
Standard	Cheap	Bintang 3
Standard	Average	Bintang 4
Standard	Expensive	Bintang 5
Good	Cheap	Bintang 3
Good	Average	Bintang 5
Good	Expensive	Bintang 5

## c. Fungsi Keanggotaan Fuzzy

Dalam penelitian ini menggunakan fungsi segitiga dan fungsi trapesium

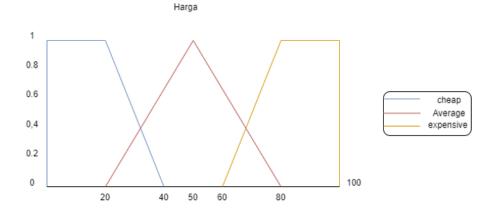
## • Pelayanan

Disini terdapat tiga variabel yaitu bad, standar dan good



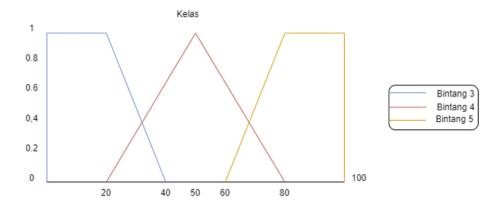
## • Harga

Disini terdapat tiga variabel yaitu cheap, average dan expensive



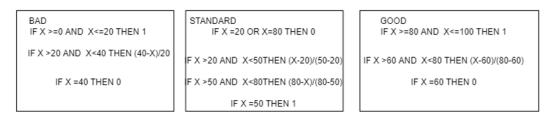
## • Kelas

Disini terdapat tiga variabel yaitu bintang 3, bintang 4 dan bintang 5



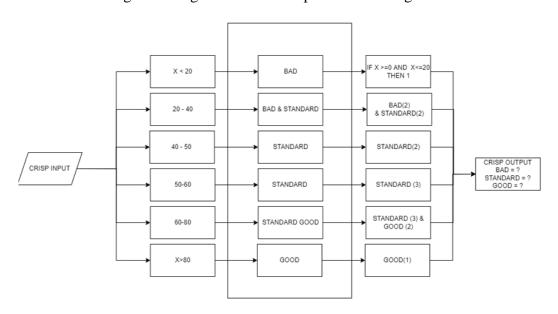
## d. Logika Fungsi

Disini karena fungsi keanggotaan antara pelayanan, harga dan kelas sama maka logika ketiganya juga sama. Bad = Cheap =Bintang 3, Standard=Average=Bintang 4 dan Good=Expensive=Bintang



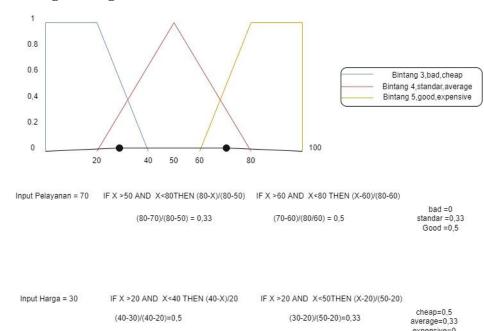
## e. Alur Fuzzyfikasi

Disini karena fungsi keanggotaan antara pelayanan, harga dan kelas sama maka alur fuzzyfikasi ketiganya juga sama. Bad = Cheap =Bintang 3, Standard=Average=Bintang 4 dan Good=Expensive=Bintang



**BAB IV** 

## 4.1 Perhitungan Dengan 7 Kondisi Berbeda



Pelayanan		Harga		Kelas	
Bad	0	Cheap	0.5	Bintang 3	0
Bad	0	Average	0.3	Bintang 3	0
Bad	0	Expensive	0	Bintang 4	0
Standard	0.3	Cheap	0.5	Bintang 3	0.3
Standard	0.3	Average	0.3	Bintang 4	0.3
Standard	0.3	Expensive	0	Bintang 5	0
Good	0.5	Cheap	0.5	Bintang 3	0.5
Good	0.5	Average	0.3	Bintang 5	0.3
Good	0.5	Expensive	0	Bintang 5	0

Ambil nilai Minimum dari tabel variabel pelayanan dan harga untuk mengisi variabel kelas, lalu ambil nilai Maksimum dari kelas yang sama.

Bintang 3 = 0 v 0 v 0.3 v 0.5 = 0.5

Bintang 4= 0 v 0.3 = 0.3

Bintang 5 = 0 v 0.3 v 0 = 0.3

Lalu step selanjutnya adalah defuzzyfikasi, untuk menentukan crisp output dibutuhkan angka random, dibawah ini saya menentukan angka random dengan 7 kondisi berbeda,

a. Kondisi 1

Random Number [5,15,25,35,45,55,65,75,85,95]

	В3	B4	B5
5	1	0	0
15	1	0	0
25	0.75	0.25	0
35	0.25	0.5	0
45	0	0.83	0
55	0	0.83	0
65	0	0.5	0.25
75	0	0.16	0,75
85	0	0	1
95	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
5	0.5	0	0
15	0.5	0	0
25	0.5	0.25	0
35	0.25	0.3	0
45	0	0.3	0
55	0	0.3	0
65	0	0.3	0.25
75	0	0.16	0,3
85	0	0	0.3
95	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
5	0.5	0	0	0.5
15	0.5	0	0	0.5
25	0.5	0.25	0	0.5
35	0.25	0.3	0	0.3
45	0	0.3	0	0.3
55	0	0.3	0	0.3
65	0	0.3	0.25	0.3
75	0	0.16	0,3	0.3
85	0	0	0.3	0.3
95	0	0	0.3	0.3

Step terakhir

5	0,50	2,50
15	0,50	7,50
25	0,50	12,50
35	0,30	10,50
45	0,30	13,50
55	0,30	16,50
65	0,30	19,50
75	0,30	22,50
85	0,30	25,50
95	0,30	28,50
	3,60	159,00

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i) . z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 159/3,6$$

$$Z^* = 44,16$$

b. Kondisi 2

Random Number [6,16,26,36,46,56,66,76,86,96]

	B3	B4	B5
6	1	0	0
16	1	0	0
26	0.7	0.2	0
36	0.2	0.53	0
46	0	0.86	0
56	0	0.8	0
66	0	0.46	0.3
76	0	0.13	0,8
86	0	0	1
96	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
6	0.5	0	0
16	0.5	0	0
26	0.5	0.2	0
36	0.2	0.3	0
46	0	0.3	0
56	0	0.3	0
66	0	0.3	0.3
76	0	0.13	0,3
86	0	0	0.3
96	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
6	0.5	0	0	0.5
16	0.5	0	0	0.5
26	0.5	0.2	0	0.5
36	0.2	0.3	0	0.3
46	0	0.3	0	0.3
56	0	0.3	0	0.3
66	0	0.3	0.3	0.3
76	0	0.13	0,3	0.3
86	0	0	0.3	0.3
96	0	0	0.3	0.3

Step terakhir

6	0,50	3,00
16	0,50	8,00
26	0,50	13,00
36	0,30	10,80
46	0,30	13,80
56	0,30	16,80
66	0,30	19,80
76	0,30	22,80
86	0,30	25,80
96	0,30	28,80
	3,60	162,60

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i). z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 162,6/3,6$$

$$Z^* = 45,16$$

c. Kondisi 3

Random Number [7,17,27,37,47,57,67,77,87,97]

	B3	B4	B5
7	1	0	0
17	1	0	0
27	0.65	0.23	0
37	0.15	0.56	0
47	0	0.9	0
57	0	0.76	0
67	0	0.43	0.35
77	0	0.1	0,85
87	0	0	1
97	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
7	0.5	0	0
17	0.5	0	0
27	0.5	0.23	0
37	0.15	0.3	0
47	0	0.3	0
57	0	0.3	0
67	0	0.3	0.3
77	0	0.1	0,3
87	0	0	0.3
97	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
7	0.5	0	0	0.5
17	0.5	0	0	0.5
27	0.5	0.23	0	0.5
37	0.15	0.3	0	0.3
47	0	0.3	0	0.3
57	0	0.3	0	0.3
67	0	0.3	0.3	0.3
77	0	0.1	0,3	0.3
87	0	0	0.3	0.3
97	0	0	0.3	0.3

Step terakhir

7	0,50	3,50
17	0,50	8,50
27	0,50	13,50
37	0,30	11,10
47	0,30	14,10
57	0,30	17,10
67	0,30	20,10
77	0,30	23,10
87	0,30	26,10
97	0,30	29,10
	3,60	166,20

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i). z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 166,2/3,6$$

$$Z^* = 46,16$$

d. Kondisi 4

Random Number [8,18,28,38,48,58,68,78,88,98]

	B3	B4	B5
8	1	0	0
18	1	0	0
28	0.6	0.26	0
38	0.1	0.6	0
48	0	0.93	0
58	0	0.73	0
68	0	0.4	0.4
78	0	0.06	0,9
88	0	0	1
98	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
8	0.5	0	0
18	0.5	0	0
28	0.5	0.26	0
38	0.1	0.3	0
48	0	0.3	0
58	0	0.3	0
68	0	0.3	0.3
78	0	0.06	0,3
88	0	0	0.3
98	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
8	0.5	0	0	0.5
18	0.5	0	0	0.5
28	0.5	0.26	0	0.5
38	0.1	0.3	0	0.3
48	0	0.3	0	0.3
58	0	0.3	0	0.3
68	0	0.3	0.3	0.3
78	0	0.06	0,3	0.3
88	0	0	0.3	0.3
98	0	0	0.3	0.3

Step terakhir

8	0,50	4,00
18	0,50	9,00
28	0,50	14,00
38	0,30	11,40
48	0,30	14,40
58	0,30	17,40
68	0,30	20,40
78	0,30	23,40
88	0,30	26,40
98	0,30	29,40
	3,60	169,80

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i) . z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 169,8/3,6$$

$$Z^* = 47,16$$

e. Kondisi 5

Random Number [9,19,29,39,49,59,69,79,89,99]

	B3	B4	B5
9	1	0	0
19	1	0	0
29	0.55	0.3	0
39	0.05	0.63	0
49	0	0.96	0
59	0	0.7	0
69	0	0.36	0.45
79	0	0.03	0,95
89	0	0	1
99	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
9	0.5	0	0
19	0.5	0	0
29	0.5	0.3	0
39	0.05	0.3	0
49	0	0.3	0
59	0	0.3	0
69	0	0.3	0.3
79	0	0.03	0,3
89	0	0	0.3
99	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
9	0.5	0	0	0.5
19	0.5	0	0	0.5
29	0.5	0.3	0	0.5
39	0.05	0.3	0	0.3
49	0	0.3	0	0.3
59	0	0.3	0	0.3
69	0	0.3	0.3	0.3
79	0	0.03	0,3	0.3
89	0	0	0.3	0.3
99	0	0	0.3	0.3

Step terakhir

9	0,50	4,50
19	0,50	9,50
29	0,50	14,50
39	0,30	11,70
49	0,30	14,70
59	0,30	17,70
69	0,30	20,70
79	0,30	23,70
89	0,30	26,70
99	0,30	29,70
	3,60	173,40

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i). z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 173,4/3,6$$

$$Z^* = 48,16$$

f. Kondisi 6

Random Number [4,14,24,34,44,54,64,74,84,94]

	B3	B4	B5
4	1	0	0
14	1	0	0
24	0.8	0.13	0
34	0.3	0.46	0
44	0	0.8	0
54	0	0.86	0
64	0	0.53	0.2
74	0	0.2	0,7
84	0	0	1
94	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
4	0.5	0	0
14	0.5	0	0
24	0.5	0.13	0
34	0.3	0.3	0
44	0	0.3	0
54	0	0.3	0
64	0	0.3	0.2
74	0	0.2	0,3
84	0	0	0.3
94	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
4	0.5	0	0	0.5
14	0.5	0	0	0.5
24	0.5	0.13	0	0.5
34	0.3	0.3	0	0.3
44	0	0.3	0	0.3
54	0	0.3	0	0.3
64	0	0.3	0.2	0.3
74	0	0.2	0,3	0.3
84	0	0	0.3	0.3
94	0	0	0.3	0.3

Step terakhir

4	0,50	2,00
14	0,50	7,00
24	0,50	12,00
34	0,30	10,20
44	0,30	13,20
54	0,30	16,20
64	0,30	19,20
74	0,30	22,20
84	0,30	25,20
94	0,30	28,20
	3,60	155,40

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i) . z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 155,4/3,6$$

$$Z^* = 43,16$$

g. Kondisi 7

Random Number [3,13,23,33,43,53,63,73,83,93]

	B3	B4	B5
3	1	0	0
13	1	0	0
23	0.85	0.1	0
33	0.35	0.43	0
43	0	0.76	0
53	0	0.9	0
63	0	0.56	0.15
73	0	0.23	0,65
83	0	0	1
93	0	0	1

Bintang 3 = 0.5

Bintang 4= 0.3

Bintang 5= 0.3

	В3	B4	B5
3	0.5	0	0
13	0.5	0	0
23	0.5	0.1	0
33	0.35	0.3	0
43	0	0.3	0
53	0	0.3	0
63	0	0.3	0.15
73	0	0.23	0,3
83	0	0	0.3
93	0	0	0.3

Lalu bandingkan antar variabel dan ambil nilai paling besar

	В3	B4	B5	
3	0.5	0	0	0.5
13	0.5	0	0	0.5
23	0.5	0.1	0	0.5
33	0.35	0.3	0	0.35
43	0	0.3	0	0.3
53	0	0.3	0	0.3
63	0	0.3	0.15	0.3
73	0	0.23	0,3	0.3
83	0	0	0.3	0.3
93	0	0	0.3	0.3

Step terakhir

		l
3	0,50	1,50
13	0,50	6,50
23	0,50	11,50
33	0,35	11,55
43	0,30	12,90
53	0,30	15,90
63	0,30	18,90
73	0,30	21,90
83	0,30	24,90
93	0,30	27,90
	3,65	153,45

Hitung dengan rumus dibawah ini

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i). z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

$$Z^* = 153,45/3,65$$

$$Z^* = 42,04$$

## 4.2 Hasil Perancangan

Hasil perancangan yang telah saya buat mengacu pada rancangan metode reasoning diatas.

a. Fuzzyfikasi mengacu pada fungsi keanggotaan fuzzy

```
def fuzzyfikasi pelayanan (x):
  bad score= 0
  standard score = 0
  good score = 0
  if (x<20):
    bad score = bad(x)
  elif (x>=20 \text{ and } x<40):
   bad score = bad(x)
    standard score = standard(x)
  elif (x>=40 \text{ and } x<50):
    standard score = standard(x)
  elif (x>=50 and x<60):
    standard_score = standard(x)
  elif (x>=60 \text{ and } x<80):
    standard score = standard(x)
    good_score = good(x)
  elif (x>=80 and x<=100):
    good_score = good(x)
  return {'bad':bad_score,'standard':standard_score,'good':good_score}
```

```
lef fuzzyfikasi_harga (x):
cheap_score= 0
average_score = 0
expensive_score = 0
if (x<20):
  cheap_score = cheap(x)
elif (x>=20 and x<40):
  cheap_score= cheap(x)
  average_score = average(x)
elif (x>=40 and x<50):
  average_score = average(x)
elif (x>=50 and x<60):
  average_score = average(x)
elif (x>=60 and x<80):
  average_score = average(x)
  expensive_score = expensive(x)
elif (x>=80 and x<=100):
  expensive score = expensive(x)
return {'cheap':cheap_score, 'average':average_score, 'expensive':expensive_score}
```

b. Inference mengacu pada fuzzy rules

```
#INFERENCE
list_inference=[]
for key, value in f_pelayanan.items():
    for key2, value2 in f_harga.items():
        list_inference.append (min(value,value2))

bintang3 = max([list_inference[0] , list_inference[1] , list_inference[3] , list_inference[6]])
bintang4 = max([list_inference[2] , list_inference[4]])
bintang5 = max([list_inference[5] , list_inference[7] , list_inference[8]])
```

## c. Defuzzyfikasi

Pada tahap ini diperlukan angka acak untuk menghitung crisp output nya, angka acak yang saya pilih adalah 5,15,25,35,45,55,65,75,85,95.

```
#DEFUZIFICATION
n_numbers = [5,15,25,35,45,55,65,75,85,95]
crisp_output = {}
for i in range(len(n_numbers)-1):
 crisp output[n numbers[i]] = 0
 if n numbers[i] <= 20:</pre>
    crisp output[n numbers[i]] = min(bintang3, bad(n numbers[i]))
 elif n_numbers[i] > 20 and n_numbers[i] <= 40:</pre>
    temp bintang3 = min(bintang3, bad(n numbers[i]))
    temp_bintang4 = min(bintang4, standard(n_numbers[i]))
    crisp_output[n_numbers[i]] = max(temp_bintang3, temp_bintang4)
  elif n_numbers[i] > 40 and n_numbers[i] <= 60:</pre>
    crisp_output[n_numbers[i]] = min(bintang4, standard(n_numbers[i]))
  elif n numbers[i] > 60 and n numbers[i] <= 80:</pre>
    temp_bintang5 = min(bintang5, good(n_numbers[i]))
    temp_bintang4 = min(bintang4, standard(n_numbers[i]))
    crisp_output[n_numbers[i]] = max(temp_bintang5, temp_bintang4)
  elif n numbers[i] > 80:
    crisp_output[n_numbers[i]] = min(bintang5, good(n numbers[i]))
```

## d. Menentukan crisp output

Karena metode yang digunakan adalah metode mamdani maka saya menentukan crisp output dengan rumus mamdani.

$$z^* = \frac{\sum_{i=1}^{n} \mu B(z_i). z_i}{\sum_{i=1}^{n} \mu B(z_i)}$$

```
#MAMDANI
X = 0 #X adalah bilangan atas
Y = 0 #Y adalah bilangan bawah
for titik_random, skor_akhir in crisp_output.items():
   total = titik_random*skor_akhir
   X+=total

Y+=skor_akhir

Z = X/Y
return Z
```

## 4.3 Hasil Eksekusi Program

Hasil eksekusi program dari data yang telah saya masukan

## a. Data Input

No	Harga	Pelayanan
1	100	100
2	80	54
3	31	98
4	78	52
5	82	63
6	70	59
7	30	100
8	42	30
9	49	45
10	48	36
11	90	10
12	58	38
13	54	80
14	98	31
15	52	78
16	11	82
17	59	70
18	10	90
19	30	42
20	45	49
21	36	48
22	10	79
23	40	70
24	99	100
25	10	61

No	Harga	Pelayanan
26	59	43
27	44	59
28	77	44
29	84	91
30	74	76
31	42	74
32	33	42
33	93	86
34	77	93
35	32	21
36	31	32
37	77	31
38	52	89
39	67	52
40	33	46
41	94	33
42	34	94
43	63	34
44	87	63
45	38	77
46	21	38
47	64	21
48	19	64
49	30	19
50	70	42

No	Harga	Pelayanan
51	10	48
52	95	94
53	70	21
54	10	64
55	65	50
56	90	49
57	39	24
58	57	31
59	78	28
60	95	79
61	80	42
62	27	31
63	59	78
64	86	35
65	78	70
66	39	80
67	26	27
68	22	59
69	54	86
70	61	78
71	45	39
72	11	26
73	20	22
74	87	54
75	39	61

No	Harga	Pelayanan
76	69	45
77	13	11
78	69	20
79	11	87
80	18	39
81	30	70
82	56	13
83	18	69
84	48	11
85	10	18
86	98	30
87	83	56
88	40	18
89	20	48
90	63	10
91	30	98
92	61	83
93	60	40
94	59	20
95	44	63
96	11	30
97	80	25
98	74	27
99	42	75
100	33	11

## b. Data Output

index	pelayanan	harga	fuzzy logic score
0	100	100	78.75
1			78.30357142857143
2			40.2258064516129
3			73.6923076923077
4			77.28915662650601
5			
6			37.8124999999999
7			33.8888888888888888
8			50.0
9			44.05882352941177
10		90	50.0
11			47.073170731707314
12			78.30357142857143
13			56.60493827160494
14			73.6923076923077
15			
16			
17			
18			33.88888888888888888
19			50.0
20	48	36	44.05882352941177
21			16.03448275862069
22			60.33333333333333
23	100		
24			17.325581395348838

index	pelayanan	harga	fuzzy logic score
25	43	59	50.000000000000001
26			50.00000000000001
27			71.1363636363636363
28			78.75
29			68.51145038167937
30			65.96551724137932
31			38.95480225988701
32	86		78.75
33			78.24324324324324
34			21.947368421052623
36			36.647058823529406
36			53.39080459770114
37			78.53448275862068
38			56.47435897435898
39			38.95480225988701
40			58.972602739726035
41			48.499999999999
42			42.83783783783
43			77.28915662650601
44			63.53658536585366
45			20.038167938931302
46			30.597484276729553
47			17.7027027027027
48			17.857142857142858
49	42	70	60.33333333333333

index	pelayanan	harga	fuzzy logic score
50	48	10	16.1046511627907
51			
52			40.72916666666667
53			
54			54.0625
55			78.64406779661017
56			25.80745341614907
57			35.55865921787709
58			52.14285714285714
59			78.58974358974359
60			77.81553398058252
61			32.43243243243243
62			72.47826086956522
63			61.92307692307692
64			70.49450549450549
65			70.8252427184466
66			28.146067415730332
67			21.4968152866242
68			78.30357142857143
69			71.9158878504673
70			48.518518518518526
71			17.127659574468087
72			
73			78.30357142857143
74			49.181818181819

index	pelayanan	harga	fuzzy logic score
75	45	69	59.013157894736835
76			
77			38.80434782608696
78			
79			17.325581395348838
80			40.71428571428571
81			16.73076923076923
82			
83			16.1046511627907
84			
85			55.588235294117645
86			78.0555555555555
87			
88			16.1046511627907
89			27.54901960784314
90			37.8124999999999
91			
92			49.9999999999999
93			17.127659574468087
94			52.00636942675159
95			17.857142857142858
96			51.9444444444444
97			47.92079207920792
98			67.23776223776224
99	11	33	18.225806451612904

#### 4.4 Analisa

Jalanya program sesuai dari hasil perancangan dan dari studi literatur yang sudah ada, pertama terdapat input nilai, setelah itu menentukan tipe keanggotaanya, disini tipe keanggotaan saya adalah bintang 3, bintang 4 dan bintang 5 karena berhubungan dengan kewemahan hotel. Untuk variabelnya ada 2 pelayanan dan harga. Setelah itu definisikan area fungsinya disini saya menggunakan fungsi trapesium dan fungsi segitiga. Setelah itu saya menghitung nilai fuzzy dari pelayanan dan harga. Setelah mendapat nilai fuzzy dari kedua variabel lalu digunakan untuk menghitung nilai bintang. Sebelumnya saya membuat fuzzy rulesnya dulu agar dapat digunakan untuk inference. Dari inference tersebut diambil nilai maksimal dari masing-masing variabel, misal bintang 3 terapat 4 nilai 0,0.5,0.75 dan 1 maka nilai yang diambil 1. Setelah mendapat nilai inference dari bintang 3,4 dan 5 maka dilakukan defuzzification. Untuk menghitung persamaan mamdani harus mendeskripsikan random number disini saya memakai angka 5,15,25,35,45,55,65,75,85,95. Setelah menentukan angka random lalu saya memetakan angka tersebut ke fungsi keanggotaan yang telah dibuat. Langkah selanjutnya adalah merubah angka random tersebut menjadi nilai fuzzy, setelah nilai fuzzy sudah ditentukan dibandingkan lagi dengan nilai inference yang tadi sudah didapat setelah itu ambil nilai minimumnya. Setelah mendapat nilai minimumnya selanjutnya nilai dari setiap angka diambil nila maksimumnya. Contoh angka 45 memiliki nilai bintang 3= 0, bintang 4=0,25 dan bintang 5=0 maka yang diambil nilai 0,25. Langkah terakhir adalah menghitung crisp output dengan rumus yang telah ditentukan.

Analisa saya dari hasil perancangan sudah cukup memuaskan karena semua hal-hal yang diperlukan untuk menyelesaikan masalah dalam kasus ini sudah dapat berhasil di implementasikan ke dalam sistem. Dengan begitu Langkah dari penelitian ini sudah semakin menemukan jalan keluarnya. Lalu dibuktikan dengan hasil eksekusi program yang berhasil dan memiliki keakuratan cukup tinggi. Dengan begitu sistem pada penelitian ini sudah berhasil dibuat dan dijalankan dengan sangat baik.

### **BAB V**

#### KESIMPULAN

Berdasarkan hasil pengujian dan pembahasan yang telah dilakukan dapat ditarik kesimpulan sebagai berikut:

- 1. Penerapan Fuzzy Inference System Mamdani Untuk Mengukur Tingkat Kemewahan Hotel menghasilkan hasil dengan tingkat keakuratan yang baik, hal ini karena dalam implementasinya metode Mamdani menyajikan 2 model perkiraan yaitu model bedasarkan perkiraan atau peramalan dan model bedasarkan akualita kondisi di lapangan. Selain itu variabel yang digunakan pada metode Fuzzy Logic Mamdani terbilang kompleks dan dalam pemaparannya metode Fuzzy Mamdani menggunakan perhitungan yang lebih rumit, hal ini disebabkan banyaknya variabel yang digunakan dalam pengambilan keputusan. Tetapi berdasarkan hal tersebut dengan implementasi menggunakan metode Fuzzy Mamdani tingkat akurasi pengukuran tingkat kemewahan hotel menjadi lebih baik.
- 2. Berdasarkan hasil perbandingan hitungan manual dan menggunakan sistem dengan bahasa pemrograman python pada google collabs dapat diketahui tidak terdapat hasil yang signifikan berbeda.
- 3. Untuk random number yang digunakan untuk proses inference jika dimasukan dengan kondisi yang berbeda atau bisa dikatakan random number nya diubah akan menghasilkan crisp output yang berbeda nilai namun tetap sama klasifikasinya dalam kelas yang sejenis.

## **BAB VI**

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# **LAMPIRAN**

- 1. Hasil eksekusi program untuk setiap kondisi
  - a. Kondisi 1

Random Number [5,15,25,35,45,55,65,75,85,95]

Nandoni				
index	pelayanan		harga	fuzzy logic score
0		100		78.75
1 2		54 98	80 31	78.30357142857143 40.2258064516129
3				73.6923076923077
<b>4 5</b>		63 59	82 70	77.28915662650601 60.333333333333333
6				37.81249999999999
7 8		30 45	42 49	33.88888888888888 50.0
9				44.05882352941177
10 11		10 38	90 58	50.0 47.073170731707314
12		80	54	78.30357142857143
13 14		31 78	98 52	56.60493827160494 73.6923076923077
15		82	11	15.8333333333333333333333333333333333333
16		70	59	60.3333333333333
17 18		90 42	10 30	15.8333333333333333333333333333333333333
19				
20 21		48 79	36 10	44.05882352941177 16.03448275862069
22				60.333333333333333
23 24		100 61	99 10	78.75 17.325581395348838
2.4		01	10	17.323301383340030
index	pelayanan		harga	fuzzy logic score
25		43	59	50.0000000000001
26 27		59 44	44 77	50.00000000000000 71.13636363636363
28				78.75
29 30		76 74	74 42	68.51145038167937 65.96551724137932
31		42	33	38.95480225988701
32		86		78.75
33 34		93 21	77 32	78.24324324324324 21.947368421052623
36				36.647058823529406
36 37		31 89	77 52	53.39080459770114 78.53448275862068
38		52	67	56.47435897435898
39		46	33	38.95480225988701
40 41		33 94	94 34	58.972602739726035 48.4999999999999
42				42.83783783783783
43 44		63	87 38	77,28915662650601 63,53658536585366
45		77 38	21	20.038167938931302
46				30.597484276729553
47 48		64 19	19 30	17.7027027027027 17.857142857142858
49		42	70	60.33333333333333
index	pelayanan	40	harga	fuzzy logic score
50	pelayanan	48 94		16.1046511627907
50 51 52	pelayanan	94 21	10 95 70	16.1046511627907 78.75 40.72916666666667
50 51	pelayanan		10 95	16.1046511627907 78.75 40.72916666666667 17.7027027027027
50 51 52 53 54 55	pelayanan	94 21 64 50 49	10 95 70 10 65 90	16.1046511627907 78.75 40.729166666666667 17.7027027027 64.0825 78.64406779661017
50 51 52 53 54 56 66	pelayanan	94 21 64 50 49 24	10 95 70 10 65 90 30	18.1048511827907 78.75 40.72916868666667 17.7027027027027 43.0025 78.64406779681017 25.80745341614007
50 51 52 53 54 55	pelayanan	94 21 64 50 49	10 95 70 10 65 90	16.1046511627907 78.75 40.729166666666667 17.7027027027 64.0825 78.64406779661017
50 51 52 53 54 55 56 57 58	pelayanan	94 21 64 50 49 24 31 28 79	10 95 70 10 65 90 30 57 78	16.1046511627907 78.75 78.75 40.72916666666667 17.7027027027027 74.406779661017 25.80745341614907 35.55865921787709 52.14285714285714 78.88974358974358
50 51 52 53 54 55 56 57 58 59	pelayanan	94 21 64 50 49 24 31 28 79	10 95 70 10 65 90 30 57 78 95	18.1048511827907 77.875 40.729168666666667 17.7027027027027027027 54.0025 78.84408770861307 25.80745341614007 35.556659217807700 52.14285714285714 78.889743590 77.81553398058252
50 51 52 53 64 55 66 57 58 69 60 61	pelayanan	94 21 64 50 49 24 31 28 79	10 95 70 10 65 90 30 57 70 95 80 27	16.1046511627907 78.75 78.75 40.72916666666667 17.7027027027027 74.406779661017 25.80745341614907 35.55865921787709 52.14285714285714 78.88974358974358
50 51 52 53 54 55 66 57 58 69 60 61 62 63	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78	10 95 70 10 65 90 30 57 78 95 80 27 59	18.1048511627907 78.75 40.72916666666667 47.7027027027027 54.0625 78.64406779681017 25.80745341614907 35.55865921787709 52.14265714265714 78.58974358974359 77.81553398058252 32.4324324334343 72.4782608696652 61.92307692307692
50 51 52 53 64 55 66 57 58 69 60 61	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78	10 95 70 10 65 90 30 57 70 95 80 27	18.1048511827907 77.875 40.729166666666667 17.7027027027027 54.0825 78.8440877686107 25.80745341614007 35.55865921780700 52.14285714285714 78.8897425807 77.8155338808252 32.43243343343 72.44785086965652
50 51 52 53 64 65 66 57 68 69 60 61 62 63 64 65	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 39	10.1046511627007 77.875 40.729166066666667 17.7027027027027027027027027027027027027027
50 51 52 53 64 55 56 57 68 59 60 61 62 63 64 65 66	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27	10 95 70 10 65 90 39 57 78 95 80 27 59 96 78 39 26	18.1048511827907 78.75 40.729168666666667 17.7027027027027027027027027027027027027027
50 51 52 53 64 56 56 57 58 60 61 62 63 64 65 66 67 68	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 39	10.1046511627007 77.875 40.729166066666667 17.7027027027027027027027027027027027027027
50 51 52 53 64 65 66 67 60 60 61 62 63 64 66 66 67 68	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78	10 95 70 10 65 90 30 57 78 95 65 96 78 95 27 50 86 78 39 26 22 54 61	10.1048511627007 7 78.75 40.729166066666667 17.7027027027027 54.0025 78.6440877966107 25.80745341614007 35.55865821 787700 52.14285714285714 78.58974358974507 77.81553390058252 32.43243243243343 72.4782608054652 61.92.207682377682 70.49450549450540 70.8252427184486 28.146067415730332 21.4068152866242 78.30357142857143 71.9158878504673 48.518518518518518526
50 51 52 53 54 56 66 57 58 59 60 61 62 63 64 65 66 67 68	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78 39	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 39 22 54 61 45	18.1048511827907 78.75 40.72916866866667 17.7027027027027027027027027027027027027027
50 51 52 53 54 55 66 57 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78 39 26 22 25	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20	18.1048511827907 78.75 40.729166666666667 17.7027027027027027027 54.0025 78.8400770801077 25.80745341614007 35.55665921780700 52.14285714285714 78.898743590 77.81553398058252 32.43243343243243 72.47826086958252 61.92307692307692 70.494505404504045050406050 70.8252427184460 28.14606741573032 24.4068152868242 78.3035714288714354 17.19158878504693
50 51 52 53 64 55 66 67 60 60 61 62 63 64 65 66 67 68	pelayanan	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78 39 26 22	10 95 70 10 65 90 30 57 78 95 80 27 78 95 80 22 54 61 45	10.1048511627907 78.75 40.729166066666667 17.7027027027027 54.0625 78.6440877966107 25.80745341614007 35.55865821787709 52.14285714285714 78.58974358974507 77.81553390058252 32.43243243243 32.43243243243243 72.4702008056522 61.922076925 70.49450549450540 70.8252427184480 28.140607415730332 21.4068152866542 78.30557142857143 77.9158878504673 48.518518518518526
50 51 52 53 64 55 66 66 67 60 61 62 63 64 66 67 68 69 70 71 72 73		94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78 39 26 22 25	10 95 70 10 65 90 30 57 78 95 80 95 80 78 95 27 50 86 78 39 26 22 54 61 45 11 20 67	10.1046511627007 78.75 40.729166666666667 17.7027027027027 54.0625 78.64408779661017 25.80745341614007 35.55865821 787700 52.14285714285714 78.5897435897459 77.81553390068252 32.43243243243243 32.43243243243243 72.47826080954502 70.49450549450540 70.8252427184486 28.146067415730332 21.4968152866242 78.30357142857143 71.9158878504673 48.5188181818181819
50 51 52 53 54 55 66 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74	pelayanan	94   94   94   94   95   96   96   96   96   96   96   96	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 39 20 27 51 41 45 11 20 87 39	10:104651627007 78:75 78:75 40:729166666666667 17:7027027027027 54:0025 78:04406779661017 25:00745341614007 35:558659217436770 52:14265714265714 78:503745341614007 77:81563396058252 32:4324324324324324324324324324324324324324
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50 51 52 53 64 55 66 67 68 69 70 71 72 73 74		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 13 69 13 69 11	18.1046511627907 78.75 40.729166666666667 17.7027027027027 54.0625 78.6440677966107 55.00745341614007 55.00745341614007 55.00745341614007 56.00745341614007 56.00745341614007 57.0155339005925 52.4324534243343 77.0155339005925 52.43243243243343 72.47620008096522 61.92307092307692 70.494505404506405040 70.8252427184460 70.8252427184460 28.14606741573032 24.496815286624 78.30357142857143 71.9158878504673 85.185186185185266 17.127659574468087 16.25 78.30357142857143 49.1818181818119
50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 76 77 72 73 74		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 30 20 27 50 86 78 30 20 20 30 11 13 60 11	10.1046511627007 78.75 40.729166606066667 117.7027027027027 54.0025 78.84406779661017 25.80745341614007 35.55866921787709 52.142857142857143 78.889743589745389747488974
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50 51 52 53 64 65 66 66 69 60 61 62 63 64 66 67 68 69 70 71 72 73 74		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 96 95 90 95 78 95 96 78 96 27 50 86 78 39 26 22 54 61 45 11 20 87 39 11 18 30 56 18	18.1048511627907 78.75 40.729166666666667 17.7027027027027 54.0625 78.64406779861017 25.80745341614007 35.5586582178709 52.14285714285714 78.868974358974359 77.81563398058252 32.43243243243243 77.81563398058252 32.43243243243243 78.430530566522 61.922076923076952 61.922076923076952 70.49450540450540 70.8259227184460 70.8259227184460 70.8259227184460 71.9158878504673 83.51857862852 61.712766997468087 76.255 78.30357142857143 49.18181818181819  **Tuzzy logic score**  59.013157894736835 15.83333333333333333 38.80434782608696 15.83333333333333333 37.325981395348838 40.71428571428571 16.73076922076922 16.10651162709622
50 51 52 53 64 55 66 67 68 69 70 71 72 73 74 Index 75 76 77 78 80 81 82 83 84		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 96 95 90 95 78 95 96 78 96 27 50 86 78 39 26 22 54 61 45 11 20 87 39 11 18 30 56 18 48 10 98	18.1048511627907 78.75 40.729166666666667 17.7027027027027 54.0625 78.64406779861017 25.80745341614007 35.5586582178709 62.14285714285714 78.88974358974359 77.81563398058252 32.43243243243243 77.81563398058252 32.43243243243243 78.43053058552 32.43243243243243 78.430530580582 32.43243243243243 78.430530580582 32.44968152860582 32.44968152860582 32.44968152860582 32.14968162860582 32.1496
50 51 52 53 54 55 56 56 57 58 60 61 62 63 64 65 66 67 76 77 72 73 74  Index 76 76 77 78 70 80 81 82 83 84 85		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 30 28 24 51 11 20 87 39  harga 60 13 60 11 18 30 56 18 48 10 98 83	10: 1046511627007 78:75 78:75 40:779166606066667 17: 7027027027027 54: 004257 55: 04: 00257 56: 04: 00257 56: 04: 00257 56: 04: 04: 04: 04: 04: 04: 04: 04: 04: 04
50 51 52 53 64 55 66 67 68 69 70 71 72 73 74 Index 75 76 77 78 80 81 82 83 84		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 96 95 90 95 78 95 96 78 96 27 50 86 78 39 26 22 54 61 45 11 20 87 39 11 18 30 56 18 48 10 98	18.1048511627907 78.75 40.729166666666667 17.7027027027027 54.0625 78.64406779861017 25.80745341614007 35.5586582178709 62.14285714285714 78.88974358974359 77.81563398058252 32.43243243243243 77.81563398058252 32.43243243243243 78.43053058552 32.43243243243243 78.430530580582 32.43243243243243 78.430530580582 32.44968152860582 32.44968152860582 32.44968152860582 32.14968162860582 32.1496
50 51 52 53 64 55 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index 75 76 77 78 80 81 82 83 84 85 86 87		94   94   94   94   94   94   94   94	10 95 70 10 66 90 30 57 78 95 96 96 97 86 97 86 78 39 26 22 54 61 45 11 20 87 39 11 18 30 56 18 48 10 98 83 40 20 63	10.1046511627907  78.75 40.729166666666667 17.7027027027027 54.0027027 54.00207 54.00207 54.00207 55.80745341614007 55.80745341614007 62.14285714285714 78.858074539474399 77.81553398058252 32.43243243243243 72.44526080596522 61.92207092307692 70.49450540450540 70.8259227184460 70.8259227184460 20.146067415730332 21.4908152866242 78.30357142857143 77.9158878504673 84.518518518518518518586674 78.30357142857143 77.9158878504673 84.518518518518518518518518 10.20769233958333333333333333333333333333333333
50 51 52 53 64 55 66 57 68 69 60 61 62 63 64 66 67 68 69 70 71 72 73 74  Index 76 76 77 78 78 80 81 82 83 84 85 86 87 88		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 27 59 86 78 30 28 22 54 61 41 20 67 39 harga 69 11 18 30 56 11 18 30 56 11 18 30 56 11 18 30 56 30 30 83	10: 1046511627007 78:75 78:75 40:779166606066667 17: 7027027027027 54: 040257 55: 040025 78: 04406779661017 25: 80745341614007 35: 558665921764709 52: 142657142657143 78: 88974358974589 77: 81:553380608252 32: 432432432432434343434343434343434343434
50 51 52 53 64 55 66 57 68 69 60 61 62 63 64 66 67 70 71 72 73 74  Index 76 76 76 78 80 81 82 83 84 85 86 87 88 89 90 91		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 27 59 86 86 78 30 28 22 54 61 41 20 67 39  harga 69 11 18 30 56 16 18 48 10 96 83 40 20 63 30 61 60	10: 1046511627007 78 78 78 40 779166606066667 17 70270207207027 54 004207027 54 004207 55 08046075060117 25 080745341614007 35 550860621780709 52 14265714265714 78 5808765341614007 52 14265714265714 78 58087455887453467440 78 58087455887453467440 78 1553380606052 51 9230769230706023 79 4780608606052 51 9230769230706023 70 49450540450440 70 825242714406 70 825242714416 71 91588745247440 71 91588745247440807 71 91588745247453 71 91588745247453 71 9158874544040 70 82524271441640 70 82524271441640 70 82524271441640 71 915887454440 71 9158874544544 71 915887454454 71 915887454454 71 91588745446405 70 9131578847468037 10 25 78 30357142857143 71 915887454674460037 10 25 78 30357142857143 71 915887454674460037 10 25 78 30357142857143 71 91588745467460037 10 25 78 30357142857143 71 91588745467460037 10 25 30357142857143 71 91588745467460037 10 25 30357142857143 71 91588745467460037 10 25 30357142857143 71 91588745467460037 10 25 30357142857143 71 91588745467460037 10 25 30357142857143 71 91588745467460037 10 25 3035714285714285714 71 91588745467460037 71 91588745467460037 71 91588745467460037 72 91588745467460037 73 9158874574753 75 916909090000000000000000000000000000000
50 51 52 53 64 65 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 Index 75 76 77 78 80 81 82 83 84 85 86 87 88		94   94   94   94   94   94   94   94	10 95 70 10 66 90 30 57 78 95 96 96 96 97 89 96 86 78 39 26 22 54 61 45 11 20 87 39 87 39 11 18 30 56 18 48 10 98 83 40 20 63 30 61	10.1046511627907 78.75 40.729166666666666 117.7291666666666666 117.729166666666666 117.729166666666666 117.729166666666666 118.6408779866101 119.864468779866101 119.86446879866101 119.86446879866101 119.86446879866101 119.8644860898989999999999999999999999999999
50 51 52 53 64 65 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index  Index  18 80 81 82 83 84 85 86 87 88 89 90 91 92 93		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 96 96 96 97 98 96 86 78 39 26 22 54 61 45 11 20 67 39 11 18 30 56 18 48 10 98 83 40 20 63 30 61 60 59 44 11	10.1046511627907  78.75 40.729166666666666 17.7027027027027 54.0027027 54.0027027 54.00207027 54.00207027 55.00745341614007 55.00745341614007 55.00745341614007 56.0074574164067 56.0074574164067 57.81653390068252 32.43243243243243243 32.43243243243243243243243 32.43243243243243243 32.4326060956522 61.92207092307092 70.49450549450540 70.8259227184460 20.146067415730332 21.4008152806242 78.30357142857143 77.9158878504673 48.51857865828 17.127659574468087 62.57 63.00357142857143 38.0043782608090 15.833333333333333 38.0043782608090 15.833333333333333 40.71428571428581 16.1046511627907 15.8333333333333333 55.586255294117045 78.05555555555559 17.227222222222222222222222222222222222
50 51 52 53 64 55 66 57 68 69 60 61 62 63 64 66 66 67 70 71 72 73 74  Index 76 76 76 78 80 81 82 83 84 86 87 88 89 90 91 92 93 94		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 80 27 59 86 87 89 86 78 39 86 78 39 86 78 39 86 78 39 86 78 39 86 78 39 86 78 30 61 11 18 30 56 69 11 18 30 56 11 18 30 56 60 60 60 60 60 60 60 60 60 60 60 60 60	10.1046511627007 78.75 40.72916060606067 17.7027027027027 54.00257 54.00257 55.00257 54.00257 58.0440579060117 25.80745341614007 35.55866592176709 52.14265714265744 78.58396058253 32.43243343243243 32.43243343243243 32.4324334324343434343434343434343434343
50 51 52 53 64 65 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index  Index  18 80 81 82 83 84 85 86 87 88 89 90 91 92 93		94   94   94   94   94   94   94   94	10 95 70 10 65 90 30 57 78 95 96 96 96 97 98 96 86 78 39 26 22 54 61 45 11 20 67 39 11 18 30 56 18 48 10 98 83 40 20 63 30 61 60 59 44 11	10.1046511627907  78.75 40.729166666666666 17.7027027027027 54.0027027 54.0027027 54.00207027 54.00207027 55.00745341614007 55.00745341614007 55.00745341614007 56.0074574164067 56.0074574164067 57.81653390068252 32.43243243243243243 32.43243243243243243243243 32.43243243243243243 32.4326060956522 61.92207092307092 70.49450549450540 70.8259227184460 20.146067415730332 21.4008152806242 78.30357142857143 77.9158878504673 48.51857865828 17.127659574468087 62.57 63.00357142857143 38.0043782608090 15.833333333333333 38.0043782608090 15.833333333333333 40.71428571428581 16.1046511627907 15.8333333333333333 55.586255294117045 78.05555555555559 17.227222222222222222222222222222222222

b. Kondisi 2

Random Number [6,16,26,36,46,56,66,76,86,96]

0	pelayanan	harga	fuzzy logic score	
4	100	100		79.33333333333334
	54 98	80		78.88135593220338
2	98 52	31 78		41.806451612903224 74.52941176470588
4	63	82		77.86046511627906
5				60.868421052631575
6	100			39.37499999999999
7	30	42		34.42696629213483
8 9	45 36	49 48		50.04494382022471 44.3333333333333336
10	10	90		49.9999999999999
11				47.09756097560976
12				78.88135593220338
13				
14 15	78 82	52 11		74.52941176470588 16.344827586206897
16	82 70	59		60.868421052631575
17				16.344827586206897
18				34.42696629213483
19				50.04494382022471
20 21	48 79	36 10		44.3333333333333333 16.535714285714285
22	70	40		60.868421052631575
23	100			79.33333333333334
24				17.904761904761905
index	pelayanan	harga	fuzzy logic score	
25	43	59		50.02439024390243
26 27	59 44	44 77		50.02439024390243 72.08695652173914
28	91	84		79.33333333333333
29				69.43283582089552
30	74	42		66.4
31 32	42 86	33 93		39.54285714285714 79.333333333333333
33	93	93 77		78.8205128205128
34				22.521739130434778
35	32	31		37.1904761904762
36 37	31 89	77 52		54.06818181818181 79.11475409836066
38	52	52 67		57.075949367088604
39				39.54285714285714
40	33	94		59.513513513513516
41 42	94 34	34 63		50.14285714285714 43.66304347826087
43	63	87		77.86046511627906
44				64.57142857142857
45				20.6875000000000004
46 47	21 64	64 19		30.93506493506493 18.22222222222225
48	64 19	30		18.352941176470587
49				60.868421052631575
index	pelayanan	harga	fuzzy logic score	
50 51	48 94	10 95		16.602409638554217 79.333333333333333
52				
				41.10638297872341
53	21 64	70 10		41.10638297872341 18.222222222222225
53 64	64 50	10 65		18.222222222222225 54.5625
53 54 55	64 50 49	10 65 90		18 222222222222225 54.5625 79.2258064516129
53 54 55 56 57	64 50 49 24 31	10 65 90 39 57		18 2222222222222225 54.5625 79.2258064516129 26 63291139240506 36.112994350282484
53 54 55 56 57 58	64 50 49 24 31 28	10 65 90 37 57 78		18 2222222222225 54.5625 79.2258064516129 26 63291139240506 36.112994350282484 52.52173913043478
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53 54 55 56 57 58 60 61 62 63 64 65 66 67 68	64 50 49 24 31 28 79 42 31 78 35 70 80 80 86 86 78	10 665 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61		18 222222222222222  18 252604518129 26 63291130240506 26 13299430282484 25 25173913043478 26 14529318867024 27 267805089655 27 28813559322033 62 4444444444444 27 131914893071021 27 233760233760225 28 485549135047077 22 233760233760225 48 553613569322033 27 27272727272724 28 53060419753066
53 54 65 66 67 68 60 61 62 63 64 66 67 68 69 70 71 72 73	64 50 49 24 78 78 42 35 70 80 27 59 80 78 27 28 28 28 28	10 665 90 30 57 78 80 27 59 86 28 22 24 61 45 11 20 80 81 81 81		18 2222222222222 79 2280045 16139 20 63291139240506 36 1129943500282484 52 52173913043478 79 1707317031709 78 45283018867924 73 287586050896555 72 28813599322033 62 444444444444 71 31914593917021 71 60037735400056 78 8813559322033 72 72727272727 74 5300641975306 75 78 8813559322033 72 7272727272727 76 8813559322033 77 73913045476261 76 78 813559322033
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63 64 65 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74	64 50 49 42 43 31 29 42 31 78 31 78 35 70 80 66 78 39 26 61 11 20 87 39 39 70	10 65 90 39 97 77 78 95 80 27 50 86 78 39 26 22 54 61 45 11 20 87 39 herga  09 11 18	fuzzy logic score	18 222222222222222  79 2258064516122  78 122683064516122  78 12268350226244  52 5217391304378  79 170731707317073  78 1528013509322033  52 27580506989555  73 288135599322033  52 434444444444444  71 31914899317021  71 60037735940956  28 485549132947977  78 881355993220338  48 2727272727273  48 53069419753096  17 73913094712857  18 74074074074074  78 881355993220338  49 212121212121212  59 57142857142857  39 40559340659341  10 34482759620697  39 40559340659341  10 34482759620697  17 994781904781905  41 7142857142857
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53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 70 71 72 73 74 Index 75 76 77 78 79 90 81 82 83 84 85 86 87 87 87 87 87 87 87 87 87 87	64 50 40 40 24 41 31 31 28 42 31 78 35 70 80 80 67 84 39 26 22 54 61  pelayanan 45 11 20 87 39 70 69 60 11	10 65 66 77 78 95 80 27 59 86 78 39 26 22 45 41 41 20 87 39  harga 69 11 18 30 56 18 48	fuzzy logic score	18 22222222222222  39 22580645161229  26 6329119240506  36 112994350282484  52 551739139449506  36 112994350282484  52 55173913943976  78 45283018967924  78 45283018967924  78 45283018967924  78 48959170217  78 6803753840056  78 288135593220338  72 7272727272727  78 88135593220338  40 212121212121212  50 57142857142857  16 344827596206897  17 394 4059305059341  16 344827596206897  17 94976194761905  41 71428571428571  18 5806451612290324  16 032400538554217  18 5806451612290324  16 034400538554217  18 5806451612290324  16 034400538554217  18 5806451612290324
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53 54 55 56 57 68 59 60 61 62 63 64 65 66 67 70 71 72 73 74 1index 76 77 78 79 80 81 82 83 84 85 86 87 87 87 87 88 89 80 80 80 80 80 80 80 80 80 80	64 50 40 40 40 41 41 41 42 41 42 43 43 45 70 60 60 70 60 40 40 40 40 40 40 40 40 40 40 40 40 40	10 10 10 10 10 10 10 10 10 10 10 10 10 1	fuzzy logic score	18 22222222222222  39 2258064516129  26 6329119040506  36 112994350282446  52 52173013043478  79 1707317073170731709  78 45283018067024  78 45283018067024  78 45283018067024  78 45283018067024  78 48135593220338  48 5246444444444  71 31914893617021  22 233708025  78 88135593220338  48 52006419753080  77 79913045478261  16 74074074074  78 88135593220338  49 212121212121212  59 57142857142857  16 344827586200887  71 79 94781907871905  41 7142857142857  16 344827586200887  56 11764705862553  16 344827586200887  56 11764705862553  16 344827586200887  56 11764705862555  16 344827586200887  56 11764705862555  16 344827586200887  56 11764705862555  57 2884738842786200887  56 11764705882553  58 83157884738842
53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 77 72 73 73 74 Index 75 76 77 78 79 80 81 82 83 84 85 86 87 87 88 89 80 81 81 81 81 81 81 81 81 81 81	64 50 49 24 41 31 28 79 42 31 79 35 70 80 80 78 30 22 54 61  pelayanan 45 11 20 87 39 70 13 69 11 18 30 56	10 65 90 90 90 90 90 90 90 90 90 90 90 90 90	fuzzy logic score	18 2222222222222222  36 3231 25 45625  79 2286084516129  28 63291139240506  36 112994350282484  52 52173913043478  79 1707317931709  78 432830188817924  78 2813559322033  52 444544444444  71 31914893617021  72 233766233769225  78 88135593220338  72 727272738840556  78 88135593220338  72 7272727272727  78 88135593220338  48 53096419753086  77 73913043478261  16 74074074074074  78 8813559320338  49 2121212121212  59 57142857142857  19 344827596020887  71 904761904761905  11 548827586200887  71 904761904761905  11 548827586200887  71 904761904761905  18 580645161290334  16 62449053855421  16 344827586200887  71 94761904761905  59 571428571428571  16 344827586200887  79 94761904761905  59 571428571428571  16 344827586200887  79 94761904761905  78 634174705882353  78 63157684736842  78 63157684736842
53 54 55 56 57 68 59 60 61 62 63 64 65 66 67 70 71 72 73 74 1index 76 77 78 79 80 81 82 83 84 85 86 87 87 87 87 88 89 80 80 80 80 80 80 80 80 80 80	64 50 40 40 40 41 41 41 42 41 42 43 43 45 70 60 60 70 60 40 40 40 40 40 40 40 40 40 40 40 40 40	10 10 10 10 10 10 10 10 10 10 10 10 10 1	fuzzy logic score	18 222222222222222222222222222222222222
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Random Number [7,17,27,37,47,57,67,77,87,97]

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101   101				
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1				75,38028169014083
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18				16.82142857142857
10	18			34.95454545454545
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Mart				61.451612903225815
Part				79.95454545454545
18		61	10	18.46341463414634
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19		43	59	50.04878048780486
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ACCORDING NO.   ACCORDING NO				60.0666666666666
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84         18         10         16.824/2057 14/2057           85         30         98         56.647/08/2057/08/2016           86         56         83         79.307/02/2016/02/2016/02/2016/02/2016/02/2016/02/2016/02/2016/02/2016/09/2016/0	50 51 52 53 54 65 56 67 68 69 60 61 62 63 64 65 66 67 70 71 72 73 74 Index A 75 76 77 78	48 94 21 66 65 67 49 28 31 79 42 31 78 35 79 60 60 66 22 77 86 26 22 61 pelayanan 45 54 39 67 30 60 61 61 61 62 63 67 63 63 63 64 61 61 61 61 62 63 63 64 64 65 66 66 67 68 67 68 68 68 68 68 68 68 68 68 68 68 68 68	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 0025 77 90 65454554564545 41 4,05027 1793 10346 41 4,05027 1793 10346 41 4,05027 1793 10346 41 4,05027 1793 10346 41 4,05027 1793 10346 42 60 674 40257 40266 43 60 674 40257 40266 43 60 674 40257 40266 43 60 674 40257 40266 43 674 674564 43 674 674564 43 674 674564 44 674 674664 45 674 674664 46 674 674664 47 674 674664 48 674 674664 49 24424244444245 40 674 40257 40266 40 674 402564 40256 40 674 402564 40256 41 674 674 674664 41 674 674 674664 42 74 40257 402656 43 674 402564 40256 44 674 402564 40256 45 674 402564 40256 46 674 402564 40256 47 674 402564 40256 48 674 402564 40256 48 674 402564 40256 49 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 244 2456 40 244 244 244 2456 2466 40 244 244 244 244 2456 2466 40 244 244 244 244 2456 2466 40 244 244 244 244 2456 2466 40 244 244 244 244 2456 2466 40 244 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2456 2466 40 244 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 2466 40 244 2466 40 244 2466 40 244 2466 40 244 2466 40 244 2466 40 244 2466 40 244 2466 40 244 2466 40 2446
85         30         98         56 6470588235294           86         56         83         78 30078229708225           87         18         40         18.328144999999996           88         48         20         17 002           90         10         03         28 24099999999           91         83         61         78 752773196876603           91         83         61         78 75277319687699           92         40         60         44 30099999999           93         20         59         18 1903030303033           94         63         44         52 474999999999           95         30         11         18 8181818181816           96         25         80         52 70652173913044           97         27         74         40 1074313725480           98         75         42         60 1476313725480	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 77 72 74 Index a 75 76 50 60 61	48 21 64 64 65 66 69 69 68 79 68 69 68 69 68 69 69 69 69 69 69 69 69 69 69 69 69 69	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 (9025 79 96461549564645 41 4.5652173913045 41 4.5652173913045 41 4.5652173913045 41 4.5652173913045 55 00240909090909090 79 864615386415385 26 90392140692745 36 667144958142665 79 79 79009767441850 79 79 7900976744195 37 79 7900976744195 37 79 7900976744195 37 79 7900976744195 37 79 7900976744195 38 79 7900976744195 39 79 7900976744195 39 79 7900990909099999 72 75 544991752577 72 545091755957 73 72 545091755957 74 545091755957 75 75 75 75 75 75 75 75 75 75 75 75 75 7
86         56         83         79.3076922476922           87         18         40         18.32746999999999           88         48         20         £17.0025           89         10         63         £22.49999999999999           90         98         30         40.775.59699999999999           91         83         61         78.7557731060765           92         40         60         40.9999999999           93         20         59         18.1080898983333           94         63         44         52.47499999999999           96         30         11         18.118181818161           94         25         80         52.70652173913044           97         27         74         4.1074313724699           98         75         42         60.14851067114	90 51 52 63 54 55 56 57 58 59 60 61 62 63 64 65 66 66 67 70 71 72 73 73 74 Index A 75 76 77 78 79 80 81 82 83	48 94 21 96 49 24 31 28 29 34 31 78 35 70 27 89 66 78 39 28 61  pelayanan 45 11 20 87 39 39 30 61 31 69	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 0025 79 06465454564645 41 4,656277391304 18 714285714385715 50 0024699999999999999999999999999999999999
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89         10         63         2a 24/00/00/00/00/00/00           90         90         30         4A77559/00/00           91         83         61         78 15/25/72/10/60/00           92         40         60         43 00/00/00/00/00/00/00           94         63         44         52 47/00/00/00/00/00/00           96         30         11         68 88 18/18/19/19/19/00/00           97         27         74         40 10/24/31/27/26/00           98         75         42         60 14/26/31/27/26/00	50 51 52 53 54 55 56 57 68 69 60 61 62 63 64 65 66 67 68 70 71 72 73 74 Index A 75 76 77 78 80 81 82 83 84	48 24 31 32 49 42 31 79 42 33 79 42 35 70 60 27 86 26 28 30 68 30 68 30 68 30 68 30 68 30 70 31 31 41 11 18	100 99 99 99 99 99 99 99 99 99 99 99 99 9	17 00025 79 0004054540540545 41 4.0502.73013040 41 4.0502.73013040 41 4.0502.73013040 41 4.0502.73013040 55 002.400000000000 79 0440154054055 50 002400000000000 79 04405744050 79 70000767441050 79 70000767441000 79 1000174311020 30 22377622377020 74 1074301052000 72 1.9403917525773 72 50000000000000 72 1.9403917525773 73 500000000000000 73 5.940759603708 40 5.4302007600000000 40 242424242424225 40 01.4102564102564 40 01.4102564102564 40 01.4102564102564 41 0244242424242425 42 01.4402857442657 43 01.440287442657 43 01.440287442657 44 0244405474657 44 02444054742657 44 02444057676867657 44 024440576767676767676767676767676767676767676
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91         83         61         78.7557731068765           92         40         60         40.00000000000000000000000000000000000	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 73 74 Index A 75 76 77 78 80 81 62 83 84 85 86 87 88	48 24 26 46 47 48 48 48 48 49 49 49 49 49 49 49 49 49 49 49 49 49	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 0025 79 054545545545545 41 4.5052173913045 41 4.5052173913045 41 4.5052173913045 41 4.5052173913045 55 062400000000000000000000000000000000000
92         40         60         40,00000000000000000000000000000000000	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index A 75 76 77 78 80 80 81 82 83 85 85 86 87 88	48 94 21 66 66 69 49 49 24 31 79 42 31 78 60 27 66 67 78 39 66 78 49 41 40 41 41 41 41 41 41 41 41 41 41 41 41 41	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 0025 79 0045455456454 41 45052173913044 41 45052173913044 41 45052173913044 41 45052173913044 55 002400000000007 79 004515540615355 50 0024000000000000000000000000000000000
93         20         59         181 180509 950 NEW 333           94         63         44         52.2 A 14 MIRROR DEPORT           95         30         11         18 81 B1	50 51 52 53 54 55 56 57 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index A 75 78 78 80 81 82 83 84 85 86 87 88	48 49 41 21 64 64 65 66 49 49 42 43 31 79 42 43 35 70 66 27 86 86 28 28 28 44 39 86 30 78 78 30 78 78 30 78 78 30 78 30 78 30 78 30 30 78 30 30 31 31 45 45 41 30 30 46 46 46 48 48 48	100 100 100 100 100 100 100 100 100 100	17 00025 79 0004054545454545 41 4.0502.73913045 41 4.0502.73913045 41 4.0502.73913045 43 64 15304813305 55 002.400000000000 79 044057420574205 50 00374740407205 79 79000767441000 79 79000767441000 33 22377622377023 74 10733910500000 72 1.5403917525773 72 50000000000000 72 1.5403917525773 73 500000000000000 73 5.5405775000760000000000000000000000000000
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<b>98</b> 75 42 69.1476510067114	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 Index A 75 76 78 78 79 80 81 82 83 84 85 86 87 88 87 88 88 89 99 91 92 93	48 24 24 31 46 36 47 48 37 49 41 38 49 42 41 38 49 42 41 48 48 48 48 48 48 48 49 88 88 88 88 88 88 88 88 88 88 88 88 88	100 100 100 100 100 100 100 100 100 100	17 0025 79 00454545454545 41 4,5052717913045 41 4,5052717913045 41 4,5052717913045 41 4,5052717913045 55 002400000000000 79 44015745455 56 005744595714255 79 30707674741050 33 22377622377623 71 107037690000000000000 72 1546937125673 72 5046971506933 73 2000000000000000000000000000000000000
	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 77 73 74 77 78 77 78 78 78 78 78 78 78 78 78 78	48 94 21 64 65 66 49 42 31 32 87 79 42 31 78 35 70 00 07 27 87 86 39 86 42 22 43 41 41 48 48 48 48 48 49 40 20 20 20 20 20 20 20 20 20 20 20 20 20	10 10 10 10 10 10 10 10 10 10 10 10 10 1	17 (1025) 79 (0546545454545454545454545454545454545454
	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 77 72 73 74  Index a  77 78 79 80 81 82 83 84 65 86 87 88 89 90 91 91 92 93 94	48 94 21 64 65 66 49 95 49 31 79 42 31 78 55 57 70 67 27 72 87 88 99 88 19 20 22 54 11 11 18 18 19 20 87 39 19 11 18 18 30 56 67 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 68 30 30 30 30 30 30 30 30 30 30 30 30 30	100 100 100 100 100 100 100 100 100 100	17 0005 77 09454554544545 41 445652173133045 41 44565217313045 41 44565217313045 55 002400000000000 77 0445554045555 56 002400000000000 77 044555405565 57 0770000776741955 77 70000776741955 77 70000776741955 77 1700077674317020 33 22377622377623 77 10007762377623 77 10007762377623 77 10007762377623 77 10007762377623 77 10007762377623 77 10007762377623 77 10007762377623 77 1000776200000000000 77 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 10007762377763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 10007762377763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 10007762377763 78 1000776237763 78 1000776237763 78 1000776237763 78 1000776237763 78 10007762377763 78 1000776237763 78 10007762377763 78 1000777763 78 10007777763 78 10007777763777763 78 100077777763 78 1000777777777777777777777777777777777

d. Kondisi 4

Random Number [8,18,28,38,48,58,68,78,88,98]

0	100		fuzzy logic score
			80.608695652
	98	31	
			62.125000000
			41.846153846
		42	
8	30 45	49	
			47.1463414634
12		54	
13	31	98	
			62.125000000
18	42	30	
			33.41 (204301)
20			
			17.423076923
22		40	62.125000000
23		99	
24			18.847457627
index	pelayanan	harga	fuzzy logic score
25	43		
		84	80.608695652
29		74	
30	74	42	
		33	
		93	
			80.142857142
		32	
35	32	31	
36	31	77	
		52	
		94	
41	94	34	
42	34	63	
43	63	87	
		38	
45			21.9344262295
46		64	
47	64 19	19	
48 49	42	30 70	
49 index	42 pelayanan	70 harga	62 125000000 fuzzy logic score
index 50	pelayanan 48	70 harga 10	62.125000000 fuzzy logic score 17.4805194805
49 index 50 51	42 pelayanan 48 94	70 harga 10 95	62 125000000 fluzzy logic score 77 48051948005 80 000806605
49 index 50 51 52	42 pelayanan 48 94 21	70 harga 10 95 70	62 125000000  fluzzy logic score  17 4805194805 80 6068066652 41 777777777
49 index 50 51 52 53	42 pelayanan 48 94 21 64	70 harga 10 95 70 10	62.125000000 fluzzy logic score 17.4805194805 88.060896502 41.777777775 19.1764705882
49 index 50 51 52 53	42 pelayanan 48 94 21 64	70 harga 10 95 70 10 65	62.125000000  fluzzy logic score  77.4805194805 80.008959552 41.77777777 19.17474705802 55.5562705
49 index 50 51 52 53	42 pelayanan 48 94 21 64	70 harga 10 95 70 10	62.125000000  fluzzy logic score  77.4805194805 80.008959552 41.77777777 19.17474705802 55.5562705
49 index 50 51 52 53 54	42 pelayanan 48 94 21 64 50 49	70 harga 10 95 70 10 65 90	62 125000000  fluzzy logic score  17.4805194805 88 068065652 41.77777777 19.776470582 55.562500000
49 index 50 51 52 53 54 55 56 56	42 pelayanan 48 99 21 64 50 49	harga 10 95 70 10 65 90 93 93	fuzzy logic score 7.7.4805194805 80 608996952 41.77777777 19.17764705825 55 562500000
49 index 50 51 52 53 54 55 56 56 57	42 pelayanan 48 94 21 64 55 49 24	70 harga 10 965 70 10 655 90 30 57	62.125000000  fluzzy logic score  17.4805194805 80.608969502 41.77777777 19.1764705802 55.56540540 37.19075144
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49 index 50 61 62 63 54 55 66 67 58 60 60 61	42  pelayanan  48  94  64  50  49  24  31  28  79  42  31  78	70 harga 10 955 70 10 656 90 30 37 78 95 90 27	62.125000000  fluzzy logic score  77.4805194805 80.000805652 41.77777777 19.1764705802 55.56240540 37.19075144 53.3191480361 80.444444 70.785714285 33.002868979 74.95546340
49 index 50 51 52 53 54 55 56 57 58 59 59 60 61 62	42  pelayanan  48  91  21  64  49  49  49  31  28  79  42  31  78  33  78	harga 10 96 70 11 65 90 57 78 90 90 90 90 90 90 90 90 90 90 90 90 90	fuzzy logic score  17.4805194805 80.606969502 41.777777777 19.17.764705802 55.562500000 27.0540540540 37.19075144 53.3104646444 73.7871574 80.4444444 73.7871574 80.44836870 68.6383870
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49  index 50 51 52 53 54 55 56 57 68 59 60 61 62 63	pelayanan 48 49 21 50 50 50 50 50 50 50 50 50 50 50 50 50	harga 10 66 70 16 66 90 30 77 78 95 90 27 78 95 90 27 78 78	fuzzy logic score  17.4805194805 80.60869695 41.777777777 19.17 PAP4705825 55.562500000 27.0540540540 37.19075144 53.310148054 80.44444444 77.97871442857 63.6383333333 63.6383333333
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49  50  51  52  53  54  56  56  57  68  59  60  61  62  63  64  65  66  67  70  71  72  73  74  77  78  79  70  71  77  78  78  79  80  81  82  83  84  85  86  87	pelayanan  48 49 21 64 65 69 49 42 31 78 79 42 31 78 35 70 70 80 80 80 80 80 80 80 80 80 80 78 80 80 78 78 31 78 35 70 70 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 78 30 70 70 78 30 70 70 70 70 70 70 70 70 70 70 70 70 70	harga 10 50 70 10 65 65 60 65 60 67 78 65 60 60 67 78 60 60 78 78 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  17.4805194805 80.600696505 41.777777777 19.17 PARTOSB82 55.502500000 77.0540540540 37.19075144 35.331014805 37.19075144 37.357142857 38.344444444 47.7757777 59.385542168 23.482657746 49.2727272  fuzzy logic score  60.812496999 77.2569509505 18.4761904761 67.47619682 67.47619682 67.47619699 67.2569509505 67.776470582 67.776470582 67.776470582 67.776470582 67.7765892
49  index 50 51 52 55 56 66 67 68 69 60 61 62 63 64 65 66 67 77 73 74  index 77 78 79 80 81 82 83 84 86 86 87 88 89 89	## Pelayanan  ## 48  ## 48  ## 49  ##	harga 10 65 77 10 65 65 90 97 78 95 96 97 97 98 96 97 98 97 98 98 98 98 98 98 98 98 98 98 98 98 98	fuzzy logic score  17.4805194805  18.00869592  41.777777777  19.17 PAP4709802  55.562500000  27.0540540540  37.18075444  43.33.311480341  43.33.3133333  73.35742857  74.395438270  74.395438270  74.395438270  74.395438270  74.395438270  75.395428574  76.395428574  76.395428574  77.395428574  77.395428574  78.3954285  78.395428574  78.395428574  78.395428574  78.395428574  78.395
49  ndex  50  51  52  53  54  55  66  67  69  60  61  62  63  64  65  66  67  77  71  72  73  74  index  77  78  79  80  81  82  83  84  85  86  87  88  89  80  80  81	pelayanan 48 94 21 64 55 64 42 31 22 31 32 35 79 42 33 35 66 67 80 80 80 66 78 81 42 51 52 54 61  pelayanan 45 11 12 27 30 30 26 31 30 30 30 30 31 31 31 31 31 31 31 31 31 31 31 31 31	harga 10 56 57 70 10 66 69 90 57 78 95 88 88 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  17.4805194805 80.600696505 41.777777777 19.17 Pratriosses 55.502500000 77.0540540540 37.19075144 80.344444445 80.344444444 81.35.3101464 80.344444444 80.33.330037 80.34444454 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.30037744 80.34.3003744 80.34.30037744 80.34.3003744 80.34
49  notex 50 51 52 55 56 66 66 60 61 62 63 64 66 66 67 68 69 70 71 72 73 74  index 75 79 80 81 82 83 84 89 89 89 89 90 91 91	## Pelayanan  ## 48  ## 48  ## 49  ##	harga 10 65 65 66 60 60 67 77 78 65 66 78 66 78 78 66 78 78 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  17.4805194805 80.000019562 41.77777777 19.17.47770582 55.562500000 27.056240540 37.19075144 33.311480261 80.44444444 77.7757742 83.30.00039879 74.95548387 63.63333333 73.357142857 29.3805421080 22.4002877484 80.500505555 18.476190451 80.422227272 80.822499999999999999999999999999999999999
49  50  51  52  53  54  55  56  66  67  62  63  64  65  66  67  77  71  72  73  74  Index  77  78  80  81  82  83  84  85  86  87  88  89  89  99  90  91	pelayanan 48 94 21 64 55 64 42 31 31 79 42 33 35 70 80 80 80 66 78 80 80 26 27 59 66 78 80 80 20 10 11 11 10 10 10 10 10 10 10 10 10 10	harga 10 56 57 70 10 66 69 90 57 78 95 88 88 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  17.4805194805 80.000019562 41.77777777 19.17.47770582 55.562500000 27.056240540 37.19075144 33.311480261 80.44444444 77.7757742 83.30.00039879 74.95548387 63.63333333 73.357142857 29.3805421080 22.4002877484 80.500505555 18.476190451 80.422227272 80.822499999999999999999999999999999999999
49  50  51  52  55  56  56  57  68  59  00  61  62  63  64  65  66  67  77  71  72  73  74  Index  77  78  89  80  81  82  83  84  85  89  90  90  91  92  93	pelayanan 48 48 21 21 55 50 50 50 50 50 50 50 50 50 50 50 50	harga 10 56 57 70 10 10 66 69 90 57 78 95 86 87 78 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  17.4805194805 80.000805652 41.777777777 19.17 PAP4705802 55.562500000 77.0540540540 37.19075144 80.344444444 18.35.310146454 19.7575142657 29.3655421666 23.4905967 24.49543574 25.4905967 25.4905967 26.8033333333 73.357142857 26.365542666 25.4905967 26.803333333 27.357142857 28.3655421666 28.4905967 28.4905967 28.4905967 28.4905967 28.4905967 28.4905967 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.3655421666 29.375421667 29.37542167 29.3754
49  index 50  51 52 55 56 56 57 68 59 60 61 62 65 66 67 68 69 70 71 72 73 74  index 75 77 78 79 80 81 82 83 84 85 86 86 87 88 89 90 91 91 92 93	### Pelayanan  ### 48  ##########	harga 10 65 70 11 65 65 60 90 97 78 95 66 87 78 95 88 77 78 95 88 77 78 95 88 77 78 95 88 78 78 95 88 88 78 78 95 88 88 78 78 96 88 88 88 88 88 88 88 88 88 88 88 88 88	fuzzy logic score  17.4805194805 80.000019562 41.77777777 19.174705805 95.502500000 27.0940540540 37.19075144 53.3101480261 80.44444444 43.33101480261 80.44444444 43.33303333 77.367142857 29.3855421080 63.83333333 77.367142857 29.3855421080 40.272127272 81.22271022 81.22227102
49  sindex  50  51  52  53  54  55  56  57  60  60  61  62  63  64  66  66  67  70  71  72  73  74  Index  77  78  79  80  81  82  83  84  85  87  88  89  90  91  92  93  94  95  96	### Pelayanan  ### 48  ##########	harga 10 66 77 10 66 90 97 78 95 96 78 96 78 96 78 96 78 96 78 96 97 98 98 98 98 98 98 98 98 98 98 98 98 98	fuzzy logic score  17.4805194805 80.0000050505 41.777777777 19.17 PAP4705802 55.562500000 27.0540540540 37.19075144 53.310194805 80.44444444 70.785714285 33.000583879 74.93543870 63.83333333 73.357142857 74.93543870 64.95555555 81.4761904181 86.95575720 75.958559555 81.4761904181 86.95757720 75.95857959 75.958579 75.9585
49  50  51  52  53  54  56  56  57  68  59  60  61  62  63  64  65  66  67  70  71  72  73  74  77  78  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94	Pelayanan	harga 10 50 50 65 60 60 65 60 60 60 60 60 60 60 60 60 60 60 60 60	fuzzy logic score  17.4805194805 80 00009562 41.77777777 19.1747050805 95.50200000 27.064064000 37.19975144 53.3191489361 80.444444444 77.757574265 33.062683679 74.95648370 63.83333333 77.3367142867 63.83333333 77.3367142867 63.83333333 77.3456742867 64.8456742867 65.8456742867 66.8456742867 78.978103468 78.97810486
49  index 50 51 52 55 56 66 67 68 69 70 77 77 74  index 77 78 78 80 81 82 88 88 89 90 91 91 92 93 94	## Pelayanan   48   48   48   49   49   49   49   49	harga 10 65 77 10 65 99 97 78 95 96 97 97 97 97 97 97 97 97 97 97 97 97 97	fuzzy logic score  fuzzy logic s
49  ndex 50 51 52 53 54 56 66 67 69 60 61 62 63 64 68 69 77 71 72 73 74 74 77 78 79 80 81 82 83 84 85 86 97 88 99 90 91 92 92 93 94	Pelayanan	harga 10 50 50 65 60 60 65 60 60 60 60 60 60 60 60 60 60 60 60 60	fuzzy logic score  17.4805194805 80.600696505 41.77777777 19.17 PARTOSSE2 55.562500000 77.0540540540 37.19075144 35.310194361 80.44444444 47.77757774 47.775714285 33.600383879 74.93543831 63.83333333 73.357142857 29.3855421688 23.409577448 49.27272727  fuzzy logic score  60.812499999 17.2569569505 18.4761904761 49.1742857142 19.17428571

e. Kondisi 5

Random Number [9,19,29,39,49,59,69,79,89,99]

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3			77.07947019867551
5	63 59	82 70	79.73684210526316 62.81818181818182
6 7	100 30	30 42	42.921568627450974 35.97674418604652
8			50.046511627906966
9	36 10	48 90	44.67901234567902 50.0000000000000001
11 12	38 80	58 54	47.2716049382716 80.90839694656488
13			58.818181818181806
14 15	78 82	52 11	77.07947019867551 17.653846153846157
16	70 90	59 10	62.81818181818182 17.653846153846157
17 18			35.97674418604652
19 20	49 48	45 36	50.046511627906966 44.67901234567902
21			17.800000000000004
22 23	70 100	40 99	62.818181818182 81.29166666666667
24	61	10	19.08928571428572
index pelayanan			fuzzy logic score
25 26	43 59	59 44	50.09756097560975 50.09756097560975
27 28	44 91	77 84	74.71428571428571 81.291666666667
29			72.21678321678323
30 31	74 42	42 33	69.37735849058604 40.575757575758
32 33	86 93	93 77	81.2916666666667 80.86046511627906
34			24.060240963855414
35 36	32 31	31 77	38.75308641975308 55.77966101694915
37 38	89 52	52 67	81 09633093525181 58 6874999999999
39			40.57575757575758
40 41	33 94	94 34	61.452830188679236 55.07142857142857
42 43	34 63	63 87	45.91011235955055 79.73684210526316
44			67.66666666666667
45 46	38 21	21 64	22.362068965517235 32.108108108108105
47 48	64 19	19 30	19.6060606060606 19.64516129032258
49	42	70	62.818181818182
index pelayanan	) hai	ga	fuzzy logic score
50	48	10 95	17.85135135135135135
51 52	94 21	95 70	81.2916666666667 42.06818181818182
51			81.2916666666667
51 52 53 54 55	94 21 64 50 49	95 70 10 65 90	81.29 retopologicopologico 42.068161818 18162- 19 diopologicopologico 50.022- 81.100008510050- 81.10008510050-
51 52 53 54 55 66 57	94 21 64 50 49 24 31	95 70 10 65 90 39 57	81 29 (неположности.) 42 049 141 814 814 915 19 000000000000000 50 0625 81 1800086014993 27 32 14763246 78333 37 71345002635
51 52 53 54 55	94 21 64 50 49 24	95 70 10 65 90 39	81 29/06/06/06/06/06/06/7 42 06/19/18/18/18/18/18/18/18/18/18/18/18/18/18/
61 62 63 54 55 56 66 67 69 60	94 21 64 50 49 24 31 28 79	95 70 10 65 90 39 57 78 95	81 2916000000000000000000000000000000000000
61 62 63 64 65 66 67 68 69 60 61	94 21 64 50 49 24 31 28 79 42 31 78	95 70 10 65 90 39 57 78 95 80 27 59	81 29 (1990) 000 000 000 000 000 000 000 000 000
61 52 63 54 55 66 57 68 69 60 61 62	94 21 64 50 40 24 31 28 79 42 31 79 31 78	95 70 10 65 90 39 57 78 95 80 27 59	81 29 1600 000 000 000 000 000 000 000 000 00
61 52 53 54 55 56 57 58 59 60 61 62 63 64	94 21 64 50 49 24 31 28 79 42 31 78 35 70	95 70 10 65 90 39 57 78 95 80 27 59 80 27 59	81 29 (600,000 (600,000 ) 81 20 (601,000 ) 86 (602,000 ) 81 180 (600,000 (600,000 ) 81 180 (600,000 ) 81 180 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (600,000 ) 81 120 (700,000 )
61 52 53 54 55 56 57 58 59 60 61 62 63 64 65 65	94 21 64 50 49 24 31 20 79 42 31 78 35 70 80 27	95 70 10 65 90 39 57 78 80 27 59 86 78 39	81 22 PROPROGROUNDOORS 42 0581 8181 8181 812 19 0000000000000000 50 0025 81 1000000000000000 27 37 16732 167
51 52 53 54 55 56 57 58 59 60 61 62 63 64 65	94 21 64 50 49 24 31 72 31 73 55 70 80 27 59	95 70 10 65 90 39 57 78 95 80 27 59 86 78	81 27 Internocentomory 42 06918 Int 81 Int 8
61 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 80 78	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54	81 2796000000000000000000000000000000000000
61 62 63 64 65 66 66 60 61 62 63 64 65 66 67 68 69 70	94 21 64 50 49 24 31 20 79 42 31 78 35 70 80 27 59 86 78 39 26	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61	8 1 29 100 000 000 000 000 000 000 000 000 00
51 52 53 64 55 56 57 58 59 60 61 62 63 64 65 66 67 70 71 72 73	94 21 64 50 49 24 31 70 42 31 70 55 70 80 77 59 88 78 39 26 22 54	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61 45	8 1.79 (порожением) 4.2 (0818) 1818 1816 1816 1816 1816 1816 1816
61 62 63 54 55 56 66 67 68 69 60 61 62 63 64 65 66 67 68 69 70 71 71 72 73	94 21 64 50 49 24 31 20 79 42 31 78 35 70 80 27 59 86 78 39 26 54	95 70 10 65 90 39 57 78 96 80 27 59 86 78 39 26 22 54 61 45 11 20 87	8 1 29 16000000000000000000000000000000000000
51 52 53 54 55 55 56 57 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74	94 21 64 50 49 24 31 78 78 78 55 70 80 27 59 86 78 59 59 66 78 59 54 61	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87	8 1 29 1000000000000000000000000000000000
51 52 53 64 55 56 57 58 59 60 61 62 63 64 65 66 67 70 71 72 73 74  Index pelayanan 75 76	94 21 24 50 49 24 31 28 79 42 31 78 55 70 80 27 59 88 78 39 20 22 54 61	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61 45 11 20 87 39	8 1.72 (1996) Score
51 52 53 64 65 56 57 58 59 60 61 62 63 64 65 66 67 70 71 72 73 74 Index petayanan 75 76	94 21 24 31 38 79 42 31 78 35 70 80 27 59 86 27 59 86 27 59 86 61 42 45 41 41 20 87	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61 45 11 20 87 30 30	81.29 (1960) (19
51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 70 71 72 73 74  Index pelayanan 75 76 77 78	94 21 64 50 49 24 31 78 78 78 35 70 80 27 59 80 27 59 80 27 59 86 78 39 26 22 54 61	95 70 10 65 90 30 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 39	8 12 79 10 60 00 00 00 00 00 00 00 00 00 00 00 00
51 52 53 54 55 55 56 56 60 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index petayanan 75 76 77 78 80	94 24 24 49 24 31 78 79 42 31 78 55 70 80 27 59 80 22 54 61 1 20 87 30 70 13	95 70 10 65 90 39 57 78 95 80 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 39	8 12 29600000000000000000000000000000000000
51 52 53 54 55 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74  Index petlayanan 75 76 77 78 79 80 81 82 83	94 21 64 50 49 24 31 28 79 42 31 78 35 70 80 27 59 80 27 59 80 61 11 10 10 11	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 45 11 11 20 87 39	8 1 29 16000000000000000000000000000000000000
61 62 63 64 65 66 66 67 68 69 70 71 72 73 73 74  Index pelayanan 75 76 77 78 79 80 81	94 24 31 49 24 31 28 79 42 31 78 35 70 80 27 59 86 78 30 26 11 20 45 41 11 20 67	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 39 45 61 45 11 20 87 39	8 12 29 0000 0000000000000000000000000000
51 52 53 54 55 56 57 68 59 60 61 62 63 64 66 66 67 68 88 69 70 71 72 73 74  Index pelayanan 75 76 78 79 80 81 82 83 84 88	94 24 24 50 49 24 31 28 79 42 31 78 35 70 80 27 59 80 27 59 80 27 59 80 11 20 87 30 26 22 54 61 11 20 87 30 70 11 18	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 39 39 11 18 30 56 18 48 10 98	8 12 29 16 9 16 16 16 16 16 16 16 16 16 16 16 16 16
51 52 53 54 55 56 56 57 58 60 60 61 62 63 64 65 66 67 68 87 70 71 72 73 74  Index petayanan 75 76 78 88 81 82 83 84 85 86	94 21 64 50 49 24 31 78 79 42 31 78 55 70 80 77 80 27 59 86 78 39 26 22 54 61 11 12 20 87 39 70 13 69 11 18 50 56 18	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 28 22 54 61 45 11 20 87 39 39 45 11 18 30 69 11 18 30 56 18 18 18 30 56 18 18 10 08 83 40	8 1 2916000000000000000000000000000000000000
61 52 53 54 55 56 56 57 58 60 60 61 62 53 64 65 66 67 68 69 70 71 72 73 73 74  Index pelayanan 75 76 77 78 79 80 81 82 83 84 85 86	94 21 21 64 50 49 24 31 78 79 42 31 70 80 77 59 86 78 30 26 22 24 61 11 20 87 30 70 13 45 11 20 87 30 98 11 13 98	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61 45 11 20 87 30 11 18 60 11 18 30 69 11 18 30 69 11 18 30 69 11 18 30 56 18 48 10 06 83 40 20	8 1 29 16000000000000000000000000000000000000
51 52 53 54 55 56 56 57 68 69 60 61 62 63 64 65 66 67 68 69 70 71 72 73 73 74  Index petrayanan 75 76 77 78 89 80 81 82 83 84 85 86 87 88 89 90	94 24 24 36 49 24 31 28 79 42 31 78 35 70 80 27 78 39 86 78 39 26 22 54 61 11 20 87 30 70 13 66 11 18 30 56 18	95 70 10 65 90 39 57 78 95 80 90 27 59 86 78 39 26 22 54 61 45 11 20 87 39 39 11 18 30 60 11 18 30 56 18 18 48 10 98 88 10 98 88 30 60 61 61 60 61 60 60 61 60 60 60 60 60 60 60 60 60 60 60 60 60	8 12 29 (60) (60) (60) (70) (70) (70) (70) (70) (70) (70) (7
51 52 53 54 55 56 56 57 68 59 60 61 62 63 64 66 66 67 88 88 70 71 72 73 74 77 78 79 80 81 82 83 84 85 86 87 88 88 89 90 91	94 24 31 64 50 49 24 31 28 79 42 31 78 35 70 80 77 59 80 77 59 80 78 39 26 52 54 61 11 20 87 39 70 13 69 11 18 30 56 18 30 69 11 18 30 56 18 48 48 10 98 88	95 70 10 65 90 39 57 78 95 80 27 59 86 78 39 26 22 54 61 45 11 20 87 30 30 11 18 30 56 18 48 10 98 18 48 10 98 83 40 20 63 30 61 60 60 60	8 12 2916000000000000000000000000000000000000
51 52 53 64 55 55 56 57 58 59 60 61 62 63 64 65 66 67 77 77 78 78 79 80 81 82 83 84 85 86 87 88 89 90 91 91 92	94 21 24 31 28 79 42 31 31 28 79 42 31 78 35 70 80 27 59 86 78 30 20 22 54 61 11 12 20 87 30 70 13 66 11 18 30 56 11 18 30 56 11 18 30 56 11 18 30 56 11 18 30 56 18 46 10 56 88 88 40 20	95 70 10 65 90 39 57 78 95 80 27 59 86 78 30 26 22 54 61 45 11 20 87 30 61 18 30 69 10 30 60 60 60 60 60 60	8 12 79 16 90 16 16 16 16 16 16 16 16 16 16 16 16 16
51 52 53 64 65 55 56 57 58 59 60 60 61 62 63 64 65 66 67 70 71 72 73 74  Index pelayanan 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 90 91	94 24 24 31 38 49 24 31 79 42 31 78 55 70 80 77 59 88 87 39 26 22 54 61 11 20 87 30 70 13 69 11 18 30 56 18 18 48 10 10 96 83 30	95 70 10 65 90 39 57 78 95 80 27 78 95 80 27 78 30 26 22 54 61 45 11 20 37 30 60 11 18 30 60 11 18 30 56 18 48 10 98 83 40 20 20 20 30 61 60 59 44 11 80	8 12 2916000000000000000000000000000000000000
51 52 53 64 65 55 56 66 67 75 58 69 60 61 62 63 64 65 66 67 77 78 78 79 80 81 82 83 84 85 88 87 88 88 87 88 88 89 90 91 192 93	94 21 21 64 50 49 24 31 78 79 42 31 78 35 70 80 77 59 86 78 30 26 27 54 61 11 20 87 39 11 28 67 30 11 10 58 70 11 10 58 70 11 10 58 70 10 10 10 10 10 10 10 10 10 10 10 10 10	95 70 10 65 90 39 57 78 95 80 27 78 96 78 30 26 22 54 61 45 11 20 87 30 87 30 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 11 18 30 60 61 60 63 30 60 61 60 60 65 60 60 60 60 60 60 60 60 60 60 60 60 60	8 12 2916000000000000000000000000000000000000
51 52 53 54 55 56 56 57 58 60 60 61 62 63 64 65 66 67 68 87 70 71 72 73 74  Index petayanan 75 78 88 88 89 90 91 91 92 93	94 21 64 50 49 24 31 78 78 78 78 55 70 80 27 59 60 27 59 61 11 20 87 30 70 13 60 11 18 30 56 18 48 10 98 88 81 40 20 65 30 22 55 27	95 70 10 65 90 39 57 78 95 80 80 27 59 86 78 39 28 22 54 61 41 11 80 83 40 20 63 30 61 61 60 69 61 60 69 63 63 60 61 60 60 69 63 60 61 60 60 60 60 60 60 60 60 60 60 60 60 60	8 12 29600000000000000000000000000000000000

f. Kondisi 6

Random Number [4,14,24,34,44,54,64,74,84,94]

	pelayanan	harga	fuzzy logic score
0	100	100	78.21052631578948
2	54 98	80 31	77.77358490566037 38.64516129032258
3	52	78	72.8709677419355
4			76.75000000000001
5			59.81081081081081
6	100 30	30 42	36.249999999999 33.340659340659336
8	45	49	49.95505617977528
9			43.76744186046511
10			50.0
11 12	38 80	58 54	47.048780487804876
13	31	98	77.77358490566037 55.999999999999
14	78	52	72.8709677419355
15			15 290322580645165
16	70	59	59.81081081081081
17 18	90 42	10 30	15.290322580645165 33.340659340659336
19	49	45	49.95505617977528
20			43.76744186046511
21			15.5
22 23	70 100	40 99	59.81081081081081 78.21052631578948
24	61	10	16.7272727272727
	• • • • • • • • • • • • • • • • • • • •	10	TV-TETETETETET
index	pelayanan	harga	fuzzy logic score
25	43	59	49.975609756097555
26 27	59 44	44 77	49.975609756097555 70.19047619047619
27 28	44 91	// 84	70.1904/61904/619 78.21052631578948
29			67.59375
30		42	65.57142857142858
31 32	42 86	33 93	38.357541899441344 78.21052631578948
33	93		78.21052631578948 77.71428571428571
34			21.3469387755102
35			36.09302325581395
36 37	31 89	77 52	52.72093023255814 78.0
38	52	67	76.0 55.88311688311688
39			38.357541899441344
40			58.4444444444444
41	94 34	34	46.857142857142854 42.18181818181817
42 43	63	63 87	42.181818181818181817 76.7500000000001
44			62.5
45			19.373134328358216
46 47	21 64	64 19	30 21951219512194 17.157894736842103
48	19	30	17.1578947,30842103
49	42	70	59.81081081081081
			00.01001001001
			50-0 100 100 100 100 1
index	pelayanan	harga	fuzzy łogic score
index 50	pelayanan 48	harga 10	fuzzy logic score 15.57303370786517
index	pelayanan	harga	fuzzy łogic score
index 50 61 52 63	pelayanan 48 94 21 64	harga 10 95 70 10	fuzzy togic score 15.5/73033/70780517 78.210508315/78948 40.14698333333333 171.578947/88824103
index 50 61 62 63 64	pelayanan 48 94 21 64 50	harga 10 95 70 10 65	fuzzy logic score 15.57303370786517 78.2165831578848 40.1458333333333 17.15780473847174847175
index 50 61 52 63	pelayanan 48 94 21 64	harga 10 95 70 10	fuzzy togic score 15.5/73033/70780517 78.210508315/78948 40.14698333333333 171.578947/88824103
Index 50 51 52 53 54 55 66	pelayanan 48 94 21 64 50 49 24 31 31 31	harga 10 95 95 10 65 90 30 55	fuzzy logic score 15.57303370780517 78.21505333733333 17.1578047386517 78.01473786715 78.01471786715 78.0147286715 78.0147286715
Index 50 51 52 53 54 55 56 66 57	pelayanan 48 94 21 64 50 49 24 31 28	harga 10 95 95 70 10 96 95 90 95 95 97 78 78	fuzzy togic score 15 5/7303370780517 78 2105831578888 40 14683333333333 171 578947788627103 53 678497174847175 78 1017428574288 24 97600796097865 34 49647513812544 51 777777777777777777777777777777777777
Index 50 51 52 53 54 55 56 57 57	pelayanan 48 94 21 65 94 99 92 94 99 92 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 95 10 10 10 90 39 57 70 85	fuzzy logic score  15.57303370780517  78.210030315788051  40.145833333333  17.157884735842715  78.1074285742855  24.075003750075007505  34.994475138121544  51.7777777777777
index 50 51 52 53 54 55 66 67 68	pelayanan 48 94 94 94 94 94 95 95 95 95 95 95 95 95 95 95 95 95 95	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	fuzzy logic score  15.57303370786517  78.2160503157886518  40.146333333333  17.157884715  78.1074285714285  24.0175786715007955  34.094475138121544  51.777777777777  78.0540569564665  77.26509166964665  72.0509168067465
Index 50 61 62 63 64 65 66 67 68 60 60 61	pelayanan 43 94 21 64 50 49 24 31 28 79 42 31 78	harga 10 95 77 10 65 90 30 57 78 95 90 27	fuzzy logic score  15.57303370780517  78.210503157880517  78.210503157880517  78.21050337333333333  17.157894738042103  53.6748071748(71)15  78.101714295744200  24.975600756057565  34.9844751821544  51.7777777777777  76.0605405405405405  77.26530612244000  32.03821560827453  71.076571428057444
Index 50 61 62 63 64 65 66 67 68 69 60 61 62 63	pelayanan 48 94 94 95 96 96 96 96 96 96 96 96 96 96 96 96 96	harga 10 95 95 95 95 95 95 95 95 95 95 95 95 95	fuzzy togic score  15 5/7303370780517  78 21905831578884  40 14583333333333  17 1578947398422103  53 678487174847175  78 10 17142871428  24 97460078007500  34 99447513871777777  78 05405405405405405405405  32 0392158807451  71 678574428571448
index 50 61 62 83 64 65 66 66 67 66 60 61 62 63	pelayanan	harga 10 95 70 10 65 90 39 57 78 95 96 27 59 96 78	Nutzzy logic score  15.57303370780517  78.216033170780517  78.216033170780517  78.216033137080517  40.1458333333333  17.15780473842100  53.678407178467175  78.10171428571428  24.973600780071805  34.99477518121544  51.77777777777  78.0540340632044008  32.03021580677451  77.678571748077144  61.40000000000000000  60.68181818181811
Index 50 61 52 63 64 65 66 66 67 68 60 61 62 63	pelayanan 48 49 44 21 64 50 50 64 64 64 64 64 64 64 64 64 64 64 64 64	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	fuzzy logic score  15.57303370780517  78.210503370780517  78.210503370780517  78.210503370780517  78.107427857  78.1074285714286  24.473600795007360  34.9944739121544  51.777777777777777  77.8050612244867  77.26530612244867  30.0003760674606  30.0003760674606  30.0003760674606  30.0003760674606  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466
index 50 51 52 63 64 65 66 60 60 61 62 63 64 65 66 66	pelayanan  43 94 21 64 50 49 24 31 78 42 31 78 35 70 80 27	harga 10 95 70 10 65 80 39 57 78 80 95 80 27 59 80 80 28 28 28	fuzzy logic score  15.57303370780517  78.210503170780517  78.210503170780517  78.210503170780517  40.4163333333333  17.15780473047410471715  78.1017408574200  24.975007750077950  34.99447318121544  51.777777777777777  78.05405405405405  32.03021560872451  71.6785714207144  61.4999999999999999999999999999999999999
Index 50 61 52 63 64 65 66 66 60 61 62 63	pelayanan 48 49 44 21 64 50 50 64 64 64 64 64 64 64 64 64 64 64 64 64	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	fuzzy logic score  15.57303370780517  78.210503370780517  78.210503370780517  78.210503370780517  78.107427857  78.1074285714286  24.473600795007360  34.9944739121544  51.777777777777777  77.8050612244867  77.26530612244867  30.0003760674606  30.0003760674606  30.0003760674606  30.0003760674606  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466  30.0003760746067466
Index  50  51  52  53  54  55  56  67  68  60  61  62  63  64  65  66  67  68	pelayanan 48 94 121 121 121 121 121 121 121 121 121 12	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ##################################
Index 50 51 52 63 64 65 66 67 68 66 67 68	pelayanan  43 94 21 64 50 49 24 31 78 35 55 95 80 87 80 80 80 80 80 80 80 80 80 80 80 80 80	harga 10 95 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	fuzzy logic score  15.57303370780517  78.21050315789851  40.1463333333333  17.1578947389533333333  31.757894738951740207175  78.101742805742805  24.974609738073565  34.9944738139121544  51.777777777777777  77.05509612246986  32.09215090612246986  32.09215090612246986  32.09215090612246986  32.09215090612246986  32.0727764989999999996  32.77746999999999996  77.775504999999999996  77.775504999999999996  77.775504999999999996  77.7755049999999999996  77.775504999999999996  77.7755049999999999996  48.5501228955846  48.5501228955846
Index 50 51 52 53 54 55 66 57 68 69 60 61 62 63 64 65 66 67 68	pelayanan 48 94 124 124 125 125 125 125 125 125 125 125 125 125	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ### ##############################
Index 50 51 52 63 64 65 66 67 68 66 67 68	pelayanan  43 94 21 64 50 49 24 31 78 35 55 95 80 87 80 80 80 80 80 80 80 80 80 80 80 80 80	harga 10 95 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	fuzzy logic score  15.57303370780517  78.21050315789851  40.1463333333333  17.1578947389533333333  31.757894738951740207175  78.101742805742805  24.974609738073565  34.9944738139121544  51.777777777777777  77.05509612246986  32.09215090612246986  32.09215090612246986  32.09215090612246986  32.09215090612246986  32.0727764989999999996  32.77746999999999996  77.775504999999999996  77.775504999999999996  77.775504999999999996  77.7755049999999999996  77.775504999999999996  77.7755049999999999996  48.5501228955846  48.5501228955846
Index 50 51 52 53 64 65 66 66 67 62 63 64 66 66 67 71 72 73	pelayanan  48 94 24 59 24 31 78 42 42 31 78 35 50 60 70 80 70 70 80 70 80 70 80 70 80 70 80 80 70 80 80 80 80 80 80 80 80 80 80 80 80 80	harga 10 95 75 75 76 78 78 78 78 78 78 78 78 78 78 78 78 78	fuzzy logic score  15.57303370780517 78.210503370780517 78.210503370780517 78.210503370780517 78.2105033707805175 51.57107807175 78.57107107175 78.57107107175 78.57107107177777777 78.5710717777777777 77.8155081224648 52.0203276807464 53.0203276807464 54.0203276807464 55.7717805081224648 56.61818181817 78.61818181817 78.771508061508067 77.771508061508067 77.771508061508067 77.771508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067 77.71508061508067
Index 50 61 52 63 64 65 66 67 68 60 62 63 64 66 66 67 77 77 77 73	Pelayanan  48 94 94 95 96 49 94 42 31 78 35 76 90 90 90 66 79 39 39 26 22 54 61	harga 10 95 75 75 75 75 75 75 75 75 75 75 75 75 75	fuzzy logic score  15.57303370780517  78.2160503370780517  78.2160503370780517  78.21605033733333333  37.15978047380547305  35.674807179027175  78.101742805742805  34.594747307150071905  34.59474730715071905  37.70550612244806  32.0021518067805  37.70550612244806  30.0021518061805142805  30.0021518061805142805  30.002151806180514280514805  30.002151806180514280514805  30.002151806180514280514805  30.002151806180514280514805  30.002151806180514280514805  30.002151806180514280514805  30.0021518061805148051480514805148051480514805148051
Index 50 51 52 53 54 55 66 57 66 69 60 61 62 63 64 65 66 67 70 71 72 73 73	Pelayanan  48 94 94 95 96 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ##################################
Index 50 51 52 53 64 65 66 66 67 62 63 64 66 66 67 71 72 73 74 Index 76	Pelayanan  48 48 94 16 61 65 60 49 24 31 78 78 78 78 79 60 60 60 79 79 60 60 60 60 60 60 60 60 60 60 60 60 60	harga 10 95 75 10 10 95 30 30 57 78 80 80 87 82 22 54 61 45 41 20 87 39 harga	fuzzy logic score  15.57303370780517  78.2160503370780517  78.2160503370780517  78.216050333333333  31.71578047386473864238  32.610714285714286  24.37360079007960  34.99447391321544  51.777777777777777777  77.80500122469864  30.000215901966  77.260500122469786  17.6785714285714  61.4000000000000000  60.61851818181817  70.77539489660007  71.115384815566007  72.77439980566007  40.15151515151515
Index 50 61 52 53 64 65 66 67 68 60 60 61 62 63 64 65 66 67 73 74 Index 75 76	Pelayanan  48 94 94 165 96 49 24 31 78 78 78 37 78 37 59 86 87 80 22 41 42 42 43 43 44 44 45 46 46 47 48 48 48 48 48 48 48 48 48 48 48 48 48	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ##################################
Index 50 51 52 53 54 55 56 66 57 58 60 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74	pelayanan  48 94 94 95 96 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 95 97 97 97 97 97 97 97 97 97 97 97 97 97	fuzzy logic score  15.57303370780517  78.2160503370780517  78.2160503370380517  78.2160503370380333333333  31.158981780621713  53.674871796027103  53.674871796027103  54.39494738027104  57.7765071078077805  77.765091502507104  61.4060000000000000000000000000000000000
Index 55 51 52 53 54 55 56 66 67 68 68 68 69 77 72 73 74 Index 77 78 79 80	pelayanan  48 94 16 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### August   15 57303370786517  78 21005815788851  40 145833333333  17 1578847388421588  24 07500379007565  34 094475138121544  51 7777777777777  77 0550901224697861  77 7565091224697861  71 6785714285714285  72 044999999999999  60 6019181819177  77 7750599999999999  77 7753999999999999999999999999999999999
Index 50 61 52 63 64 65 66 67 68 60 60 61 62 63 64 66 66 67 77 78 79 80	pelayanan  48 94 94 95 96 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 70 10 10 65 90 30 57 78 80 80 80 82 22 54 41 41 20 87 39 harga 69 11 11 12 56	fuzzy logic score  15.57303370780517  78.2160503370780517  78.2160503370380517  78.2160503370380333333333  31.158981780621713  53.674871796027103  53.674871796027103  54.39494738027104  57.7765071078077805  77.765091502507104  61.4060000000000000000000000000000000000
Index 50 61 52 63 64 65 66 67 78 88 69 60 61 62 63 64 66 67 77 73 74 Index 76 77 78 79 80 81	pelayanan  48 94 94 95 96 96 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 70 10 10 95 70 10 96 90 39 97 78 80 80 80 80 82 22 86 45 41 41 20 87 39 48 48 48 69 11 10 10 30 66 11 11 10 30	fuzzy logic score  15.57303370780517  78.21002815788845 40.145833333333 17.15780473864233 53.674807179407175 78.10174285714285 24.373600796007360 34.9944738124544 51.77777777777777 77.8550612244885 32.03027164969454656 77.28550612244886 32.03027164969454656 77.28550612244886 32.03027164969454656 32.030271649696969696969 40.61816181617 77.77364969696969696969 40.5181619617 50.7777364969696969696969 54.46669696969696969 54.4666969696969696969 54.4666969696969696969 54.27277272727272727272727272727272727272
Index 50 61 52 53 54 56 66 67 68 68 68 68 68 67 77 72 73 74 Index 76 77 78 79 80 81 82 83	pelayanan  48 94 24 49 49 49 44 42 42 47 78 78 60 60 78 60 78 61 61 61 61 64 61	harga 10 95 77 10 10 66 90 90 90 90 97 78 80 90 27 59 86 22 24 41 41 41 41 90 87 39  harga 69 13 60 60 11 11 19 90 60 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16	### August   15 57303370786517  78 210003157886517  78 210003157886517  78 210003157886517  78 10714285742857  78 10714285742857  78 10714285742857  78 10714285742857  78 10814081646666  77 7265046546666  77 7265046546666  78 2000316666666  79 7265046546666  79 7265046546666  79 7265046546666  70 7265046546666  70 72753646666666  70 727536466666666666666666666666666666666666
Index 50 61 52 63 64 65 66 67 76 68 69 77 71 72 73 74  Index 77 78 78 80 81 82 83 84	pelayanan  48 94 94 95 96 96 97 97 97 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 75 10 10 65 90 39 57 78 95 90 78 96 97 86 97 98 98 98 98 98 98 98 98 98 98 98 98 98	### ### ##############################
index 50 61 52 53 54 55 56 57 66 67 67 68 68 67 77 71 72 73 73 74 Index 77 78 79 80 81 82 83 84 85	pelayanan  48 94 24 49 49 49 44 42 42 47 78 78 60 60 78 60 78 61 61 61 61 64 61	harga 10 95 77 10 10 66 90 90 90 90 97 78 80 90 27 59 86 22 24 41 41 41 41 90 87 39  harga 69 13 60 60 11 11 19 90 60 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16	### August   15 57303370786517  78 210003157886517  78 210003157886517  78 210003157886517  78 10714285742857  78 10714285742857  78 10714285742857  78 10714285742857  78 10814081646666  77 7265046546666  77 7265046546666  78 2000316666666  79 7265046546666  79 7265046546666  79 7265046546666  70 7265046546666  70 72753646666666  70 727536466666666666666666666666666666666666
index 50 51 52 53 54 55 66 57 66 67 68 69 60 77 77 78 77 78 80 80 81 82 83	pelayanan  48 48 24 24 64 65 49 49 24 42 31 78 78 70 60 27 70 27 59 30 26 25 41 61  pelayanan  45 111 20 87 70 39 70 89 11 18 36 69 11 18 36 66 18	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### August   15 57303370786517  78 2160503157866517  78 2160503157866517  78 2160503157866517  78 3160503157866517  78 3167142857142857  78 3167142857142857  78 3167142857142857  78 3167142857142857  78 3167162857142857  78 3167162857142857142857  78 3169162405666  77 26050612244666  78 26050612244666  78 26050612246666  78 26050612246666  78 26050612246666  78 27 27 26050612246666  78 27 27 27 26050612246666  78 27 27 27 27 28 28 28 28 28 28 28 28 28 28 28 28 28
Index 55 51 52 53 54 55 55 56 66 67 68 68 69 77 77 72 73 74  Index 77 88 88 86 86 87 88 88	pelayanan  48 94 16 16 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### August   15 57303370786517  78 210058315788451  78 210058315788451  40 145833333333  17 1578847388421388  24 0750037500756  34 394473138121544  51 7777777777777  77 563001224607465  77 263001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758001224607465  77 7758040000000000000000000000000000000000
Index 50 51 52 53 54 65 65 66 67 68 69 60 64 66 67 77 77 73 74  Index 77 78 79 80 81 82 83 84 85 86 87 88	pelayanan  48 94 94 95 96 96 97 97 97 97 97 97 97 97 97 97 97 97 97	harga 10 95 70 10 10 95 70 10 96 90 39 97 78 80 80 80 27 59 80 86 81 30 22 24 46 41 41 20 87 39  harga  69 11 10 90 18 18 40 19 10 10 10 10 10 10 10 10 10 10 10 10 10	### ##################################
Index  50  51  52  53  54  55  56  67  68  69  60  61  62  63  64  65  66  67  71  72  73  74  Index  77  78  79  80  81  82  83  84  86  87  88  89  90  90  91	pelayanan  48 94 16 16 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### August   15 57303370786517  78 210003157886517  78 210003157886517  78 210003157886517  78 30714285714285  78 30714285714285  78 30714285714285  78 30714285714285  78 30814054054565  79 785306122467865  79 785306122467865  79 785306122467865  79 785306122467865  79 785306122467865  79 785306122467865  79 785306122467865  79 785306122467865  79 78 30814058650007  79 77 7753061260007865  79 77 7753061260007865  79 77 7753061260007865  79 78 785306122467865  79 78 785306122467865  10 78 78 78 78 78 78 78 78 78 78 78 78 78
Index  50 51 52 53 54 55 56 66 57 68 69 60 60 61 62 63 64 66 67 70 71 72 73 74  Index 77 78 79 80 81 82 83 84 86 87 88 88 88 87 88 88 88 87	pelayanan  48 94 121 24 15 69 49 49 42 42 42 43 78 78 78 78 20 27 50 80 78 78 78 78 78 78 78 78 78 78 78 78 78	harga 10 95 95 95 95 95 95 95 95 95 95 95 95 95	### Autory Togic score    15.57303370786517   78.210003157886517   78.210003157886517   78.210003157886517   78.21000333333333   17.1578847388121564   24.07500379007905   24.094791389121564   25.777777777777777   78.05001224807865   77.265001224807865   77.265001224807865   77.7585001224807865   77.7585001224807865   77.7585001224807865   77.7585001224807865   77.7585001224807865   77.7585001224807865   77.7585001224807865   77.75850012248078657   20.14800000000000000000000000000000000000
Index 50 51 52 53 64 65 65 66 67 68 60 60 61 62 63 64 65 66 67 77 73 74 Index 77 78 78 79 80 81 82 83 84 85 86 87 88 89 90 91 91 92 93	pelayanan  48 94 16 16 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	harga 10 95 95 95 95 95 95 95 95 95 95 95 95 95	### ##################################
Index 50 51 52 53 54 55 56 66 57 68 69 60 61 62 63 64 66 67 77 71 72 73 74  Index 77 78 79 90 81 82 83 84 85 86 86 87 88 89 90 91 92 93	Pelayanan	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### August   15 57303370786517  78 216003370786517  78 216003370786517  78 216003370786517  78 1216003370786517  78 1216003370333333333  17.15788473886123840  24 01780078007865  34 094475138121544  55 77777777777777  78 050401224600  32 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  30 00201264000  31 111528640000000  77 773586400000000  77 773586400000000  77 773586400000000  77 773586400000000  77 773586400000000  77 77358640000000000000  78 1152864000000000000000000000000000000000000
Index 50 51 52 53 64 65 65 66 67 62 63 64 65 66 67 77 77 72 73 74  Index 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 91	pelayanan  48 94 16 94 95 96 96 97 97 97 97 98 98 98 98 98 98 98 98 98 98 98 98 98	harga 10 95 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ##################################
Index 50 51 52 53 54 55 56 66 67 67 68 68 69 70 71 72 73 74 Index 77 78 78 88 89 80 80 80 80 80 81 82 83 84 85 86 87 88 88 89 80 90 90 90 90 90 90 90 90 90 90 90 90 90	pelayanan  48 94 121 65 66 49 24 31 78 78 78 78 70 70 70 70 75 96 67 78 78 78 78 78 78 78 78 78 78 78 78 78	harga 10 95 75 76 95 96 96 96 96 96 96 96 96 96 96 96 96 96	### ### ##############################

g. Kondisi 7

Random Number [3,13,23,33,43,53,63,73,83,93]

index	pelayanan	harga	fuzzy logic score
0	100 54	100 80	77.12222222
	98	31	37.0645161290
4	63	82	76.246753246
5 6	59 100	70 30	
7	30	42	
			49.931818181
			43.232558139
10 11	10 38	90 58	47.024390243
12	80	54	
			55.5477707000
14	78	52	72.06779661
15 16	82 70	11 59	14.71874999999 59.301369863
17			
18			
19 20	49 48	45 36	49.931818181 43.232558139
21	79	10	14.935483870
22			59.3013698631
24	61	10	16.11111111
Index		h	Average de la constante de la
index 25	pelayanan 43	harga 59	fuzzy logic score 49 95121951211
26	59		49.95121951219
28	91	84	
29 30	76 74	74 42	
31			37.7513812154
33	93	77	77 242424242
34 35	21 32	32 31	20.722772277 35.52873663
36			52.171597633
			77.5192307693
38 39	52 46	67 33	55.302631578 37.7513812154
40	46	33 94	37.7513812154 57.929577464
41	94		45.481751824
			41.609625666
43 44	63 77	87 38	76.246753246 61.4615384611
45	38	21	18.6934306569
46			29.267425149
			16.5897435897-
48			16.7837837837837
			16.7837837837837
48	19 42	30 70	16.7837837837 59.3013099631
48 49 index 50	19 42 pelayanan 48	30 70 harga 10	16.78378378371 59.301369603 fuzzy logic score 15.0108696652
48 49 index 50 51	19 42 pelayanan 48 94	30 70 harga 10 95	16: 78378378371 50: 3013098031 fuzzy logic score 15: 0108050652 77: 722222222
48 49 index 50 51 52	19 42 pelayanan 48 94 21	30 70 harga 10 905 70	16 7637837637 59 301369603 fuzzy logic score 15 0108695652 77 772222222 39 562496969
48 49 Index 50 61 52 53 54	19 42 pelayanan 48 94 42 21 64	30 70 harga 10 95 70 10	16. 76378376371 50.3013098030 fuzzy logic score 15.0108696652 77. 7722222222 30. 562499999 16. 5807435987. 53. 32994739847
48 49 50 61 52 53 54 55	19 42 pelayanan	30 70 herga 10 65 70 10 65	16. 78.378.378.37 59. 3013.09803 ************************************
48 49 50 51 52 53 54 55 65	19 42  pelayanan  48 94 21 64 50 49 49	30 70 harga 10 65 70 11 65 80 30	16. 76378378371 50. 3013098031 50. 3013098031 71. 722222222 30. 562490909 16. 86874 269699 53. 3280473804 71. 622641540
48 49 50 51 52 53 54 55 56 57	19 42 pelayanan 48 94 49 21 64 50 49 24	harga 10 65 70 95 70 10 65 90 90 30 57	16. 76378376371 50. 3013098031 50. 3013098031 15. 0108693652 77. 7722222222 30. 562490900 16. 58074589694 77. 622641509 24. 413772455003 34. 4427650073 34. 4427650073
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#### 2. Sintaks program

```
"""Tubes Ai.ipynb
Automatically generated by Colaboratory.
Original file is located at
    https://colab.research.google.com/drive/1FYnT8XbYl6Im
aezTT7_OUJWMv2MxUgSR
import pandas as pd
# import dataset dan lihat 10 data pertama
data_frame = pd.read_excel("hotel.xlsx")
data_frame.head(10)
def bad(x):
    if(x \le 20):
        return 1
    elif (x > 20 \text{ and } x < 40):
        return ((40-x)/(40-20))
    elif(x == 40):
        return 0
def standard(x):
    if(x == 20 \text{ or } x == 80):
        return 0
    elif (x > 20 and x < 50):
        return ((x-20)/(50-20))
    elif (x > 50 \text{ and } x < 80):
        return ((80-x)/(80-50))
    elif(x == 50):
        return 1
def good(x):
    if(x >= 80):
        return 1
    elif (x > 60 and x < 80):
        return ((x-60)/(80-60))
    elif(x == 60):
        return 0
```

```
def cheap(x):
    if(x \le 20):
         return 1
    elif (x > 20 \text{ and } x < 40):
        return ((40-x)/20)
    elif(x == 40):
         return 0
def average(x):
    if \overline{(x == 20 \text{ or } x == 80)}:
         return 0
    elif (x > 20 \text{ and } x < 50):
         return ((x-20)/(50-20))
    elif (x > 50 and x < 80):
         return ((80-x)/(80-50))
    elif(x == 50):
         return 1
def expensive(x):
    if(x >= 80):
         return 1
    elif (x > 60 and x < 80):
        return ((x-60)/(80-60))
    elif(x == 60):
         return 0
def fuzzyfikasi pelayanan(x):
    bad score = 0
    standard score = 0
    if(x < 20):
        bad score = bad(x)
    elif(x >= 20 \text{ and } x < 40):
        bad score = bad(x)
         standard_score = standard(x)
    elif(x >= 40 \text{ and } x < 50):
         standard score = standard(x)
    elif(x >= 50 \text{ and } x < 60):
         standard score = standard(x)
    elif(x >= 60 \text{ and } x < 80):
        standard_score = standard(x)
         good_score = good(x)
    elif(x >= 80 \text{ and } x <= 100):
        good\ score = good(x)
```

```
return {'bad': bad_score, 'standard': standard_score,
'good': good score}
def fuzzyfikasi harga(x):
    average_score = 0
    expensive score = 0
    if(x < 20):
        cheap score = cheap(x)
    elif(x >= 20 \text{ and } x < 40):
        cheap\_score = cheap(x)
        average_score = average(x)
    elif(x >= 40 \text{ and } x < 50):
        average score = average(x)
    elif(x >= 50 \text{ and } x < 60):
        average_score = average(x)
    elif(x >= 60 \text{ and } x < 80):
        average score = average(x)
        expensive score = expensive(x)
    elif(x >= 80 \text{ and } x <= 100):
        expensive score = expensive(x)
    return {'cheap': cheap_score, 'average':
average_score, 'expensive': expensive_score}
f harga = fuzzyfikasi harga(20)
f_pelayanan = fuzzyfikasi_pelayanan(50)
list inference = []
for key, value in f_pelayanan.items():
    for key2, value2 in f_harga.items():
        print('pelayanan : {} & harga: {}, hasil:
{}'.format(
            key, key2, min(value, value2)))
        list inference.append(min(value, value2))
bintang3 = max([list_inference[0], list_inference[1],
                list_inference[3], list_inference[6]])
bintang4 = max([list inference[2], list inference[4]])
```

```
bintang5 = max([list_inference[5], list_inference[7],
list inference[8]])
def fuzzy_logic(pelayanan, harga):
    # FUZZYFICATION
    f_pelayanan = fuzzyfikasi_pelayanan(pelayanan)
    f_harga = fuzzyfikasi_harga(harga)
    # INFERENCE
    list inference = []
    for key, value in f_pelayanan.items():
        for key2, value2 in f harga.items():
            list_inference.append(min(value, value2))
    bintang3 = max([list_inference[0], list_inference[1],
                    list inference[3],
list inference[6]])
    bintang4 = max([list inference[2],
list inference[4]])
    bintang5 = max([list_inference[5], list_inference[7],
list inference[8]])
    # DEFUZIFICATION
    n_numbers = [5, 15, 25, 35, 45, 55, 65, 75, 85, 95]
    crisp_output = {}
    for i in range(len(n numbers)-1):
        crisp_output[n_numbers[i]] = 0
        if n numbers[i] <= 20:
            crisp output[n numbers[i]] = min(bintang3,
bad(n numbers[i]))
        elif n_numbers[i] > 20 and n_numbers[i] <= 40:</pre>
            temp bintang3 = min(bintang3,
bad(n_numbers[i]))
            temp_bintang4 = min(bintang4,
standard(n_numbers[i]))
            crisp output[n numbers[i]] =
max(temp_bintang3, temp_bintang4)
        elif n_numbers[i] > 40 and n_numbers[i] <= 60:</pre>
            crisp output[n numbers[i]] = min(bintang4,
standard(n numbers[i]))
        elif n_numbers[i] > 60 and n_numbers[i] <= 80:</pre>
            temp bintang5 = min(bintang5,
good(n numbers[i]))
```

```
temp_bintang4 = min(bintang4,
standard(n_numbers[i]))
            crisp_output[n_numbers[i]] =
max(temp_bintang5, temp_bintang4)
        elif n_numbers[i] > 80:
            crisp_output[n_numbers[i]] = min(bintang5,
good(n_numbers[i]))
   X = 0 # X adalah bilangan atas
    for titik random, skor akhir in crisp output.items():
        total = titik_random*skor_akhir
        X += total
    Z = X/Y
    return Z
fuzzy logic score = []
pelayanan = []
harga = []
for row in data frame.itertuples():
    score = fuzzy_logic(row.pelayanan, row.harga)
    pelayanan.append(row.pelayanan)
   harga.append(row.harga)
    fuzzy logic score.append(score)
data = {"pelayanan": pelayanan,
        "harga": harga,
        "fuzzy logic score": fuzzy_logic_score
final df = pd.DataFrame(data)
final_df = final_df.sort_index()
final_df.to_excel("Hasil 7 Kondisi.xlsx", encoding='utf-
8', index=False)
final df
```

#### 3. K-means cluster

4. Sample Data	X	Y	Kelompok / Cluster
Data			Cluster
1	30	100	
2	90	10	
3	60	40	
4	40	70	
5	20	48	

Kita akan mengaplikasikan K-Means Clustering untuk data diatas menjadi 2 cluster. Pertama kita akan hitung Centroid.

Cluster	X	Y
K1	30	100
K2	90	10

Perhitungan menggunakan persamaan Euclidean Distance

$$[(x,y),(a,b)] = \sqrt{(x-a)^2 + (y-b)^2}$$

Perhitungan Pertama;

Cluster 1 (90, 10) = 
$$\sqrt{(30-30)^2 + (100-100)^2} = 0$$

(jarak cluster 1 ke cluster 1)

Jarak dari Cluster 2 ke cluster 1 (90, 10)  $\leftrightarrow$  (30,100) =

$$\sqrt{(90-30)^2 + (10-100)^2} = \sqrt{(60)^2 + (-90)^2} = \sqrt{3600 + 8100} = \sqrt{11.700} = 108,17$$

Jarak dari cluster 1 ke cluster 2 (30, 100)  $\leftrightarrow$  (90, 10) =

$$\sqrt{(30-90)^2 + (100-10)^2} = \sqrt{(-60)^2 + (90)^2} = \sqrt{3600 + 8100}$$
$$= \sqrt{11.700} = 108,17$$

Jarak cluster 2 ke cluster 2 (40, 60) =  $\sqrt{(90 - 90)^2 + (10 - 10)^2} = 0$ 

Sehingga;

Cluster	Cent	Kelompok	
	X	Y	Cluster
K1 (30, 100)	0	108,17	1
K2 (90, 10)	108,17	0	2

# Perhitungan kedua.

Langkah selanjutnya kita beralih ke data ketiga yaitu (60, 40). Kita mulai menghitung jarak dataset terhadap cluster 1.

$$(30, 100) \leftrightarrow (60, 40) =$$

$$\sqrt{(60-30)^2 + (40-100)^2} = \sqrt{(30)^2 + (-60)^2} = \sqrt{900 + 3600} = \sqrt{4500}$$
= 67.08

Kemudian kita hitung jarak dataset terhadap cluster 2.

$$(90, 10) \leftrightarrow (60, 40) =$$

$$\sqrt{(60-90)^2 + (40-10)^2} = \sqrt{(-30)^2 + (30)^2} = \sqrt{900+900} = \sqrt{1800}$$
= 42.43

### Sehingga didapatkan:

Dataset	Euclidean Distance		Kelompok
	Cluster 1 Cluster 2		Cluster
(60, 40)	67,08	42,43	2

Dataset ke-3 masuk dalam kelompok cluster 2 , karena jarak minimum / terdekat dataset adalah terhadap cluster 2 yaitu 42,43.

### Kemudian kita update Centroid

Cluster	X	Y
K1	30	100
K2	$=\frac{90+60}{2}=75$	$=\frac{10+40}{2}=25$

### Jadi Cluster Centroid yang baru adalah sebagai berikut :

Cluster	X	Y
K1	30	100

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-----

Perhitungan ketiga

Kita lanjutkan kembali menghitung dataset ke-4 yaitu (40, 70). Kita mulai menghitung jarak dataset terhadap cluster 1.

$$(30, 100) \leftrightarrow (40, 70) =$$

$$\sqrt{(40-30)^2 + (70-100)^2} = \sqrt{(10)^2 + (-30)^2} = \sqrt{100 + 900} = \sqrt{1000}$$
= 31,62

Kemudian kita hitung jarak dataset terhadap cluster 2 yaitu (75, 25).

$$(75, 25) \leftrightarrow (40, 70) =$$

$$\sqrt{(40-75)^2 + (70-25)^2} = \sqrt{(-35)^2 + (45)^2} = \sqrt{1225 + 2025} = \sqrt{3250}$$
= 57.01

# Sehingga didapatkan:

Dataset	<b>Euclidean Distance</b>		Kelompok
	Cluster 1 Cluster 2		Cluster
(40, 70)	31,62	57,01	1

Dataset ke-4 masuk dalam kelompok cluster 1 , karena jarak minimum / terdekat dataset adalah terhadap cluster 1 yaitu 31,62.

### Kemudian kita update Centroid

Cluster	X	Y
K1	$=\frac{30+40}{3}=35$	$=\frac{100+70}{}=85$
	$={2}$ = 33	$={2}$ = 83
K2	75	25

Jadi Cluster Centroid yang baru adalah sebagai berikut :

Cluster	X	Y
K1	35	85
K2	75	25

### Perhitungan keempat

Kita lanjutkan kembali menghitung dataset ke-5 yaitu (20, 48). Kita mulai menghitung jarak dataset terhadap cluster 1. Perhatikan kembali, centroid 1 yang digunakan adalah yang telah terupdate yaitu (35, 85).

$$(35, 85) \leftrightarrow (20, 48) =$$

$$\sqrt{(20-35)^2 + (48-85)^2} = \sqrt{(-15)^2 + (-37)^2} = \sqrt{225+1369} = \sqrt{1594}$$
= 39.92

Kemudian kita hitung jarak dataset terhadap cluster 2.

$$(75, 25) \leftrightarrow (20, 48) =$$

$$\sqrt{(20-75)^2 + (48-25)^2} = \sqrt{(-55)^2 + (23)^2} = \sqrt{3025+529} = \sqrt{3554}$$
= 59,62

#### Sehingga didapatkan:

Dataset	<b>Euclidean Distance</b>		Kelompok
	Cluster 1	Cluster 2	Cluster
(20, 48)	39,92	59,62	1

Dataset ke-4 masuk dalam kelompok cluster 1, karena jarak minimum / terdekat dataset adalah terhadap cluster 1 yaitu 39,92

# Kemudian kita update Centroid

Cluster	X	Y
K1	$=\frac{35+20}{2}=27,5$	$=\frac{85+48}{2}=66,5$
K2	75	25

Jadi Cluster Centroid yang baru adalah sebagai berikut :

Cluster	X	Y
K1	27,5	66,5
K2	75	25

Dari kelima perhitungan perwakilan data diatas dapat disimpulkan bahwa ketika inputan x<y maka akan masuk pada klister 1 begitupun sebalikya jika inputan y<x maka akan masuk cluster 2 jika x=y maka akan masuk cluster yang centroidnya lebih rendah. Dengan adanya kesimpulan tersebut kita dapat mengisi seluruh data yang ada

Sample Data	X	Y	Kelompok / Cluster
1	30	100	1
2	90	10	2
3	60	40	2
4	40	70	1
5	20	48	1

No	Harga	Pelayanan	Cluster	N
1	100	100	1	2
2	80	54	2	2
3	31	98	1	2
4	78	52	2	2
5	82	63	2	3
6	70	59	2	3
7	30	100	1	3
8	42	30	2	3
9	49	45	2	3
10	48	36	2	3
11	90	10	2	3
12	58	38	2	3
13	54	80	1	3
14	98	31	2	3
15	52	78	1	4
16	11	82	1	4
17	59	70	1	4
18	10	90	1	4
19	30	42	1	4
20	45	49	1	4
21	36	48	1	4
22	10	79	1	4
23	40	70	1	4

	59 44	43	2
27	44		
-		59	1
28	77	44	2
29	84	91	1
30	74	76	1
31	42	74	1
32	33	42	1
33	93	86	2
34	77	93	1
35	32	21	2
36	31	32	1
37	77	31	2
38	52	89	1
39	67	52	2
40	33	46	1
41	94	33	2
42	34	94	1
43	63	34	2
44	87	63	2
45	38	77	1
46	21	38	1
47	64	21	2
48	19	64	1

24	99	100	1
25	10	61	1

49	30	19	2
50	70	42	2

No	Harga	Pelayanan	Cluster
51	10	48	1
52	95	94	2
53	70	21	2
54	10	64	1
55	65	50	2
56	90	49	2
57	39	24	2
58	57	31	2
59	78	28	2
60	95	79	2
61	80	42	2
62	27	31	1
63	59	78	1
64	86	35	2
65	78	70	2
66	39	80	1
67	26	27	1
68	22	59	1
69	54	86	1
70	61	78	1
71	45	39	2
72	11	26	1
73	20	22	1
74	87	54	2
75	39	61	1

No	Harga	Pelayanan	
76	69	45	2
77	13	11	2
78	69	20	2
79	11	87	1
80	18	39	1
81	30	70	1
82	56	13	2
83	18	69	1
84	48	11	2
85	10	18	1
86	98	30	2
87	83	56	2
88	40	18	2
89	20	48	1
90	63	10	2
91	30	98	1
92	61	83	1
93	60	40	2
94	59	20	2
95	44	63	1
96	11	30	1
97	80	25	2
98	74	27	2
99	42	75	1
100	33	11	2