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Decision Support System For Employee Assessment At PT. Kupu-Kupu Taman Lestari Using AHP And BARS Methods

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ABSTRACT

Employee performance evaluation has an important role in the world of work, especially in the field of tourism as it relates to the decision to be taken by the company. PT. Kupu-Kupu Taman Lestari is a company engaged in the field of tourism and in desperate need of competent employees to achieve corporate goals. Therefore, PT. Kupu-Kupu Taman Lestari sustainable human resources management need to improve the quality of its employees, although previously been applied but for their eventual management turnover is not there anymore management which resulted in no clear and measurable standards, as well as the employees are not motivated to work. One way to manage human resources can be assessed employee assessment based on the criteria that have been determined each weight of importance to the method Analytic Process and behaviorally Anchor Hierarhcy Rating Scale which is used to overcome the problem of subjective assessment employee performance to be more objective. By using these two methods are expected to solve the problem of assessment of employees at PT. Kupu-Kupu Taman Lestari, so that a more objective assessment, recorded, measured and employee motivation.

1. Introduction

Human resources is one important element to support the company's operations for human resources in charge of moving the other resources that exist in the company to achieve its goals. Companies must develop and retain the human resources with the ideal performance for the company. The human resources management process should begin with identifying the employee's performance for each period. Rate the performance of a challenge for the company to produce an objective assessment for employees. PT. Kupu Kupu Taman Lestari is a recreational park that preserve the diverse butterfly species which is located on Jl. Batukaru, Dusun Sandan Lebah, Sesandan village of Tabanan, Bali. The park is also exhibiting various types of insects such as beetles, grasshoppers, tarantulas and scorpions. As a company that prioritizes service in providing recreational park facilities, the company is very focused on maintaining the performance of employees for the sake of quality human resources. Increased HR bekualitas become one of its missions in order to improve services to visitors. Employee performance appraisal process at PT. Kupu-Kupu Taman Lestari, performed every 3 months. Since 2014 the company is not able to access the performance appraisal system that has been previously owned. Employee performance evaluation is needed by management to determine promotion and performance benefits of employees. Current conditions do not have good instruments for assessment. Assessment is still limited presence and complaints from visitors. Therefore it takes a computer-based decision support system for managing employee performance appraisal data PT. Kupu-Kupu Taman Lestari.

Decision Support System is a set of procedures based on the model, which is used as the data and considerations to assist managers in making decisions[1], DSS can be done by comparing a number of criteria one of which is using Analytical Hierarchy Process (AHP). AHP is a decision support models developed by Thomas L. Saaty, which outlines the multi-factor problem or a complex multi-criteria into a hierarchy[2], By using AHP, the existing problems can be described by the same criteria with a hierarchical system. Employee Performance Assessment by AHP application in the reward system has

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been successfully performed on automotive service company[3], In this article apply the AHP was developed by adding a performance assessment method commonly applied in the industrial world that is behaviorally Anchor Rating Scale (BARS)[4]. BARS is an assessment method that combines behavioral approach to work with a personal nature. BARS method consists of a series, 5 to 10 vertical behavior scale for each indicator of performance [5].

Several studies have previously stated, BARS can be juxtaposed with the AHP in data processing of employee performance value[5][6], But in the study, the calculation does not apply technology-based programming languages and databases. So that data is not managed dynamically. In this article proposes a combination of AHP and BARS to build a web-based application with a database. The combination is done by BARS as an outcome criterion value of each employee's performance. Weighting criteria is done by AHP. This article consists of several sections: the introduction, the second section of the theory of AHP, the third section of the BARS, the fourth section is the proposed method, results and discussion session of the fifth, and the sixth session is concluded.

2. Theory

2.1 Analytical Hierarchy Process (AHP)

Analytical Hierarchy Process (AHP) is a decision support models developed by Thomas L. Saaty, a mathematician[7], AHP is used to describe the problems with the multi-criteria approach to hierarchical structure. Hierarchical structure based on the criteria established by stakeholders based on several considerations to be weighted priority[2].Terdapat steps in the use of AHP[8] :

a. Define problems and specify the desired solution.
b. Creating a hierarchical structure of a comprehensive viewpoint.
c. Creating a pairwise comparison matrix to contribute to or influence any relevant elements on each of the criteria which are equivalent effect thereon. In this matrix, the pairs of elements compared with respect to a higher-level criteria.
d. Synthesize data in pairwise comparison matrix to obtain the priority of each element of the hierarchy.
e. Test the consistency of the priorities that have been obtained.
f. Perform the above steps for each level of the hierarchy.
g. Using hierarchical composition for weighting vectors with weights priority criteria and add up all the priority value that has been given weight earlier with a priority value of the next lower level and so on. The result is a comprehensive priority vector for the bottom level of the hierarchy.
h. Evaluate consistency for the entire hierarchy by multiplying each index consistency with the priorities of the relevant criteria and summing the results of time. This result is then divided by similar statements using random consistency index (random) corresponding to the dimensions of each matrix. Hierarchy consistency ratio (CR) must not be more than 10%, if more than 10% then the process should be improved.

AHP hierarchy established based on human perception that is represented in the form of the priority value of predetermined criteria. Priority criteria are determined based on a numerical analysis criteria comparison matrix. Here's an example of matrix data comparison criteria:

TABLE 1
COMPARISON MATRIX BETWEEN A PAIR OF CRITERIA

C	A1	A2	A3	Priority vector
A1	1	2	3	PV1
A2	1/2	1	2	Pv2
A3	1/3	1/2	1	Pv3
Total	ΣA1	ΣA2	Σ2	λmax

The numerical values are subjected to a comparison in Table 1 was obtained from a comparative scale created by Saaty and Vargas [7]are shown in Table 2.

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TABLE 2
SCALE VALUE COMPARISON

Importance	Definition	Information
1	equally Important	Both elements have the same effect
3	Slightly More Important	Experience and judgment slightly favoring one element compared to her partner
5	More important	Very favoring experience and judgment to the elements as compared with spouses
7	Very important	One element is preferred and practically very real dominance compared with elements partner.
9	Absolute More Important	One element of absolute proven preferable to partners at the highest confidence level
2,4,6,8	Middle value	Ratings given if there is any doubt between two adjacent votes
reverse	An = 1 / An	

The purpose of the calculations in Table 1 is to get priority vector is the value of the weight of each criterion. Priority calculation vector calculated by summing the value of each priority criterion in normalization matrix (Table 3).

TABLE 3
NORMALIZATION MATRIX

C	A1	A2	A3	Priority vector
A1	1 / ΣA1	2 / ΣA2	3 / ΣA3	PV1
A2	1/2 / ΣA1	1 / ΣA2	2 / ΣA3	Pv2
A3	1/3 / ΣA1	1/2 / ΣA2	1 / ΣA3	Pv3
Total	ΣA1	ΣA2	ΣA3	λ_{max}

$$Pv1 = \frac{\frac{1}{\sum A1}+\frac{2}{\sum A2}+\frac{3}{\sum A3}}{n} \quad (1)$$

$$Pv2 = \frac{\frac{1/2}{\sum A1}+\frac{1}{\sum A2}+\frac{2}{\sum A3}}{n} \quad (2)$$

$$Pv3 = \frac{\frac{1/3}{\sum A1}+\frac{1/2}{\sum A2}+\frac{1}{\sum A3}}{n} \quad (3)$$

Where
n = number of criteria

After determining the priority value in pairwise matrix (Table 3) further calculation consistency ratio (CR). To calculate the CR values that need to be calculated is the consistency index (CI) of the formula 5 and the random index (RI).

$$CR = \frac{CI}{RI} \quad (4)$$

$$CI = \frac{\lambda max - n}{n-1} \quad (5)$$

$$\lambda max = (Pv1 x \sum A1) + (Pv2 x \sum A2) + (Pv1 x \sum A3) \quad (6)$$

Random value index (RI) was determined according to the size of the matrix used[9][10], In this journal article criteria used was 5, so that the RI value used is 1:12.

2.2. Anchor behaviorally Rating Scale (BARS)

Anchor behaviorally Rating Scale (BARS) is one method of implementing the performance

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appraisal scale. BARS illustrate the scale on employee performance ratings of good and bad. Assessment on the BARS combines behavioral approach to work with a personal nature. Each dimension compiled ratings of 5 to 10 anchor, ie behavior that show the performance for each dimension. Anchor arranged from highest value to the lowest value[5]Generally BARS developed melaluiserangkaian meeting attended olehmanajer and incumbent yangmencakup three stages as follows[6]:

1) The manager and holder dimensions jabatanmengidentifikasi yangrelevan job.
2) The manager and the incumbent menulisdasar masingdimensi behaviors for each job. A total mungkindasar (anchor) must be written albeit from each dimension.
3) The manager and the incumbent meraihsuatu consensus with regard to the statement danpengelompokan nilaiskala to use basic (anchor) for each value of the scale.

3. Proposed Method

Decision support system proposed in this article is built based website and relational database management system MySQL. There are two stages in the system is built, namely the establishment phase and phase weighting criteria for employee performance evaluation.

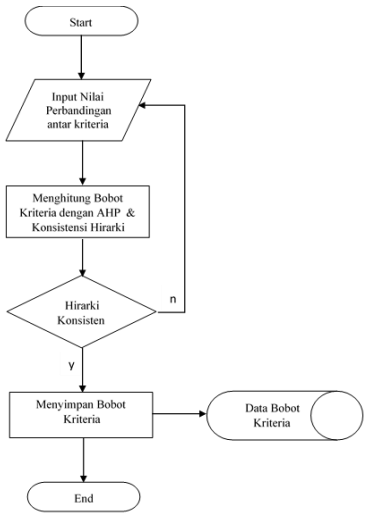

Fig. 1. Flowchart Weighting Criteria

Figure 1 shows the flow of data weighting criteria formation. The user enters a value comparison between the criteria and the system calculates the value of the consistency of the hierarchy of criteria. If the value generated by the system in accordance with the standard value hierarchy consistency, then the weight value stored in the data weighting criteria criteria. Data weighting the criteria established for the calculation of employee performance evaluation requirements. At this stage of the establishment of criteria weights, the criteria used were based approach BARS method. BARS criteria established by the policy enacted by the company PT. Kupu-Kupu Taman Lestari. Table 4 shows the employee performance evaluation criteria set by the company.

TABLE 4
EMPLOYEE PERFORMANCE ASSESSMENT CRITERIA

No.	Criteria
1	Presence
2	Service
3	Obedience
4	Cooperation
5	control of Emotions

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Predetermined criteria and then calculating the weight of priority. Priority weight determined in accordance with the value of the comparison in Table 2. Here is a comparison table of the performance assessment criteria of priority:

TABLE 5
CRITERIA COMPARISON MATRIX

Criteria.	Presence	Service	Obedience	Cooperation	control of Emotions
Presence	1				
Service		1			
Obedience			1		
Cooperation				1	
Control					1

The data in Table 5 and then implemented on the system to calculate the weight of criteria based weight calculation criteria with AHP. After the specified criteria and weighting criteria, then the system stores the data weighting criteria for calculation needs a support system keputusan.Figure 2 shows the process flow calculation on the performance appraisal decision support system with AHP and BARS. In the process of calculating the election anchor or rating scale criteria of each employee.

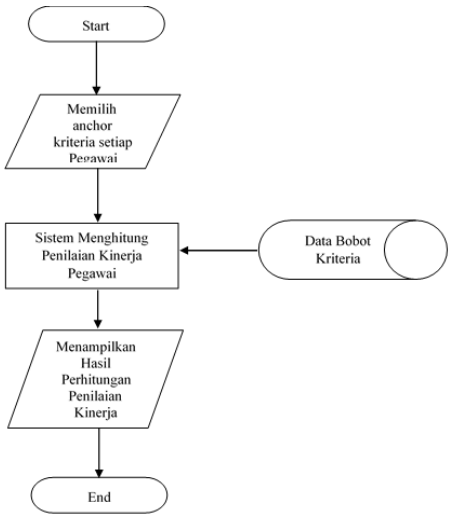

Fig. 2. Calculation of Performance Assessment Flowchart

In the BARS method thing to note is the formation of an anchor for each criterion. Each criterion is shown in Table 4. The anchor compiled as a reference assessment of each criterion. In this article the number of anchors used by each criterion is 5 anchor. The following table is an anchor and a rating scale to each criterion.

TABLE 6
SCALE ASSESSMENT CRITERIA ATTENDANCE

Criteria	Scale	Information
Presence	1	Absentee rate above 50%
	2	Absentee rate above 30%
	3	Absentee rate above 15%
	4	Absentee rate below 5%
	5	Absenteeism 0%

TABLE 7
SCALE RATINGS SERVICES CRITERIA

Criteria	Scale	Information
Service	1	The presence of 10 or more complaint from visitors
	2	The presence of 5 or more complaint from visitors

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	3	The presence of three or more complaint from visitors
	4	The presence of 1 to 2 complaint from visitors
	5	No complaint from visitors

TABLE 8
SCALE ASSESSMENT CRITERIA COMPLIANCE

Criteria	Scale	Information
Obedience	1	Do not follow the rules violations or work procedures more than 10 times
	2	Do not follow the rules violations or work procedures as much as 7 to 10 kalidari visitors
	3	The presence of three or more Doing violations of the rules or do not follow work procedures as much as 3 to 6 times
	4	The presence of 1 to 2 Conduct breach of the rules or do not follow work procedures as much as 1 to 2 times
	5	No violations of the rules and always follow work procedures

TABLE 9
COOPERATION CRITERIA ASSESSMENT SCALE

Criteria	Scale	Information
Cooperation	1	Complaints from other employees as much as 7-10 times
	2	Complaints from other employees as much as 4-6 times
	3	Complaints from other employees as much as 2-3 times
	4	Complaints from other employees 1 times
	5	The absence of complaints from other employees

TABLE 10
SCALE ASSESSMENT CRITERIA CONTROL EMOTIONS

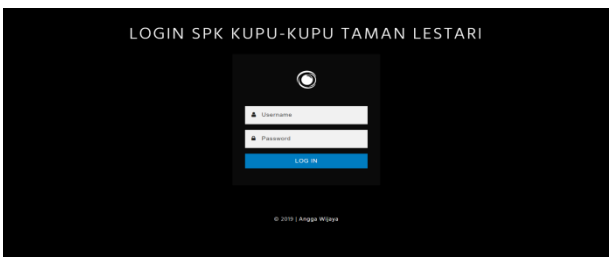
Criteria	Scale	Information
control of Emotions	1	There is a problem with visitors or with other employees more than 8 times
	2	There is a problem with visitors or with other employees from 6 to 8 times
	3	There is a problem with visitors or with other employees from 3 to 5 times
	4	There is a problem with visitors or with other employees of 1 or 2 times
	5	The absence of problems with visitors or with employees

Calculation of the final value of each employee is to calculate the rating scale value / anchor each employee on the criterion of the weight criteria. The weight of the criteria used in the calculation is the weighted criteria that have met the conditions of consistency hierarchy. Here is the formula of calculating the value of each employee's performance criteria:

$$nilai = \Sigma(bobot\ kriteria\ X\ Nilai\ rating\ scale) \quad (7)$$

4. Result and Discussion

Decision support system of employee performance ratings built with PHP programming language and MySQL database management system. Web-based systems approach is used so that the future can be accessed remotely to the needs of the decision maker. The system is designed to manage employee data and dynamic performance assessment.



Fig, 3. Page Login

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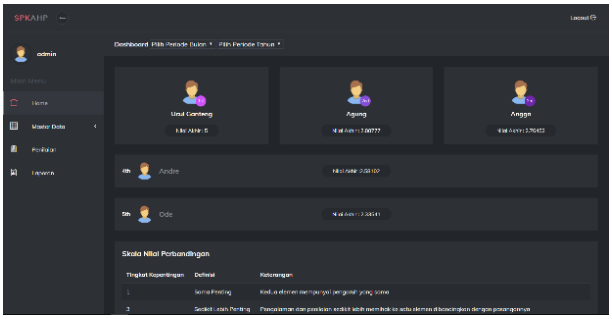
Figure 3 shows the login page views on the system. The login page is the first page that is accessed by the user. On this page the user enters a username and password.Halaman Dashboard (Figure 4) is the main page after successfully logging into the system. On this page there are information includes ranking the top 5 executive officers, scale comparison criteria, and weighting of each criterion.

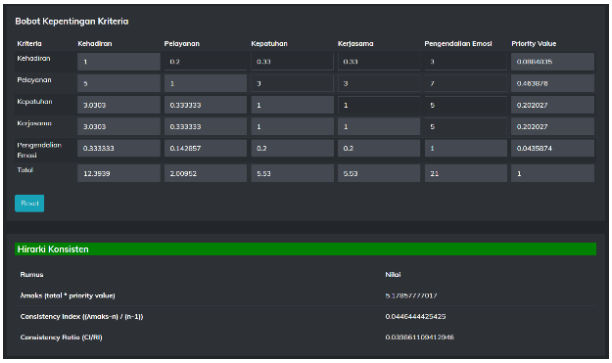


Fig, 4. Page Dashboard

In the system established criteria weighting of data can be managed according to the needs and corporate policies. Figure 5 shows the pages to determine the weight of the interests of users. Users on this page selecting priority values on a couple of criteria.

Fig, 5. Manage Data Weight Interests Criteria

After determining the priority of the tide criteria, then the system will calculate the priority vector (PV), consistency index (CI), and the consistency ratio (CR). Direct system provides information on the consistency Hierarcy by checking the consistency minimum value Hierarcy with CR. Such information can be seen in Figure 6.



Fig, 6. Consistency Index Calculations by System

After setup criteria carried weight as shown in Figure 5 and 6, the system stores the data weighting criteria for the assessment process. Setup weighting of criteria only when there is a change of policy on

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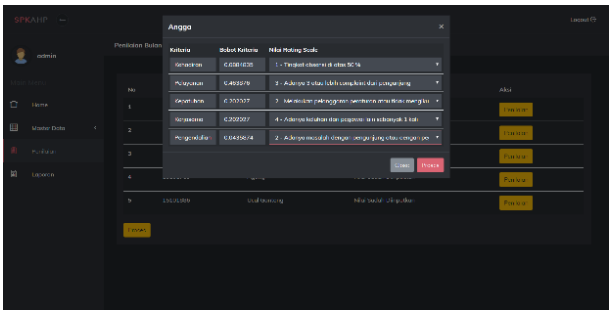
the company's weighting criteria. Figure 7 shows a list of employees who will do the assessment. Users enter a rating scale anchor on each criterion for each employee.

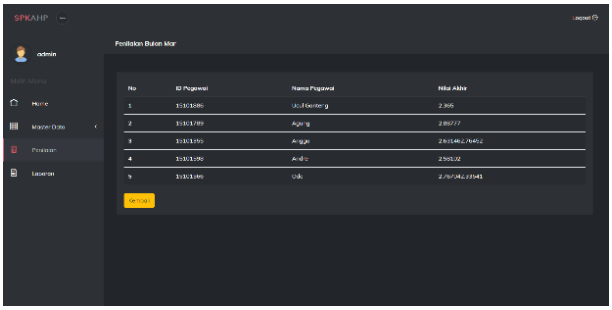
Fig. 7. List of Employee Performance Appraisal Process with AHP and BARS

The process of selecting an anchor or rating of each criterion is shown in Figure 8. The user selects the anchor provided in accordance database prepared beforehand on the system.



Fig, 8. Selection Criteria Anchor BARS Every Employee

The result of the final calculation of the decision support system that is built is shown in Figure 9. The process of calculation has been done is stored on the database by the system, so it can be accessed by the user to choose the period. Data shown in Figure 9 can be printed for reporting needs. The printout is shown in Figure 10.



Fig, 9. Results Assessment Process Decision Support Systems with AHP and BARS

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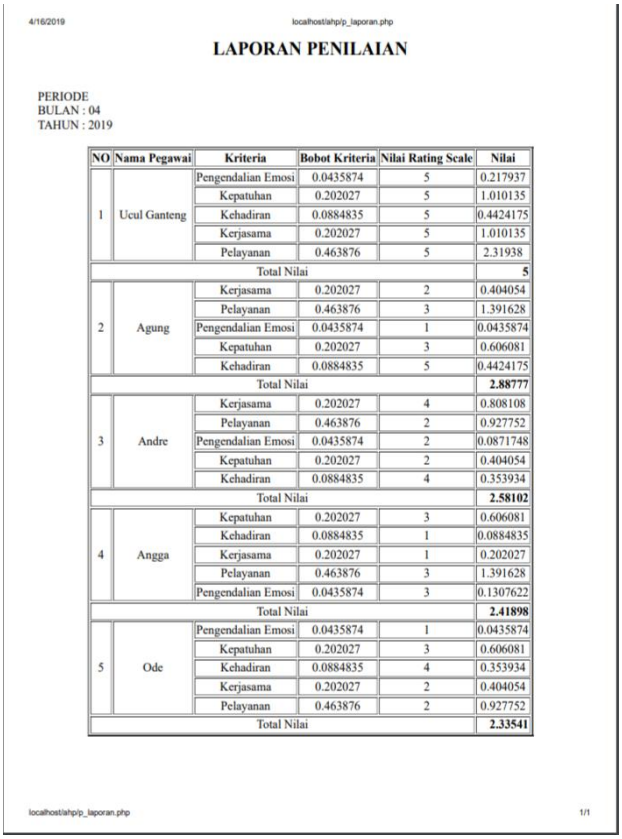

4/16/2019 localhost/ahp/p_laporan.php

LAPORAN PENILAIAN

PERIODE
BULAN : 04
TAHUN : 2019

NO	Nama Pegawai	Kriteria	Bobot Kriteria	Nilai Rating Scale	Nilai
1	Ucul Ganteng	Pengendalian Emosi	0.0435874	5	0.217937
		Kepatuhan	0.202027	5	1.010135
		Kehadiran	0.0884835	5	0.4424175
		Kerjasama	0.202027	5	1.010135
		Pelayanan	0.463876	5	2.31938
Total Nilai					**5**
2	Agung	Kerjasama	0.202027	2	0.404054
		Pelayanan	0.463876	3	1.391628
		Pengendalian Emosi	0.0435874	1	0.0435874
		Kepatuhan	0.202027	3	0.606081
		Kehadiran	0.0884835	5	0.4424175
Total Nilai					**2.88777**
3	Andre	Kerjasama	0.202027	4	0.808108
		Pelayanan	0.463876	2	0.927752
		Pengendalian Emosi	0.0435874	2	0.0871748
		Kepatuhan	0.202027	2	0.404054
		Kehadiran	0.0884835	4	0.353934
Total Nilai					**2.58102**
4	Angga	Kepatuhan	0.202027	3	0.606081
		Kehadiran	0.0884835	1	0.0884835
		Kerjasama	0.202027	1	0.202027
		Pelayanan	0.463876	3	1.391628
		Pengendalian Emosi	0.0435874	3	0.1307622
Total Nilai					**2.41898**
5	Ode	Pengendalian Emosi	0.0435874	1	0.0435874
		Kepatuhan	0.202027	3	0.606081
		Kehadiran	0.0884835	4	0.353934
		Kerjasama	0.202027	2	0.404054
		Pelayanan	0.463876	2	0.927752
Total Nilai					**2.33541**

localhost/ahp/p_laporan.php 1/1

Fig. 10. Print Results Assessment Decision Support Systems with AHP and BARS

5. Conclusion

In this article has constructed a web-based decision support system with AHP and BARS. The system is built with a MySQL database that has a history of data that can be printed back. The criteria for assessment on the BARS decision support system is determined based on the needs of enterprises and expert judgment on the part of Human Resource Management Company. Anchor specified for each criterion as much as 5 anchor at the discretion of the company. Priority value for each criteria: attendance (0:09); services (0.46); liveliness (0.20); cooperation (0.20), and the control of emotions (0:04) which meets the standards Consistency Hierarcy. The next development in this study can be developed in the analysis of employee performance appraisal history to predict employee churn rate.

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