The 3rd International Seminar On EDUCATION and TECHNOLOGY – ISET
Collaborative Graduate Schools Conference

Implementation Of The AHP Method And Decision Table To Determine The Problem Student

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Abstract

So far, the selection of types and weight of student violations is rather difficult to be done by the college. Sometimes a student has a good performance in terms of lectures, but on the other hand less in terms of behavior or attitude compared with other students and vice versa. It is necessary to develop assessment methods to conduct selection and evaluation of the students, especially those indicated problematic to be evaluated and handled in a more structured manner. In this study created a system that produces a system that supports decision-making to determine students who have problems and need attention as well as special guidance objectively. The system is created by using AHP method which is one of the methods in decision support system and decision table which is one method in data mining. The criteria used are value of achievement index, length of study, duration of not active as student, amount of absenteeism, payment of SPP, alcohol use, drugs and fighting. The AHP method is used to determine the weight of each criterion according to the input of the interest ratio. In addition to weight, the results of the AHP method also determine the classification of actions for problem students. Decision table generates referrals according to the classification produced by the AHP method. The system can describe the AHP process at each step in the form of a matrix so that it can be studied and evaluated the truth of each step on the method used.

Keywords: AHP, Decision Table, Problematic Students.

1. Introduction

Handling of undisciplined behavior or violation of campus rules is carried out in various ways and forms of treatment deemed appropriate to the level and form of the offense. The disciplined form and manner of handling an orderly offense is based on the Analysis of underlying issues and forms of violation. Academic counselors play a large role in guiding students in dealing with various problems. The academic supervisor is obliged to monitor and evaluate the students' learning outcomes that are guided until they are graduated. During college students, academic counselors are obliged to assist students in planning the study program, giving consideration and approval for taking / canceling / adding courses in accordance with prevailing regulations, holding regular meetings with their guidance students, giving advice to students who have difficulty in learning process or Non academic as far as his ability, giving recommendation to the head of study program if problems arise outside of his authority, giving educative warning to their guidance students and giving report periodically to the head of study program to all academic process of their guidance students.

So far, the selection of types and weight of student violations is rather difficult to be done by the college. Sometimes a student has a good performance in terms of lecture process but on the other hand less in terms of behavior or attitude compared with other students and vice versa. In determining the level of Student Abuse is still done manually and without using the method with one indicator only that is seen from the learning results without looking at the learning process, so that often mistakes in determining the student who has the highest level of violation or study problems. Therefore, it is necessary to develop assessment method to conduct selection and evaluation on student performance especially for students who indicated problematic in order to do evaluation and handling in more structured.

Decision Support Systems are widely used for optimization and effectiveness in making decisions in various fields, such as optimizing logistics services (Zhi and Zhao, 2014), performance effectiveness assessments (Tal, 2014) and the effectiveness of financial predictions (Michael and Constantin, 2014). Research entitled Application of the AHP Method in Modeling the Trust and Reputation of Software Agents (Mariusz Zytniewski cs, 2015) is proposed to expand the underlying conceptual basis by including such notions as self-trust and social trust, and to apply these to software agents. The discussion is concluded with an account of an experiment aimed at testing the effectiveness of the proposed solution. This paper offers an enhancement to existing trust and reputation models, involving the application of the AHP method that is widely used for decision support in social systems, notably for risks analysis. Paper titled An AHP-Derived Method For

Mapping The Physical Vulnerability Of Coastal Areas At Regional Scales (G. Le Cozannet et al, 2013), using an AHP-derived method, evaluated and mapped physical vulnerability to erosion and submersion at regional scales, in two different settings. This paper said than The main strength of the method is its ability to convert expert opinions into numerical values and to integrate quantitative and qualitative knowledge and data in a structured way.

The system created in this study uses eight criterias in determining the student problem. Some of the criterion data is taken from an already running system so there is no need to enter data manually. Systems created using AHP and decision table methods to generate problem students. The AHP method is used to determine the weight of each criterion according to the input of the interest ratio. In addition to weight, the results of the AHP method also determine the classification of actions for problem students. Decision table generates referrals according to the classification produced by the AHP method.

2. Methods

The type of research to be conducted is applied research (applied research). This research procedure begins by identifying problems and then analyze the problems in the system consisting of determining the criteria of problem students, grouping and ranking the types of decisions, determining the weight of the criteria of students with problem AHP method, so get the order of priority of problem students. The next step is to analyze the system design and drawing conclusions from this research. Conceptual framework of research can be seen in Figure 1.

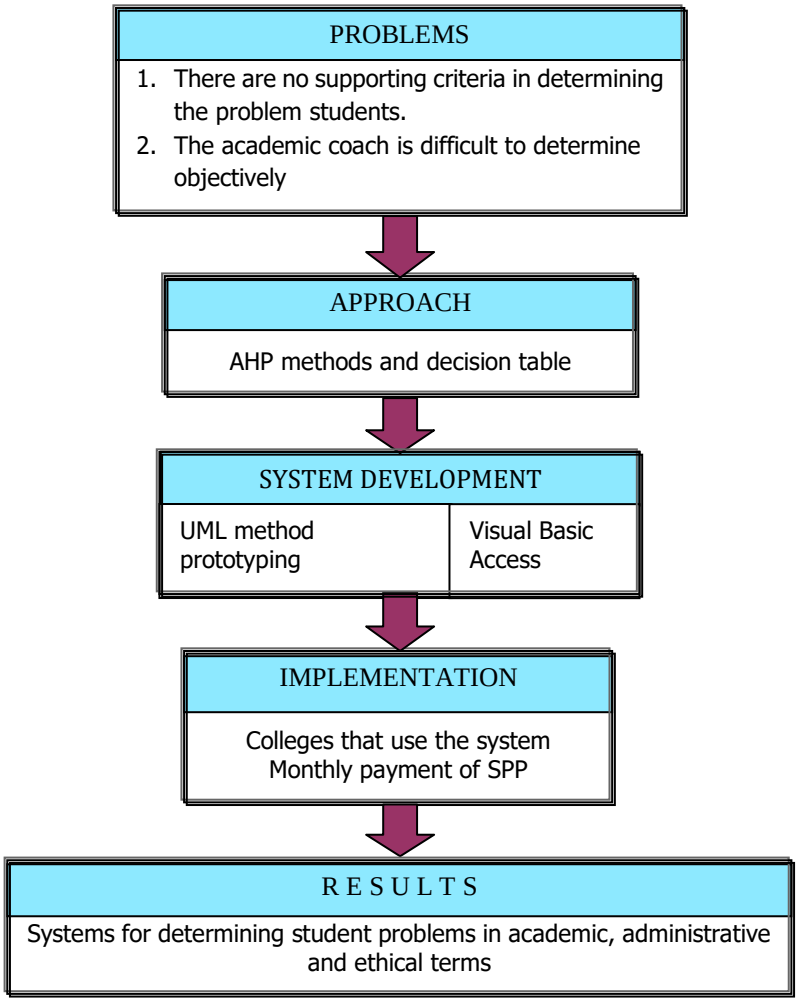


Figure 1. Conceptual Research Thinking Framework

The determination of the problem students can be seen in Figure 2.

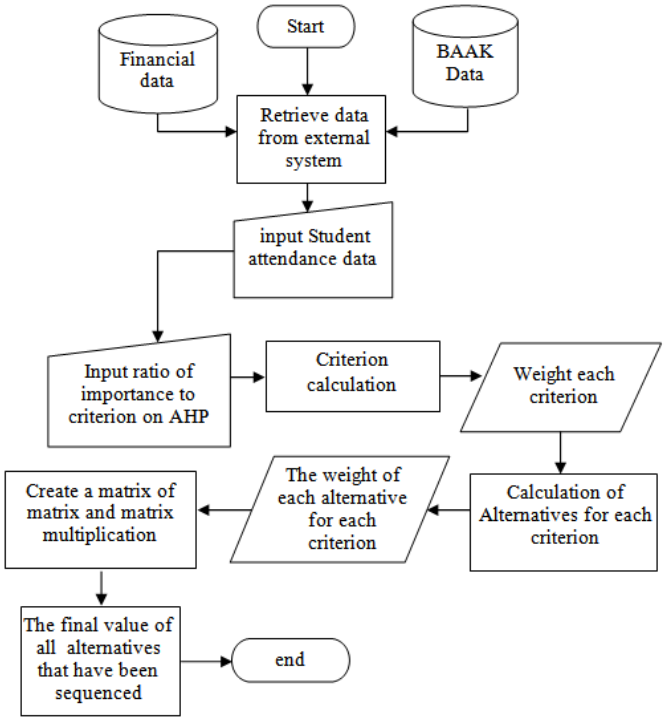


Figure 2. Data Flow of Student Handling System Problems

3. Results

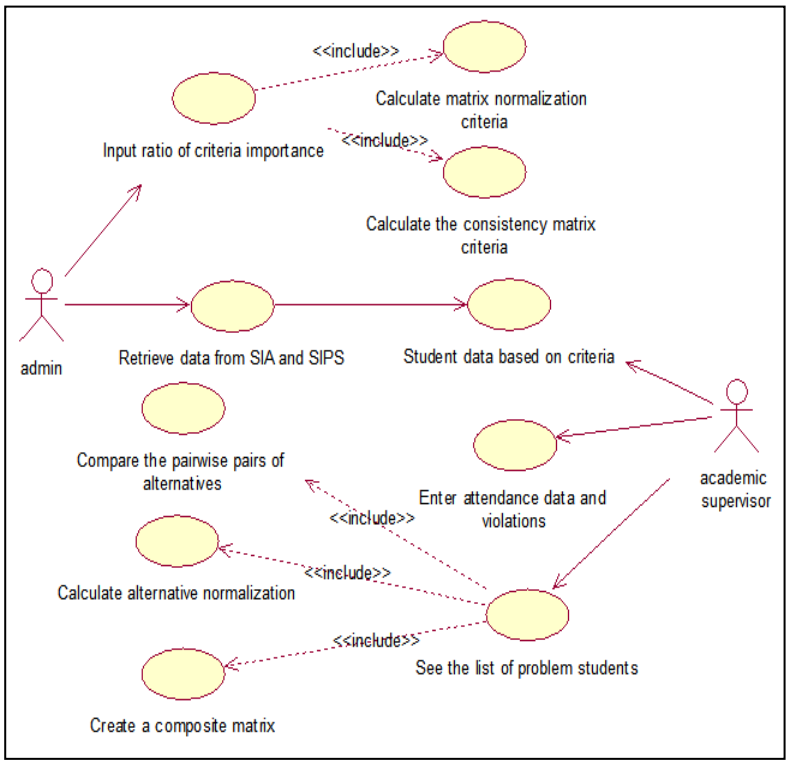
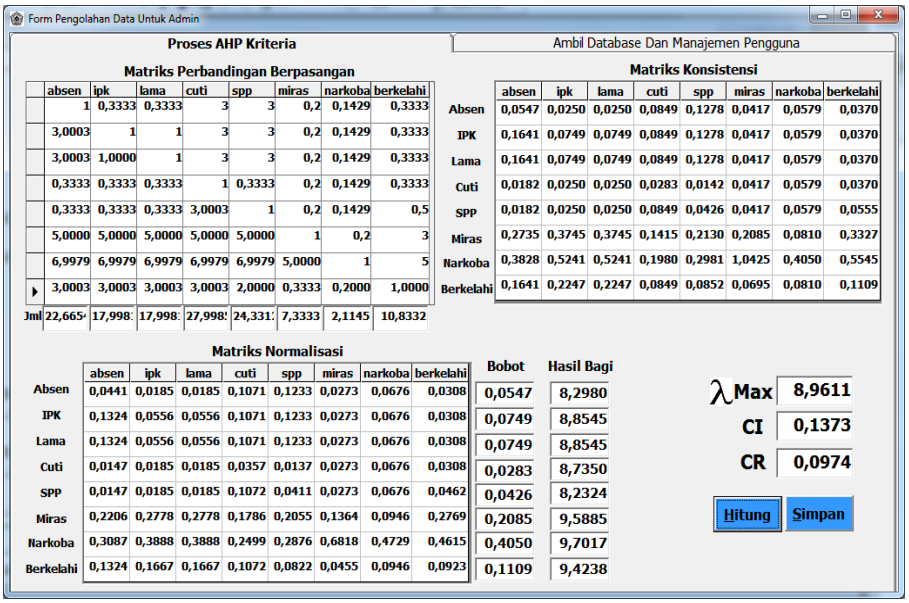


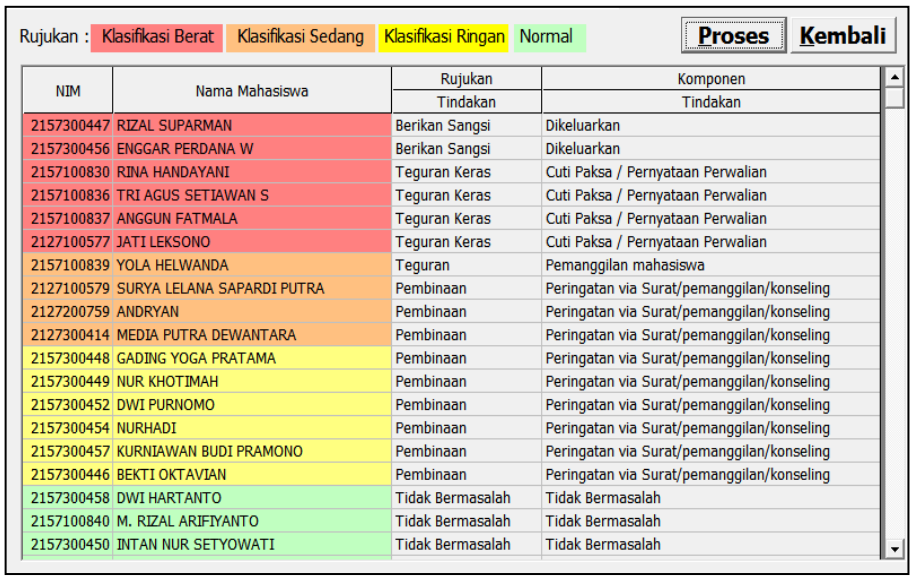
Figure 3. Use Case Diagram

Use case diagram explains how the interaction of each factor relates to the system being created. There are two actors namely academic supervisor and Admin who became users in this system. Module retrieve data from SIA and SIPS serves to retrieve data from academic information system and SPP payment system used in process on AHP method that is process for alternative (student) from calculate interest ratio, normalization matrix to produce weight of each student. Module Enter attendance data and violations serves to enter the data violation and student attendance used in the process of calculating AHP for each alternative of each criterion. Figure 3 is a use case diagram of the created system.



The AHP process display to define the criteria weight appears in Figure 5 The first admin includes the interest ratio of the first matrix (pairwise comparison matrix) and then by pressing the calculate button then the calculation to create the normalization matrix until the consistency ratio value will appear automatically according to the AHP process calculation.

Figure 5. The Process of Calculating the Criteria Weights



NIM	Nama Mahasiswa	Rujukan Tindakan	Komponen Tindakan
2157300447	RIZAL SUPARMAN	Berikan Sangsi	Dikeluarkan
2157300456	ENGGAR PERDANA W	Berikan Sangsi	Dikeluarkan
2157100830	RINA HANDAYANI	Teguran Keras	Cuti Paksa / Pernyataan Perwalian
2157100836	TRI AGUS SETIAWAN S	Teguran Keras	Cuti Paksa / Pernyataan Perwalian
2157100837	ANGGUN FATMALA	Teguran Keras	Cuti Paksa / Pernyataan Perwalian
2127100577	JATI LEKSONO	Teguran Keras	Cuti Paksa / Pernyataan Perwalian
2157100839	YOLA HELWANDA	Teguran	Pemanggilan mahasiswa
2127100579	SURYA LELANA SAPARDI PUTRA	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2127200759	ANDRYAN	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2127300414	MEDIA PUTRA DEWANTARA	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300448	GADING YOGA PRATAMA	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300449	NUR KHOTIMAH	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300452	DWI PURNOMO	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300454	NURHADI	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300457	KURNIAWAN BUDI PRAMONO	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300446	BEKTI OKTAVIAN	Pembinaan	Peringatan via Surat/pemanggilan/konseling
2157300458	DWI HARTANTO	Tidak Bermasalah	Tidak Bermasalah
2157100840	M. RIZAL ARIFIYANTO	Tidak Bermasalah	Tidak Bermasalah
2157300450	INTAN NUR SETYOWATI	Tidak Bermasalah	Tidak Bermasalah

The student identity of the red block is included in the weight classification, the orange color is a moderate classification whereas the yellow color is still a mild classification. To see the details of the violation that has been done by a student then the lecturer simply double click on the desired student data. Details of violations from students.

Figure 6. List of Student Problematic Recommendations Of The System

4. Discussion

		2.29	2.82	3.54	2.28	3.49	3.48	2.33	2.53
		2127100577	2127100579	2127200759	2127300414	2157100830	2157100836	2157100837	215710083
2.29	2127100577	1,0000	0,8121	0,6469	1,0044	0,6562	0,6580	0,9828	0,9051
2.82	2127100579	1,2314	1,0000	0,7966	1,2368	0,8080	0,8103	1,2103	1,1146
3.54	2127200759	1,5459	1,2553	1,0000	1,5526	1,0143	1,0172	1,5193	1,3992
2.28	2127300414	0,9956	0,8085	0,6441	1,0000	0,6533	0,6552	0,9785	0,9012
3.49	2157100830	1,5240	1,2376	0,9859	1,5307	1,0000	1,0029	1,4979	1,3794
3.48	2157100836	1,5197	1,2340	0,9831	1,5263	0,9971	1,0000	1,4936	1,3755
2.33	2157100837	1,0175	0,8262	0,6582	1,0219	0,6676	0,6695	1,0000	0,9209
2.53	2157100838	1,1048	0,8972	0,7147	1,1096	0,7249	0,7270	1,0858	1,0000

To calculate the comparison value for the GPA criteria is the row value divided by the column value. To fill in the columns the first two rows are derived from first row IPK (2.29) divided by GPA of second column (2.82) to 2.29 / 2.82 = 0.8120567 rounded to 0.8121.

Figure 7. Alternative Matched Matter of Alternative Criteria GPA

Table 1. Weight Criteria

Kriteria	Bobot
Absen	0,0547
IPK	0,0749
Lama	0,0749
Cuti	0,0283
SPP	0,0426
Miras	0,2085
Narkoba	0,4050
Berkelahi	0,1109

Table 2. Alternative Weight For Each Criterion

Nim	Absen	IPK	Lama	Cuti	SPP	Miras	Narkoba	Berkelahi
2127100577	0,0294	0,0547	0,0073	0,1515	0,0645	0,0400	0,1071	0,0385
2127100579	0,0294	0,0444	0,0073	0,0909	0,0323	0,0400	0,0357	0,0385
2127200759	0,0294	0,0354	0,0073	0,1515	0,1129	0,0400	0,0357	0,0385
2127300414	0,0588	0,0549	0,0073	0,0303	0,0806	0,0400	0,0357	0,0385
2157100830	0,0588	0,0359	0,0511	0,0303	0,0161	0,0400	0,0714	0,0385
2157100836	0,0882	0,0360	0,0511	0,0303	0,0323	0,0400	0,0714	0,0385
2157100837	0,1765	0,0537	0,0511	0,0303	0,0161	0,0400	0,0714	0,0385
2157100838	0,0294	0,0495	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157100839	0,0294	0,0645	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157100840	0,0294	0,0368	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157300446	0,0294	0,0427	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300447	0,0294	0,0390	0,0511	0,0303	0,0161	0,0400	0,0357	0,1538
2157300448	0,0294	0,0436	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300449	0,0294	0,0449	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300450	0,0294	0,0377	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157300451	0,0294	0,0410	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157300452	0,0882	0,0390	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300453	0,0294	0,0362	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157300454	0,0294	0,0399	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300455	0,0294	0,0467	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385
2157300456	0,0294	0,0403	0,0511	0,0303	0,0161	0,1200	0,0357	0,0385
2157300457	0,0294	0,0427	0,0511	0,0303	0,0806	0,0400	0,0357	0,0385
2157300458	0,0294	0,0405	0,0511	0,0303	0,0161	0,0400	0,0357	0,0385

To find an alternative weight with NIM 2127100577 by means of all the criterion value of the property is multiplied by the weight of the criteria.
0,0294 x 0,0547 + 0,0547 x 0,0749 + 0,0073 x 0,0749 + 0,1515 x 0,0283 + 0,0645 x 0,0426 + 0,0400 x 0,2085 + 0,1071 x 0,4050 + 0,0365 x 0,1109 = 0,069066 rounded 0,0691.
To find an alternative weight with NIM 2127100579 by means of all the criterion value of the property is multiplied by the weight of the criteria.
0,0294 x 0,0547 + 0,0444 x 0,0749 + 0,0073 x 0,0749 + 0,0909 x 0,0283 + 0,0323 x 0,0426 + 0,0400 x 0,2085 + 0,0357 x 0,4050 + 0,0385 x 0,1109 = 0,036506 rounded 0,0365.
The way of calculation as above is forwarded to the last alternative (2157300458).

Table 3. Decision Table

clasification	Reference	Atribut							
		A	I	L	C	S	M	N	B
Grave	Sanction						>1	>1	>2
	Stern warning						1	1	1
Medium	Stern warning	>6	<1.5	>8					
	Warning	>4	<2	8					
	Coaching	>2	<2.5	7					
Light	Coaching				>2	>3			
	Dispensation				>0	>1			

To determine the reference the action is made using the decision table. There are three classifications of problem students that are grave classification in the form of non academic problems and academic problems. Non academic problems consist of fighting, alcohol and drugs. Academic problems that include the medium classification are absenteeism, GPA and study period while which include light classification is college leave and SPP.

Table 4. Action Components

Klasifikasi	Rujukan	Tindakan	Kondisi
Berat	Berikan sangsi	Dikeluarkan	B>2*K
	Teguran keras	Cuti Paksa / Pernyataan Perwalian	B>1.5*K
	Teguran keras	Cuti Paksa / Pernyataan Perwalian	B>2.5*K
Sedang	Teguran	Pemanggilan mahasiswa	B>2*K
	Pembinaan	Peringatan via Surat/pemanggilan/konseling	B>1.7*K
Ringan	Pembinaan	Peringatan via Surat/pemanggilan/konseling	B>1.5*K
	Dispensasi	Jaminan Sanggupan/Tanggungjawab	B>1.3*K

After the reference is known, the next step determines the component of the action. Determination of action component is done by using AHP method. From the weight of all alternatives or students for each criterion then searched for the lowest value then compared with the corresponding weight value. The conditions for determining the component of action can be seen in the table 4.

5. Conclusions

The system design step begins with creating a system flow diagram developed, modeling the system using UML method that includes making use case diagrams, activity diagrams, class diagrams. Creating the interface design of input, process and output required and database design for tables to be used as well as relationships between existing tables. GPA data, leave and study length can be known by taking data from external system that is Academic Information System while data arrears payment of SPP taken from SPP Payment Information System. Violation data in the form of attendance data, fighting, drugs and alcohol are entered manually by academic counselors.

The use of AHP that gives the ratio of the importance of each criterion and generates an eigenvalue which is subsequently used in the process of calculating the weight of all existing criteria for each of the criteria and alternatives. Decision tables are created to determine the classification and referrals for problem students. Of the AHP method and decision table generated list of problem students according to the classification also referrals for them.

6. References

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