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Architectural Design Of Information Systems Decision Support Of Lecturer Performance Assessment With Promethee Method (Case Study: Stmik Dci)

Andri Sukmaindrayana

Teknik Informatika, STMIK DCI, Indonesia

E-mail: sukmaindrayana@gmail.com

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ABSTRACT

Lecturer performance evaluation activities are a college routine in improving internal quality on an ongoing basis. STMIK DCI Tasikmalaya currently does not routinely evaluate the performance of lecturers, implementing the university's tri dharma activities and other tasks. This study aims to design an information system architecture that supports a performance appraisal decision based on the criteria and sub-criteria of the assessment as a performance appraisal variable using the Prometheus method, where each criterion and sub-criteria, the assessment factors and alternatives, in this case, the lecturers are compared with one another to provide an output value of net flow and ranking that provides an assessment of each Lecturer's performance. This decision support information system helps in processing lecturer data, processing data on assessment criteria and sub-criteria, and processing assessments and processes using the Prometheus method. This is useful to facilitate decision-makers in assessing the Lecturer's performance so that the achievement value of the Lecturer's performance will be obtained. By using an object-oriented system design method, namely RUP (Rational Unified Process), which is iterative, and UML (Unified Modeling Language), which is used as a tool, The results of this study are in the form of a decision support information system architecture model and the implementation of its application using the MySQL database type and the Delphi programming language.

1. Introduction

Lecturers' execution examination in a college is a movement to assess the presence of every speaker in the college. As a general rule, the advantages of evaluating the presentation of speakers include: (1) dealing with the association's tasks really and effectively through maximally persuading faculty; (2) aiding dynamic connected with staff grants; (3) recognizing faculty needs and improvement; (4) gives a premise to conveying awards (Watrianthos et al., 2021). STMIK DCI Tasikmalaya is one of the colleges in West Java, where the presentation evaluation process for every speaker is completed each period, specifically toward the finish of every semester (odd-even). The appraisal cycle incorporates the evaluation of speakers by understudies, instructors' discipline in giving talks, a portion of time in educating, most recent schooling, academic positions, and logical works created per period by every teacher. The aftereffects of this presentation appraisal will be utilized as assessment material to develop execution further, and every speaker chosen as the instructor with the best exhibition will be honored.

To help the evaluation cycle, a framework is required to uphold speaker execution examination choices. Choice Support System is essential for a PC-based data framework that is utilized to help dynamic in an association or company (Yilmaz & Dağdeviren, 2011). Choice emotionally supportive networks help

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dynamic in semi-organized and unstructured circumstances. The PROMETHEE technique is one of the strategies in a dynamic framework where a choice can be made all the more rapidly and definitively, as per the ideal measures or, if nothing else, near the ideal rules (Ishizaka et al., 2020). Elective decisions should give a rundown of references to leaders before taking an ultimate choice (Nanayakkara et al., 2020). Direction is done deliberately to deal with issues through the most common way of gathering information into data and adding to the elements that should be viewed in navigation. Direction is selecting alternative actions to achieve specific goals or objectives (Agrawal, 2021). In previous Research on the decision support system for determining employee bonuses using the PROMETHEE method (Zulita et al., 2021). A decision support system has been developed with several criteria and a limited number of employees.

Choice Support System Decision-making to decide the need of provincial unrivaled items as per the necessities and abilities requires a clear and successful choice to not settle on unacceptable decisions and limit misfortunes concerning cost and time. The Weighted Product technique is essential for the Multi-Attribute Decision-Making idea where standardization is required in the computation because the organization has to pick a few things that will become elective decisions and relegate a weight worth the examination of choices and measures (Živković et al., 2017). Choices have become ordinary throughout everyday life. Since it manages issues and arrangements, the meaning of a choice overall is a decision—for example, a decision of at least two prospects. If it is connected with the cycle, the choice is the last condition of a unique interaction named direction. The choice is viewed as an interaction since it comprises a progression of related exercises and is not just an insightful activity (Ningsih et al., 2019).

In this Research, a decision support system design is made that can handle unlimited criteria determination. Quality education is the primary support for achieving Indonesia's quality human development goals. Quality education is not enough to be carried out through the transformation of science and technology but must be supported by increasing the professionalism of the lecturers. The increase in professionalism in question is the increase in the professionalism of lecturers, which significantly affects the success of the educational process. Furthermore, the professionalism of a lecturer is related to the Lecturer's performance in carrying out his duties and obligations as an educator.

Lecturer performance is measured using several criteria, including teaching, research, community service, and internal activities. The results of the assessment and calculation of the performance of the lecturers are in the form of scores or scores of each Lecturer.

Educational institutions such as STMIK DCI Tasikmalaya often require a decision-making system to assess the lecturers' performance, so a decision support system is needed that can determine and produce an assessment of the performance of the Lecturer. *Preference Ranking Organization for Enrichment Evaluation (PROMETHEE)* is one of the decision-making methods that can be used to solve problems regarding the assessment of lecturer performance, especially at STMIK DCI Tasikmalaya.

2. Research Method

2.1 Promethee Method Steps

a. The first step is to assign a value to each criterion and sub-criteria with a percentage weight for each sub-criteria.
b. The second step is to calculate the percentage value of each sub-criteria. The calculation process of this second step is to change each alternative value by multiplying it by the respective weight of each sub-criteria, or written with the formula : Sub-criteria value = value X Sub-criteria Weight Percentage
c. The third step is to calculate the percentage value of the criteria.
   The value obtained from this third step is the result of calculating the percentage value of the sub-criteria in one group of criteria multiplied by the percentage value of the criteria, or in the form of a formula as follows : Criteria Percentage Value = Total Value of Sub Criteria x Percentage of Criteria

In the fourth step, calculating the preference distance for each criterion, there are 2 (two) rules used in calculating the preference value, namely the maximization and minimization rules. The application of the maximization rule to the ordinary criteria preference type consists of two conditions, namely:

1) H (d) has a value of 1 if $d > 0$
2) H (d) has a value of 0 if $d \leq 0$

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Fifth step, the process of calculating the index value and Promethee;

1) Index Value
2) Leaving Flow
3) Entering Flow
4) Net Flow

After the sixth step, the final result is obtained, ranking each alternative Net Flow from largest to smallest. In the seventh step, the conclusion can be determined based on the ranking data above. In the data, there is a Net Flow value that is negative and positive. In addition, in the ranking column, some values are in ascending order of the Net Flow data; these values refer to each alternative.

2.2 Software Used

Borland Delphi 7 is a Windows-based programming language. Delphi 7 can help create various applications that run on the Windows operating system, ranging from a simple program to a client/server or network-based program. Delphi includes applications that can process text, graphics, numbers, databases, and web applications. One .exe file. After the program is designed in an IDE (Integrated Development Environment), Delphi will compile it into a single executable file. Programs created can be directly distributed and run on other computers without the need to include files from outside. This is a very significant advantage.MySQL is a database server program capable of receiving and sending data very quickly, multi-user, and using standard SQL (Structured Query Language) commands. MySQL has two licenses, namely FreeSoftware and Shareware; the MySQL that we usually use is MySQL FreeSoftware which is under the GNU/GPL (General Public License).

2.3 System Analysis Data Requirements

Lecturer data, used as alternative data for each Lecturer to be assessed; Minimum Assessment Limit Data is a reference for the minimum value of the final value obtained by each Lecturer, whether it meets the minimum requirements of the value or not. This data is a natural number with an interval between 0 - 1; Assessment Criteria Data is the name of the assessment group and provides a presentation value of the number of assessment criteria, which, if totaled, reaches 100%. Assessment Criteria data includes aspects, among others : Teaching, this data includes several assessments of teaching and learning activities for each Lecturer; Research, this data is used to provide an assessment of the Research conducted by each Lecturer; Community Service, this data is used to provide an assessment related to the dedication of each Lecturer to the community; Other Task Assessment, this assessment data is a group of other assessments that are relevant to the assessment process regarding the performance of lecturers, taken from routine activities, and are internal to the campus.

Assessment Sub-Criteria Data, these sub-criteria data are part of the criteria data, while this Sub-Criteria Data includes several aspects of the assessment, including: Teaching Criteria include Sub Criteria: (1) Attendance, an assessment of the presence of each Lecturer in the teaching and learning process; (2) Timeliness of submitting midterm exam and final exams questions is an assessment of the obligation of lecturers in submitting midterm exam and final exams questions in terms of timeliness that has been determined at intervals by the exam committee; (3) Timeliness of submitting midterm exam and final exams scores is an assessment of the obligation of lecturers in submitting midterm exam and final exams scores in terms of timeliness that has been determined at intervals by the exam committee; (4) Completeness of teaching, assessment of these sub-criteria regarding the completeness needed in the teaching and learning process, such as Learning Event Unit, Handbooks, Modules, and others; (5) Educational Level is an assessment of the latest education held by each Lecturer; (6) Academic Position is an assessment of the academic positions held by each Lecturer; (7) The results of student assessments about the teaching and learning process were taken from questionnaire data for students regarding the assessment of each Lecturer in relation to the teaching and learning process.

Research Criteria include Sub Criteria; (1) Conducting Research, this assessment sub-criteria relates to what each Lecturer carries out Research; (2) Papers published in scientific magazines/journals, this sub-criteria for assessment relates to any published scientific papers/journals carried out by each Lecturer; (3) Scientific works presented in scientific meetings, the sub-criteria for this assessment are related to what scientific works are presented/summarized by each Lecturer. Community Service Criteria include Sub Criteria; (1) Regency/City level, this assessment relates to community service activities carried out by each Lecturer covering the district/city area; (2) Provincial level, this assessment relates to community service activities carried out by each Lecturer covering the province; (3) National level, this assessment relates to

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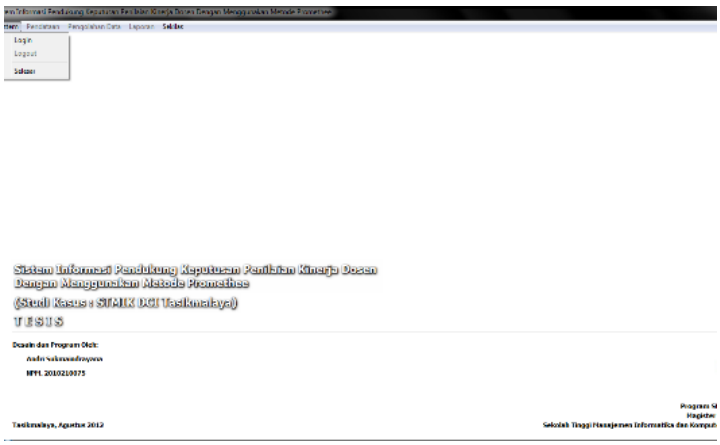
community service activities carried out by each Lecturer covering the national area. Miscellaneous Task Assessment includes Sub Criteria; (1) Case Study Supervisor and Final Project, this assessment relates to the assignment of each Lecturer in conducting a case study and final project mentoring; (2) Case Study Examiners and Final Projects, this assessment relates to the assignment of each Lecturer in conducting Case Study and Final Project testing; (3) Serving as a committee, this assessment is related to the assignment of each Lecturer in terms of participation in the committee for internal campus activities; (4) Participating in seminars and training, this assessment relates to each Lecturer's participation in seminars and training, both on campus and off campus.

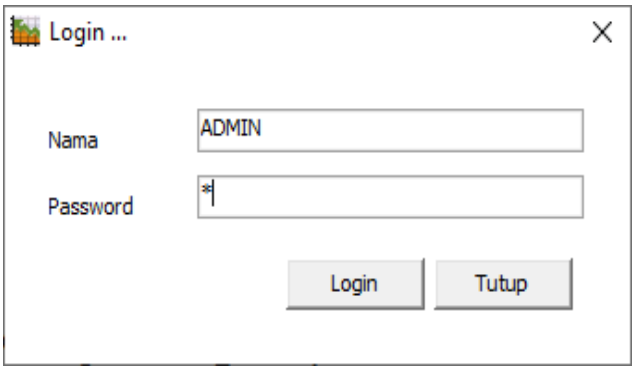
Assessment data is used to assign values and weights to each criterion and sub-criteria for each Lecturer. This assessment data is generated from several assessment processes directly based on data, assessments from students, or assessments from leaders. This assessment data is in the form of integers with intervals between 1 – 100.

3. Result and Discussion

a. Main Form



b. Login Form



c. Lecturer Data Form

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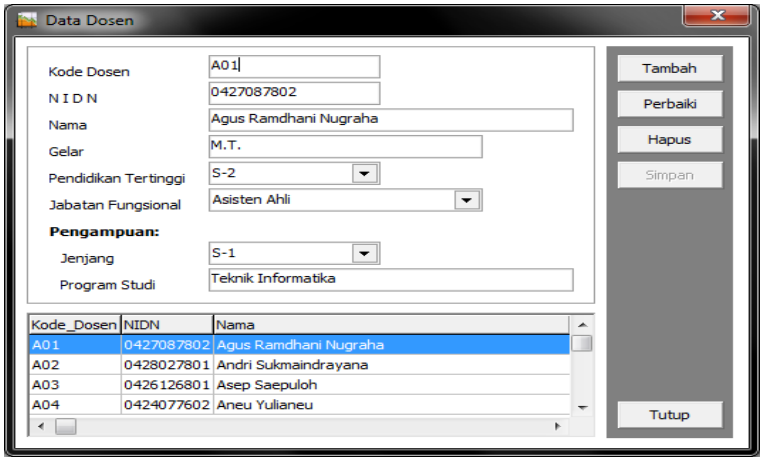
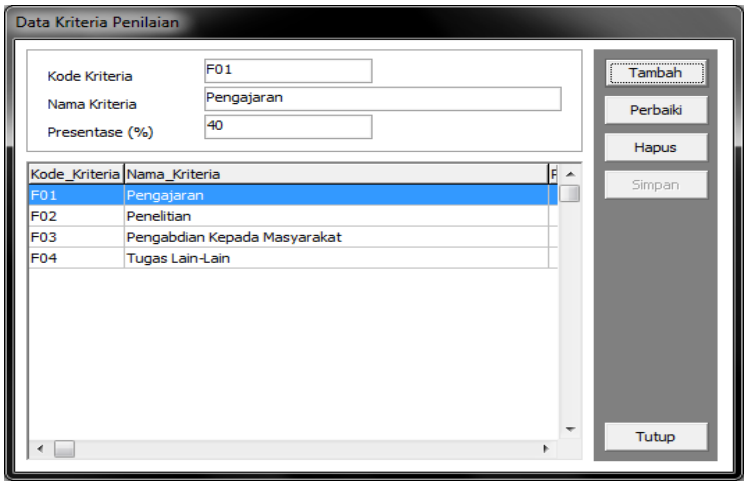
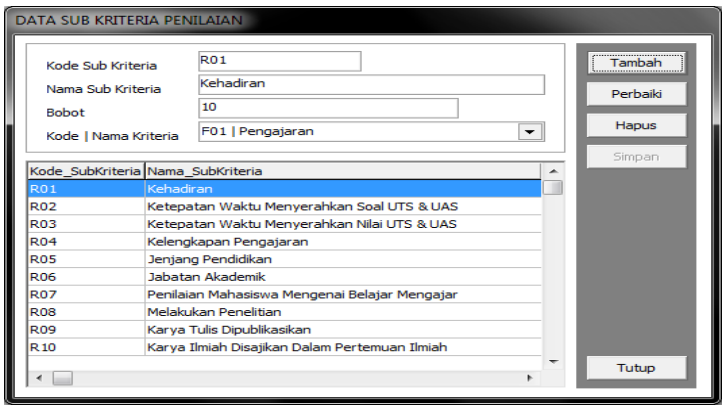


d. Criteria Data Form



e. Sub Criteria Data Form



f. Minimal Limit Data Form

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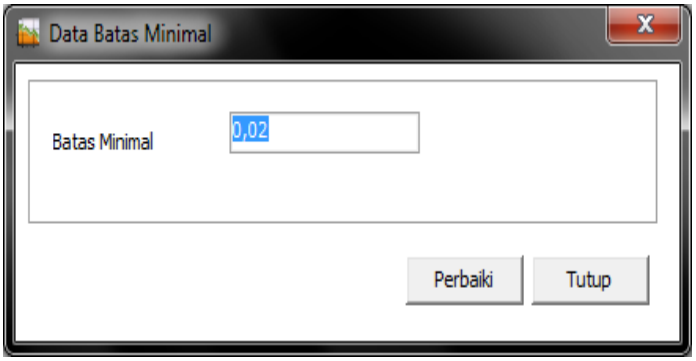
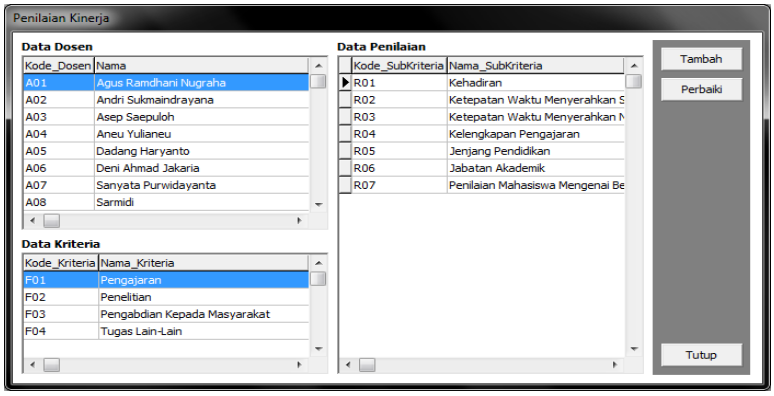
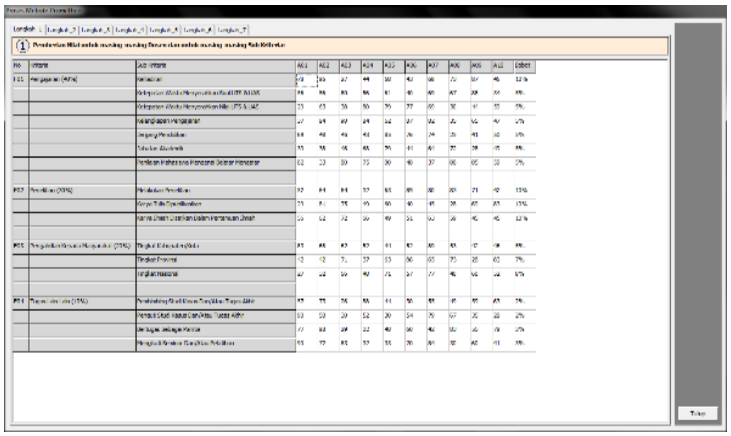


g. Assessment Performance Data Form



h. Promethee Method Processing [Step 1]



i. Promethee Method Processing [Step 2]

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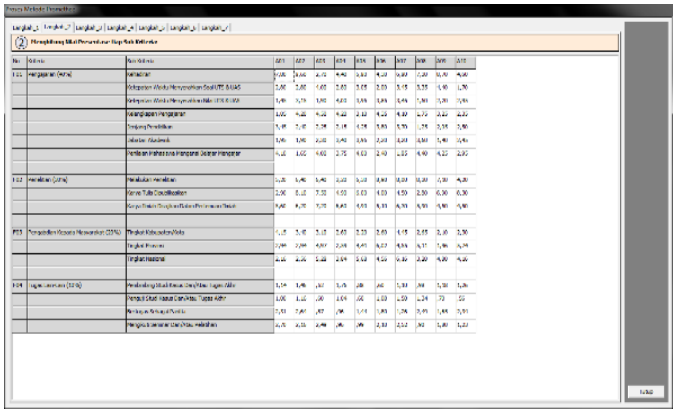
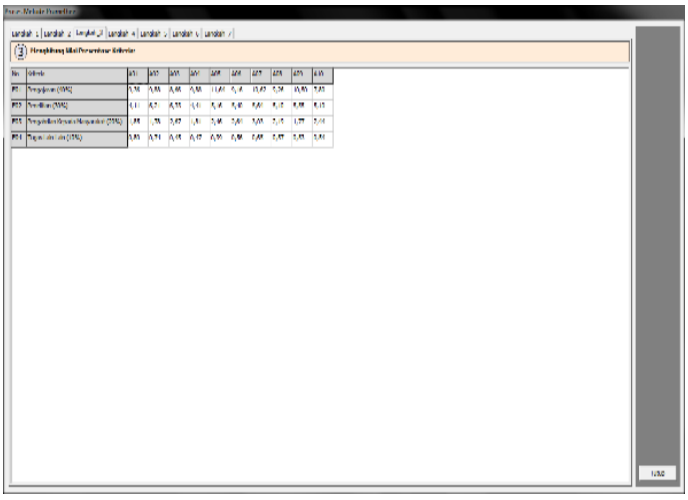
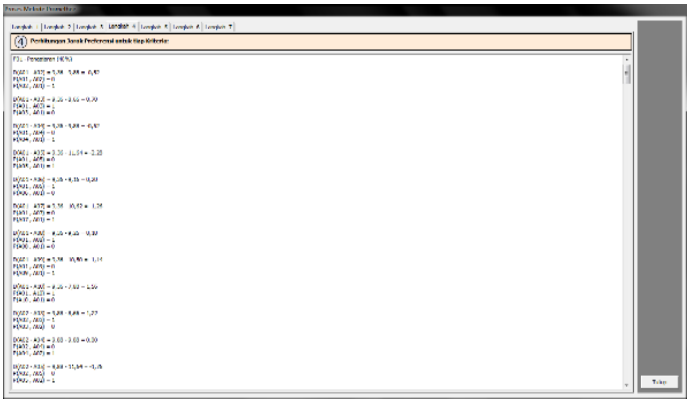


j. Promethee Method Processing [Step 3]



k. Promethee Method Processing [Step 4]



l. Promethee Method Processing [Step 5]

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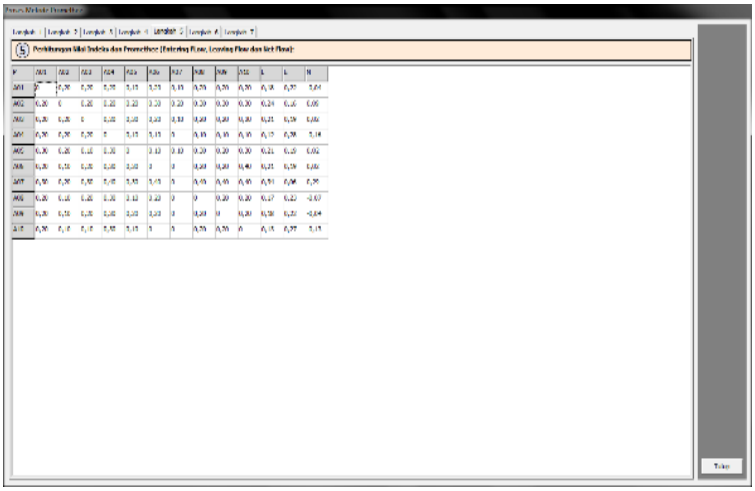
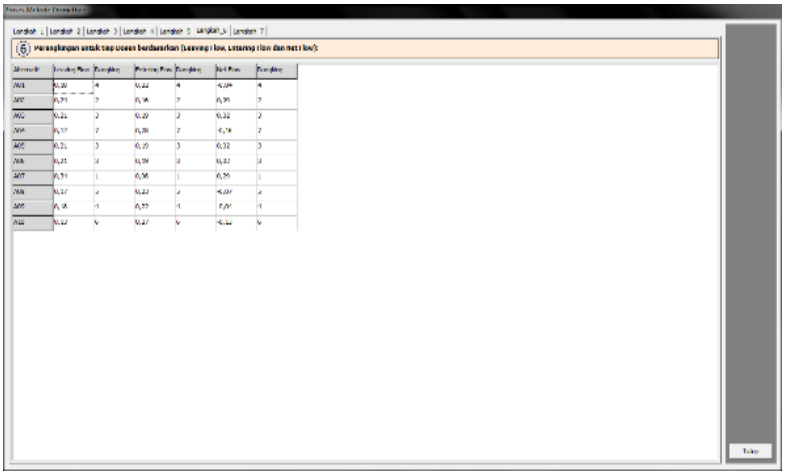
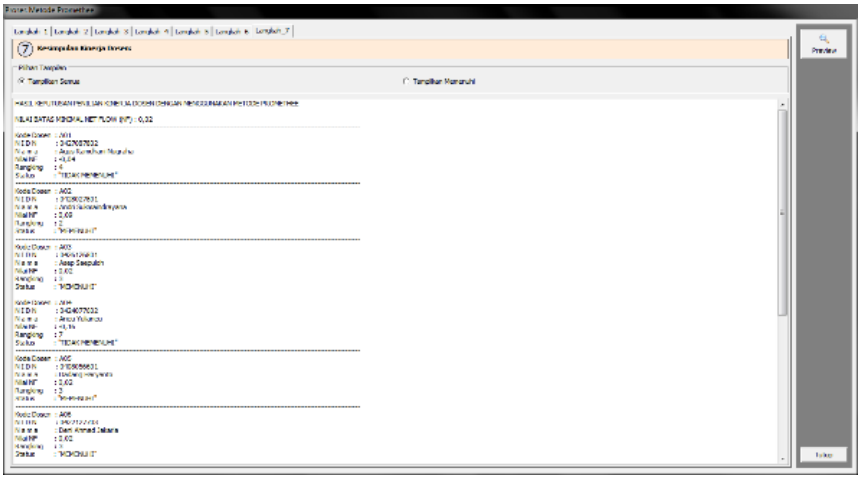


m. Promethee Method Processing [Step 6]



n. Promethee Method Processing [Step 7]



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4. Conclusion

The process of designing an information system architecture to support a lecturer's performance appraisal decision is carried out through stages in the form of data analysis through literature study, observation, and document analysis. The system is iterative, incremental, object-oriented, and uses Unified Modeling Language (UML) modeling tools. The Prometheus method, as a method for determining the order (priority) in multi-criteria analysis, is one method that can be used in designing a decision support information system architecture in the process of assessing lecturer performance. Implementing the system by making an application still has many shortcomings and limitations; however, the Delphi programming language and MySQL database can assist in making applications following the system design stage.

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