

# Decision Support System for Internship Using Multifactor Evaluation Process (MFEP) Method Case Study: Department Of Computer and Informatics Engineering Bandung State Polytechnic

SY.Yuliani  
Pajri Aprilio  
Sri Lestari  
Yenie Syukriyah

DOI: <https://doi.org/10.37178/ca-c.23.1.134>

---

**SY.Yuliani**, Informatics Engineering, Widyatama University, Indonesia  
Email: [sy.yuliani@widyatama.ac.id](mailto:sy.yuliani@widyatama.ac.id)

**Pajri Aprilio**, Informatics Engineering, Widyatama University, Indonesia

**Sri Lestari**, Informatics Engineering, Widyatama University, Indonesia

**Yenie Syukriyah**, Informatics Engineering, Widyatama University, Indonesia

---

## **Abstract**

Practical work is to apply the knowledge that has been gained during college in cases that exist in the institution or company that you want to go to. This research was conducted based on internship program that is held every year in Informatics Engineering, Bandung State Polytechnic. The internship coordinator does data collection from Internship Company or from students every year. Problems the data collected by the competence of companies receiving practical work, namely regarding and quotas that have not been recorded properly. Meanwhile interest and competence are collected from students. There are a lot of companies and student that needs to be mapped to meet company and student needs. Therefore, in this research a Decision Support System for Decision Support System for Internship at Department of Computer and Informatics Engineering Bandung State Polytechnic Using Multifactor Evaluation Process (MFEP) Method is created. It is an interactive system that is used to help making decision on internship placement by giving weight on student competence and competence that is required by company. From this research, student internship placement that is ordered by most matched competence that is required by the companies can be obtained. From the MEFP the highest and the lowest TBE is obtained. The highest TBE is 17 obtained by calculation on Karl Coombes that is assigned to CV Melani Narpati. Meanwhile the lowest TBE is 6 obtained by calculation on Marsha York, Amina Santana, Gabrielius, Kylo Thorne, Siobhan Salinas, and Jamel Orozco that is assigned to CV Mayasari.

**Keyword:** DSS, MFEP, Internship

## ***I. Introduction***

The internship is one of the courses that help statistical candidates to get to know the job field. In this practice, students can practice or apply the knowledge that has been gained during lectures in cases at the institution or company they want to go to. Every year Bandung State Polytechnic always sends its students for internships, both for applied D3 and S1 degrees. The internship coordinator for each study program carries out the internship mapping process

There are several criteria to map students to the company, either from hard or soft skill aspects. Hard skill aspects are assessed from their academic skills. Meanwhile, soft skill aspects can be seen from their character. For hard skills, the assessment is taken from several items such as software engineering core courses (programming introduction, data structure and algorithm, software engineering, software design and analysis, etc.) and information system core courses such as databases. The assessment is taken from the last project courses and input from the form teacher for soft skill aspects. A project course is a course that applies a project-based learning system that all students attend for each semester. Several aspects such as independence, collaboration, and problem solving can be assessed. The assessment can be taken from input from form teacher if the student has an academic or attitude problem.

Total quota from companies from each year is not fixed. Sometime it is less than or more than total students. For more information, Computer and Informatics Engineering have 2 classes of associate degree. Each class can have up to 30 students. Meanwhile applied bachelor degree has one class with total student can be up to 30 students.

Because there are so many assessment criteria and the company quota is not fixed, sometimes the internship coordinator has difficulty-mapping students to the company for internship. Therefore, the Decision Support System for Internship At Department Of Computer and Informatics Engineering Bandung State Polytechnic Using Multifactor Evaluation Process (MFEP) Method is expected to help the internship coordinator.

## ***II. Literature Study***

### ***2.1. Decision Support System***

Decision Support System (DSS) is interactive information systems that provide information, modeling, and data manipulation. It is used to help decision making in a semi structured and not structured situation where no one knows exactly how the decision should be mad[1, 2].

DSS is not intending to perform decision-making automation[3]. The decision-making is still done by management [4]. The DSS shows various data in an easy-to-understand UI so that management can understand the relationship between those data. Managing to make a decision uses the data. The decision can be divided based on its structure:

Structured decision: a decision that is done regularly and has a clear decision making procedure.

a. Semi structured decision: computer can do decision that is not fully done by decision maker, but partially.

b. Unstructured decision: a decision that is not routine or does not always occur  
Characteristic that is expected in DSS:

- a. Support a decision-making.
- b. Support all level of managerial.
- c. Support individual and group.
- d. Support for independent and/or sequential decision.
- e. Support in all phase of decision making
- f. Support all process and decision making style.
- g. Increase of effectively of decision-making.
- h. Full control by decision maker.

Decision making consist of several phases: intelligence, design, criteria, and implementation, shown of figure below:

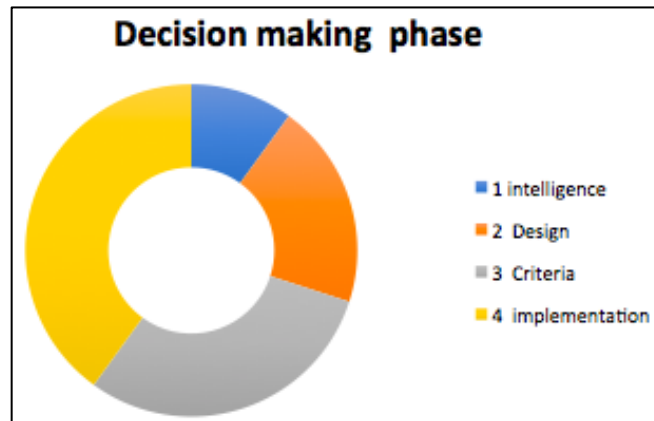


Figure1: Decision making Phase

- a. In the intelligence phase, the reality is tested, and the problem is identified and determined. And also, ownership of the problem is established.
- b. In the design phase, a model that represents the system is reconstructing. This is done by making assumptions that simplify reality and connecting between all variables. The model is developing while identifying alternative solutions.
- c. The criteria phase is the phase to choose a model that will be the solution.
- d. In implementation phase, there must be problem solving. If the problem is still not solved that need to revert back to the previous phase.

In implementation phase, there must be problem solving. If the problem is still not solved that need to revert back to the previous phase. Decision-making consists of several phases: intelligence, design, criteria, and implementation

### **2.1.1. Multifactor Evaluation Process Method**

Multi Factor Evaluation Process is a method that is fundamental from decision support system model [5]. MFEP method considers some factors (consideration criteria) that take effect to decision-making process. The consideration criteria are then given an appropriate weighting. The same step is also done to the selected alternative [6].

Steps of calculation process using MFEP method:

- a. Determine factor and weight factor where the weighting total equal to 1.
- b. Determine value for every factor that takes effect in decision making from data to be processed. The value that is assigned in the decision making process is an objective value.
- c. Calculation of weight evaluation is a process to calculate weight between weight factor and evaluation factor with summation of all of weight evaluation to get

total of evaluation result. Every member has an evaluation value for the three factors that become their consideration, to get total value of evaluation for each member this formula can be used :

Formula to do normalization:

$$Nbe = Nbe = Nbf \times Nef$$

Information:

Nbe : Evaluation weight value

Nef : Evaluation factor value

Nbf : Weight factor value

Total evaluation value formula:

$$Tne = Nbe1 + Nbe2 \times Nbe3$$

Information:

Tne: Evaluation value total

Nbe: Evaluation weight value

### 1. Methodology

This chapter discusses the methods used in research consisting of literature studies, data collection methods, design methods, implementation methods, testing and analysis methods as well as drawing conclusions and suggestions. The following is a flowchart of the research methodology carried out, Shown of figure:

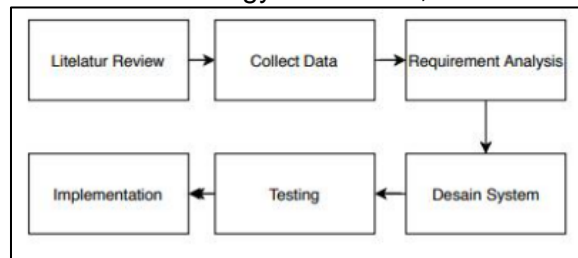


Figure2: Research Methodology  
1.1. Analysis of existing system

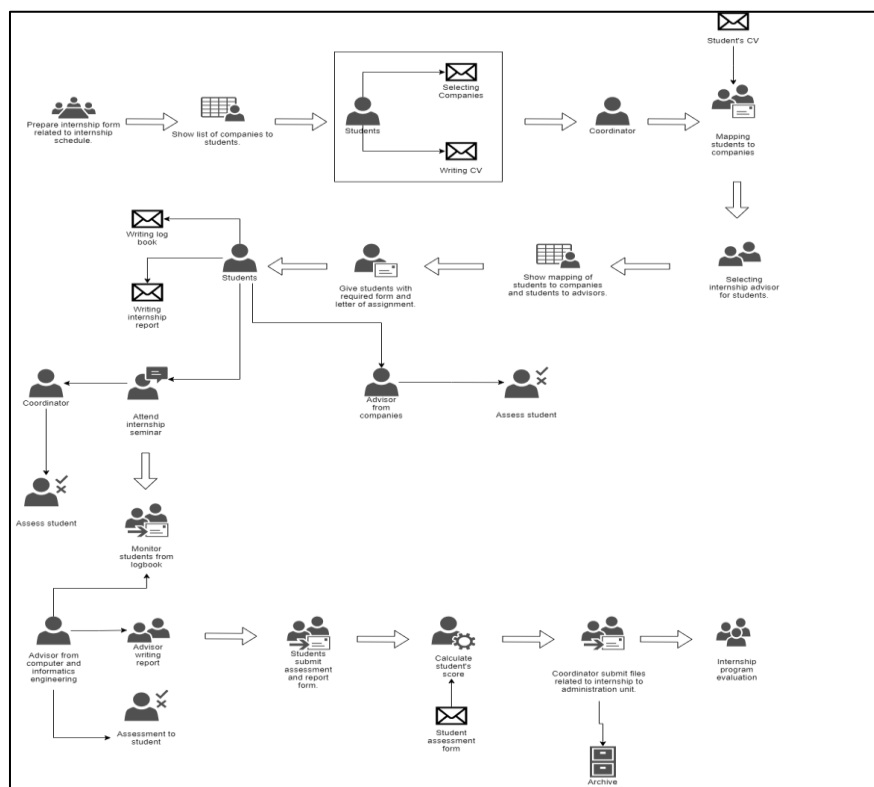


Figure.3 Diagram for the existing system.

In the existing system as shown in Figure 3 the process starts from preparing internship form related to internship schedule. After that, list of companies that is open for internship position is provided to students. Students then have to write CV and select company that they are interested in. Coordinator then receives the data that was sent by students. After that, coordinator maps students to companies based on the received data. The next process is coordinator choose internship advisor then show it to the students.

During the internship period, students have to write log book and internship report. After internship period ends, students have to attend internship seminar to present their activities during internship period. Internship advisor also assess students from their log book and internship report. After that, coordinator advisor calculate the student's final score. System that will be built only covers mapping students to companies.

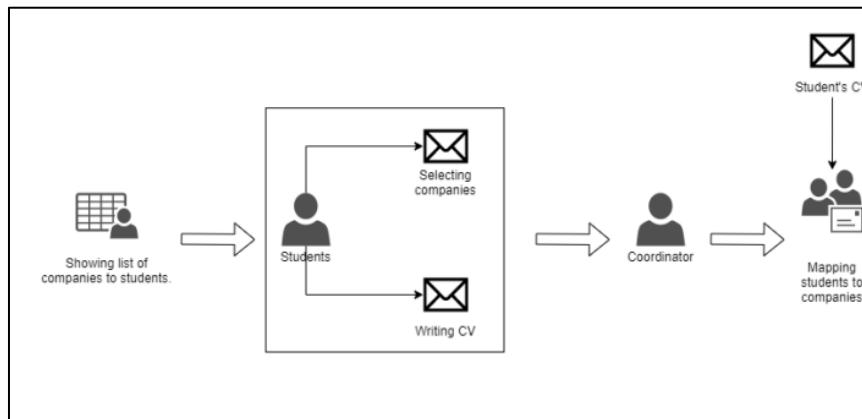


Figure 4 Mapping Diagram students to companies

In Figure 4, the system first will show list of companies that open for internship program for student. Then student submit CV and selecting company to the system. After that, internship coordinator map student with the company based on their CV.

**IV. Implementation**

The following is list of companies that needs internship student. Every student has particular criteria for student internship. In this research, it is assumed that every criterion has Evaluation Weight Value.

Table 1

**Student criteria that is needed by company CV Melani Narpati**

| Company | CV Melani Narpati     |     |
|---------|-----------------------|-----|
| No      | Competency            | NBE |
| 1       | Python                | 1   |
| 2       | PHP                   | 1   |
| 3       | JavaScript            | 1   |
| 4       | My SQL                | 1   |
| 5       | Unstructured Database | 1   |

**Error! Reference source not found.** shows that company CV Melani Narpati requires students with Python, PHP, JavaScript, My SQL, and Unstructured Database competencies.

Table 2

**Student criteria that is needed by company CV Ardianto Tbk**

| Company         |              |     |
|-----------------|--------------|-----|
| CV Ardianto Tbk |              |     |
| No              | Criteria     | NBE |
| 1               | PHP          | 1   |
| 2               | JavaScript   | 1   |
| 3               | React Native | 1   |
| 4               | MySQL        | 1   |

**Error! Reference source not found.** shows that company CV Ardianto Tbk requires students with PHP, JavaScript, React Native, and MySQL competencies.

Table 3

**Student criteria that is needed by company CV Prastuti Wastuti**

| Company             |              |     |
|---------------------|--------------|-----|
| CV Prastuti Wastuti |              |     |
| No                  | Criteria     | NBE |
| 1                   | Ruby         | 1   |
| 2                   | PHP          | 1   |
| 3                   | Java         | 1   |
| 4                   | Code Igniter | 1   |
| 5                   | Spring Rails | 1   |
| 6                   | MySQL        | 1   |
| 7                   | PostgreSQL   | 1   |
| 8                   | MongoDB      | 1   |

**Error! Reference source not found.** shows that company CV Prastuti Wastuti requires students with Ruby, PHP, Java, Code Igniter, Spring Rails, MySQL, PostgreSQL, and MongoDB competencies.

Table.1

**Student criteria that is needed by company PT Thamrin Tbk**

| Company        |                    |     |
|----------------|--------------------|-----|
| PT Thamrin Tbk |                    |     |
| No             | Criteria           | NBE |
| 1              | PHP                | 1   |
| 2              | JavaScript         | 1   |
| 3              | Oracle Database    | 1   |
| 4              | OOP Concept        | 1   |
| 5              | Data warehouse ETL | 1   |

Table.1 shows that company PT Thamrin Tbk requires students with PHP, JavaScript, Oracle Database, OOP Concept, and Data warehouse ETL competencies.

Table.2

**Student criteria that is needed by company CV Mayasari**

| Company | CV Mayasari    |     |
|---------|----------------|-----|
| No      | Criteria       | NBE |
| 1       | Node JS        | 1   |
| 2       | Vue JS         | 1   |
| 3       | MySQL          | 1   |
| 4       | Linux          | 1   |
| 5       | Windows        | 1   |
| 6       | Power Designer | 1   |
| 7       | Unit Testing   | 1   |

Table.2 shows that company CV Mayasari requires students with Node JS, Vue JS, MySQL, Linux, Windows, Power Designer, and Unit Testing competencies.

Table 3 shows student competency. The competency level of student is presented in qualitative form.

Table 3

qualitative competency levels

| Criteria | Description |
|----------|-------------|
| VG       | Very Good   |
| G        | Good        |
| E        | Enough      |
| L        | Less        |
| VL       | Very Less   |

There are Five competency levels:

VG = Very Good

G = Good

E = Enough

L = Less

VL = Very Less

Table 4 shows the mapping of student and their competencies. Students that have competency value show their competency level. Meanwhile students that have no competency value means have no competency in the corresponding field.

Table 4

**Competency of students**

| Name             | Competency |     |        |            |       |        |       |         |
|------------------|------------|-----|--------|------------|-------|--------|-------|---------|
|                  | Java       | PHP | Python | JavaScript | MySQL | Oracle | NoSQL | Postgre |
| Atif Needham     | G          |     | G      | G          | G     |        |       |         |
| Mateusz Wyatt    | E          |     | E      | E          | G     |        |       |         |
| Karl Coombes     | G          | VG  | G      | G          | G     | L      |       |         |
| Isma Duke        | G          | G   | E      | G          | G     | L      |       |         |
| Marsha York      | G          |     | G      | L          | G     |        |       |         |
| Amina Santana    | G          | L   | E      | G          | L     | E      |       |         |
| Anna Akhtar      | G          |     | G      | G          | G     | E      |       |         |
| Pascal Jordan    | G          | E   |        | G          | G     | E      |       |         |
| Finbar Gordon    | VG         | VG  | E      | G          | G     | G      |       |         |
| Shreya Armstrong | G          |     | G      | G          | G     | E      | L     |         |
| Harleen Sheehan  | G          | G   | G      | G          | G     | E      | L     |         |
| Aanya Andersen   | E          | L   | E      | G          | E     |        |       |         |
| Gabrielius       | G          | L   | G      | E          | E     | E      |       | E       |
| Taran Schaefer   | G          |     | G      | E          | G     | E      |       | L       |
| Elina Ford       | G          | E   | G      | G          | G     | E      |       |         |
| Macy Britt       | E          | E   | E      | G          | G     | E      |       |         |
| Mateo Murphy     | E          | E   | G      | G          | G     | E      |       |         |
| Fionn Pace       | G          | G   | G      | G          | G     |        |       |         |
| Kylo Thorne      | G          | L   | E      | E          | E     |        |       |         |
| Iga Mcleod       | G          | G   | G      | G          | G     | L      |       |         |
| Sarah Howell     | G          | L   | G      | E          | G     | E      |       |         |
| Keaton Charles   | G          | G   |        | G          | G     |        |       |         |
| Siobhan Salinas  | G          | L   | G      | E          | E     | E      | E     | E       |
| Nataniel Spears  | G          | L   | E      | G          | G     | L      |       |         |
| Kymani Derrick   | G          |     | G      | E          | G     | L      |       |         |
| Jamel Orozco     |            | E   | G      | G          | L     |        |       |         |

The next step is calculating the decision using MFEP. This process is conducted for each company. However competency level will be converted first to numerical form based on Table 5.

Table 5

Numerical competency levels

| Code | Description | Score |
|------|-------------|-------|
| VG   | Very Good   | 5     |
| G    | Good        | 4     |
| E    | Enough      | 3     |



|    |           |   |
|----|-----------|---|
| L  | Less      | 2 |
| VL | Very Less | 1 |

Table 5 shows numerical value for each competency level. VG has numerical value 5, G has numerical value 4, E has numerical value 3, L has numerical value 2, and VL has numerical value 1.

a. CV Melani Narpati

Table 6

**Student-company competency mapping for company KDI**

| Student Name     | PHP |     | Python |     | JavaScript |     | MySQL |     | Unstructured Database |     | TBE | RANK |
|------------------|-----|-----|--------|-----|------------|-----|-------|-----|-----------------------|-----|-----|------|
|                  | NEF | NBE | NEF    | NBE | NEF        | NBE | NEF   | NBE | NEF                   | NBE |     |      |
| Atif Needham     | 0   | 0   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 12  | 13   |
| Mateusz Wyatt    | 0   | 0   | 3      | 3   | 3          | 3   | 4     | 4   | 0                     | 0   | 10  | 25   |
| Karl Coombes     | 5   | 5   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 17  | 1    |
| Isma Duke        | 4   | 4   | 3      | 3   | 4          | 4   | 4     | 4   | 0                     | 0   | 15  | 6    |
| Marsha York      | 0   | 0   | 4      | 4   | 2          | 2   | 4     | 4   | 0                     | 0   | 10  | 25   |
| Amina Santana    | 2   | 2   | 3      | 3   | 4          | 4   | 3     | 3   | 0                     | 0   | 12  | 13   |
| Anna Akhtar      | 0   | 0   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 12  | 13   |
| Pascal Jordan    | 3   | 3   | 0      | 0   | 4          | 4   | 4     | 4   | 0                     | 0   | 11  | 21   |
| Finbar Gordon    | 5   | 5   | 3      | 3   | 4          | 4   | 4     | 4   | 0                     | 0   | 16  | 2    |
| Shreya Armstrong | 0   | 0   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 12  | 13   |
| Harleen Sheehan  | 4   | 4   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 16  | 2    |
| Aanya Andersen   | 2   | 2   | 3      | 3   | 4          | 4   | 3     | 3   | 0                     | 0   | 12  | 13   |
| Gabrieliuis      | 2   | 2   | 4      | 4   | 3          | 3   | 3     | 3   | 0                     | 0   | 12  | 13   |
| Taran Schaefer   | 0   | 0   | 4      | 4   | 3          | 3   | 4     | 4   | 0                     | 0   | 11  | 21   |
| Elina Ford       | 3   | 3   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 15  | 6    |
| Macy Britt       | 3   | 3   | 3      | 3   | 4          | 4   | 4     | 4   | 0                     | 0   | 14  | 9    |
| Mateo Murphy     | 3   | 3   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 15  | 6    |
| Fionn Pace       | 4   | 4   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 16  | 2    |
| Kylo Thorne      | 2   | 2   | 3      | 3   | 3          | 3   | 3     | 3   | 0                     | 0   | 11  | 21   |
| Iga Mcleod       | 4   | 4   | 4      | 4   | 4          | 4   | 4     | 4   | 0                     | 0   | 16  | 2    |
| Sarah Howell     | 2   | 2   | 4      | 4   | 3          | 3   | 4     | 4   | 0                     | 0   | 13  | 10   |
| Keaton Charles   | 4   | 4   | 0      | 0   | 4          | 4   | 4     | 4   | 0                     | 0   | 12  | 13   |

|                 |   |   |   |   |   |   |   |   |   |   |    |    |
|-----------------|---|---|---|---|---|---|---|---|---|---|----|----|
| Siobhan Salinas | 2 | 2 | 4 | 4 | 3 | 3 | 3 | 3 | 0 | 0 | 12 | 13 |
| Nataniel Spears | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 0 | 0 | 13 | 10 |
| Kymani Derrick  | 0 | 0 | 4 | 4 | 3 | 3 | 4 | 4 | 0 | 0 | 11 | 21 |
| Jamel Orozco    | 3 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 0 | 0 | 13 | 10 |

Table 6 shows result of MFEP for CV Melani Narpati, which has the highest TBE value 17 for student Karl Coombes.

b. CV Ardianto Tbk

Table 7

**Student-company competency mapping for CV Ardianto Tbk**

| Student Name     | PHP |     | JavaScript |     | React Native |     | MySQL |     | TBE | RANK |
|------------------|-----|-----|------------|-----|--------------|-----|-------|-----|-----|------|
|                  | NEF | NBE | NEF        | NBE | NEF          | NBE | NEF   | NBE |     |      |
| Atif Needham     | 0   | 0   | 4          | 4   | 0            | 0   | 4     | 4   | 8   | 16   |
| Mateusz Wyatt    | 0   | 0   | 3          | 3   | 0            | 0   | 4     | 4   | 7   | 23   |
| Karl Coombes     | 5   | 5   | 4          | 4   | 0            | 0   | 4     | 4   | 13  | 1    |
| Isma Duke        | 4   | 4   | 4          | 4   | 0            | 0   | 4     | 4   | 12  | 3    |
| Marsha York      | 0   | 0   | 2          | 2   | 0            | 0   | 4     | 4   | 6   | 26   |
| Amina Santana    | 2   | 2   | 4          | 4   | 0            | 0   | 2     | 2   | 8   | 16   |
| Anna Akhtar      | 0   | 0   | 4          | 4   | 0            | 0   | 4     | 4   | 8   | 16   |
| Pascal Jordan    | 3   | 3   | 4          | 4   | 0            | 0   | 4     | 4   | 11  | 8    |
| Finbar Gordon    | 5   | 5   | 4          | 4   | 0            | 0   | 4     | 4   | 13  | 1    |
| Shreya Armstrong | 0   | 0   | 4          | 4   | 0            | 0   | 4     | 4   | 8   | 16   |
| Harleen Sheehan  | 4   | 4   | 4          | 4   | 0            | 0   | 4     | 4   | 12  | 3    |
| Aanya Andersen   | 2   | 2   | 4          | 4   | 0            | 0   | 3     | 3   | 9   | 13   |
| Gabrielius       | 2   | 2   | 3          | 3   | 0            | 0   | 3     | 3   | 8   | 16   |
| Taran Schaefer   | 0   | 0   | 3          | 3   | 0            | 0   | 4     | 4   | 7   | 23   |
| Elina Ford       | 3   | 3   | 4          | 4   | 0            | 0   | 4     | 4   | 11  | 8    |
| Macy Britt       | 3   | 3   | 4          | 4   | 0            | 0   | 4     | 4   | 11  | 8    |
| Mateo Murphy     | 3   | 3   | 4          | 4   | 0            | 0   | 4     | 4   | 11  | 8    |
| Fionn Pace       | 4   | 4   | 4          | 4   | 0            | 0   | 4     | 4   | 12  | 3    |
| Kylo Thorne      | 2   | 2   | 3          | 3   | 0            | 0   | 3     | 3   | 8   | 16   |
| Iga Mcleod       | 4   | 4   | 4          | 4   | 0            | 0   | 4     | 4   | 12  | 3    |
| Sarah            | 2   | 2   | 3          | 3   | 0            | 0   | 4     | 4   | 9   | 13   |

|                 |   |   |   |   |   |   |   |   |    |    |
|-----------------|---|---|---|---|---|---|---|---|----|----|
| Howell          |   |   |   |   |   |   |   |   |    |    |
| Keaton Charles  | 4 | 4 | 4 | 4 | 0 | 0 | 4 | 4 | 12 | 3  |
| Siobhan Salinas | 2 | 2 | 3 | 3 | 0 | 0 | 3 | 3 | 8  | 16 |
| Nataniel Spears | 2 | 2 | 4 | 4 | 0 | 0 | 4 | 4 | 10 | 12 |
| Kymani Derrick  | 0 | 0 | 3 | 3 | 0 | 0 | 4 | 4 | 7  | 23 |
| Jamel Orozco    | 3 | 3 | 4 | 4 | 0 | 0 | 2 | 2 | 9  | 13 |

Table 7 shows result of MFEP for CV Ardianto Tbk, which has the highest TBE value 13 for student Karl Coombes, and Finbar Gordon.

Table 11

Student-company competency mapping for Ardianto Tbk

| Student Name     | Ruby |     | PHP |     | Java |     | Code Igniter |     | Spring Rails |     | MySQL |     | PostgreSQL |     | Mongo DB |     | TBE | RANK |
|------------------|------|-----|-----|-----|------|-----|--------------|-----|--------------|-----|-------|-----|------------|-----|----------|-----|-----|------|
|                  | NEF  | NBE | NEF | NBE | NEF  | NBE | NEF          | NBE | NEF          | NBE | NEF   | NBE | NEF        | NBE | NEF      | NBE |     |      |
| Atif Needham     | 0    | 0   | 0   | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 8   | 21   |
| Mateusz Wyatt    | 0    | 0   | 0   | 0   | 3    | 3   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 7   | 25   |
| Karl Coombes     | 0    | 0   | 5   | 5   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 13  | 7    |
| Isma Duke        | 0    | 0   | 4   | 4   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 12  | 11   |
| Marsha York      | 2    | 2   | 0   | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 10  | 15   |
| Amina Santana    | 0    | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 2     | 2   | 0          | 0   | 0        | 0   | 8   | 21   |
| Anna Akhtar      | 0    | 0   | 0   | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 8   | 21   |
| Pascal Jordan    | 3    | 3   | 3   | 3   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 14  | 4    |
| Finbar Gordon    | 2    | 2   | 5   | 5   | 5    | 5   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 16  | 1    |
| Shreya Armstrong | 3    | 3   | 0   | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 2        | 2   | 13  | 7    |
| Harleen Sheehan  | 2    | 2   | 4   | 4   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 2        | 2   | 16  | 1    |
| Aanya Andersen   | 0    | 0   | 2   | 2   | 3    | 3   | 0            | 0   | 0            | 0   | 3     | 3   | 0          | 0   | 0        | 0   | 8   | 21   |
| Gabrielius       | 0    | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 3     | 3   | 3          | 3   | 0        | 0   | 12  | 11   |
| Taran Schaefer   | 0    | 0   |     | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 2          | 2   | 0        | 0   | 10  | 15   |
| Elina Ford       | 0    | 0   | 3   | 3   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 11  | 14   |
| Macy Britt       | 3    | 3   | 3   | 3   | 3    | 3   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 13  | 7    |
| Mateo Murphy     | 3    | 3   | 3   | 3   | 3    | 3   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 13  | 7    |
| Fionn Pace       | 2    | 2   | 4   | 4   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 14  | 4    |
| Kylo Thorne      |      | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 3     | 3   | 0          | 0   | 0        | 0   | 9   | 20   |
| Iga Mcleod       | 2    | 2   | 4   | 4   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 14  | 4    |
| Sarah Howell     | 0    | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 10  | 15   |
| Keaton Charles   | 0    | 0   | 4   | 4   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 12  | 11   |
| Siobhan Salinas  | 0    | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 3     | 3   | 3          | 3   | 3        | 3   | 15  | 3    |
| Nataniel Spears  | 0    | 0   | 2   | 2   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 10  | 15   |
| Kymani Derrick   | 2    | 2   | 0   | 0   | 4    | 4   | 0            | 0   | 0            | 0   | 4     | 4   | 0          | 0   | 0        | 0   | 10  | 15   |
| Jamel Orozco     | 2    | 2   | 3   | 3   |      | 0   | 0            | 0   | 0            | 0   | 2     | 2   | 0          | 0   | 0        | 0   | 7   | 25   |

shows result of MFEP for CV Ardianto Tbk, which has the highest TBE value 16 for student Harleen Sheehan, and Finbar Gordon.

c. PT Thamrin Tbk

Table 8

Student-company competency mapping for PT Thamrin Tbk

| Student Name     | PHP |     | JavaScript |     | Oracle Database |     | OOP Concept |     | Data warehouse ETL |     | TBE | RANK |
|------------------|-----|-----|------------|-----|-----------------|-----|-------------|-----|--------------------|-----|-----|------|
|                  | NEF | NBE | NEF        | NBE | NEF             | NBE | NEF         | NBE | NEF                | NBE |     |      |
| Atif Needham     | 0   | 0   | 4          | 4   | 0               | 0   | 0           | 0   | 0                  | 0   | 4   | 24   |
| Mateusz Wyatt    | 0   | 0   | 3          | 3   | 0               | 0   | 0           | 0   | 0                  | 0   | 3   | 25   |
| Karl Coombes     | 5   | 5   | 4          | 4   | 2               | 2   | 0           | 0   | 0                  | 0   | 11  | 2    |
| Isma Duke        | 4   | 4   | 4          | 4   | 2               | 2   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Marsha York      | 0   | 0   | 2          | 2   | 0               | 0   | 0           | 0   | 0                  | 0   | 2   | 26   |
| Amina Santana    | 2   | 2   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 9   | 10   |
| Anna Akhtar      | 0   | 0   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 7   | 17   |
| Pascal Jordan    | 3   | 3   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Finbar Gordon    | 5   | 5   | 4          | 4   | 4               | 4   | 0           | 0   | 0                  | 0   | 13  | 1    |
| Shreya Armstrong | 0   | 0   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 7   | 17   |
| Harleen Sheehan  | 4   | 4   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 11  | 2    |
| Aanya Andersen   | 2   | 2   | 4          | 4   | 0               | 0   | 0           | 0   | 0                  | 0   | 6   | 20   |
| Gabrielius       | 2   | 2   | 3          | 3   | 3               | 3   | 0           | 0   | 0                  | 0   | 8   | 11   |
| Taran Schaefer   | 0   | 0   | 3          | 3   | 3               | 3   | 0           | 0   | 0                  | 0   | 6   | 20   |
| Elina Ford       | 3   | 3   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Macy Britt       | 3   | 3   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Mateo Murphy     | 3   | 3   | 4          | 4   | 3               | 3   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Fionn Pace       | 4   | 4   | 4          | 4   | 0               | 0   | 0           | 0   | 0                  | 0   | 8   | 11   |
| Kylo Thorne      | 2   | 2   | 3          | 3   | 0               | 0   | 0           | 0   | 0                  | 0   | 5   | 22   |
| Iga Mcleod       | 4   | 4   | 4          | 4   | 2               | 2   | 0           | 0   | 0                  | 0   | 10  | 4    |
| Sarah Howell     | 2   | 2   | 3          | 3   | 3               | 3   | 0           | 0   | 0                  | 0   | 8   | 11   |
| Keaton Charles   | 4   | 4   | 4          | 4   | 0               | 0   | 0           | 0   | 0                  | 0   | 8   | 11   |
| Siobhan Salinas  | 2   | 2   | 3          | 3   | 3               | 3   | 0           | 0   | 0                  | 0   | 8   | 11   |

|                 |   |   |   |   |   |   |   |   |   |   |   |    |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|----|
| Nataniel Spears | 2 | 2 | 4 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 8 | 11 |
| Kymani Derrick  | 0 | 0 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 5 | 22 |
| Jamel Orozco    | 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 17 |

Table 8 shows result of MFEP for PT Thamrin Tbk, which has the highest TBE value 13 for student Finbar Gordon.

d. CV Mayasari

Table 9

Student-company competency mapping for CV Mayasari

| Student Name     | Node JS |     | Vue JS |     | MySQL |     | Linux |     | Windows |     | Power Designer |     | Unit Testing |     | TBE | RANK |
|------------------|---------|-----|--------|-----|-------|-----|-------|-----|---------|-----|----------------|-----|--------------|-----|-----|------|
|                  | NEF     | NBE | NEF    | NBE | NEF   | NBE | NEF   | NBE | NEF     | NBE | NEF            | NBE | NEF          | NBE |     |      |
| Atif Needham     | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Mateusz Wyatt    | 0       | 0   | 3      | 3   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 7   | 16   |
| Karl Coombes     | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Isma Duke        | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Marsha York      | 0       | 0   | 2      | 2   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 6   | 21   |
| Amina Santana    | 0       | 0   | 4      | 4   | 2     | 2   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 6   | 21   |
| Anna Akhtar      | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Pascal Jordan    | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Finbar Gordon    | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Shreya Armstrong | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Harleen Sheehan  | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Aanya Andersen   | 0       | 0   | 4      | 4   | 3     | 3   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 7   | 16   |
| Gabrielius       | 0       | 0   | 3      | 3   | 3     | 3   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 6   | 21   |
| Taran Schaefer   | 0       | 0   | 3      | 3   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 7   | 16   |
| Elina Ford       | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Macy Britt       | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Mateo Murphy     | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Fionn Pace       | 0       | 0   | 4      | 4   | 4     | 4   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 8   | 1    |
| Kylo Thorne      | 0       | 0   | 3      | 3   | 3     | 3   | 0     | 0   | 0       | 0   | 0              | 0   | 0            | 0   | 6   | 21   |

|                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Iga Mcleod      | 0 | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1  |
| Sarah Howell    | 0 | 0 | 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 16 |
| Keaton Charles  | 0 | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1  |
| Siobhan Salinas | 0 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 21 |
| Nataniel Spears | 0 | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1  |
| Kymani Derrick  | 0 | 0 | 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 16 |
| Jamel Orozco    | 0 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 21 |

Table 9 shows result of MFEP for CV Mayasari, which has the highest TBE value 8.

### V. Result

According to calculation above,

Table 10 shows priorities of students for internship placement based on their competencies. This data can be used by internship coordinator to consider the placement of internship.

*Table 10*  
**Priorities of students for internship placement based on their competencies**

|                   |                        |                  |                  |                  |
|-------------------|------------------------|------------------|------------------|------------------|
| CV Melani Narpati | CV <b>Ardianto</b> Tbk | Ardianto Tbk     | PT Thamrin Tbk   | CV Mayasari      |
| Karl Coombes      | Karl Coombes           | Finbar Gordon    | Finbar Gordon    | Atif Needham     |
| Finbar Gordon     | Finbar Gordon          | Harleen Sheehan  | Karl Coombes     | Karl Coombes     |
| Harleen Sheehan   | Isma Duke              | Siobhan Salinas  | Harleen Sheehan  | Isma Duke        |
| Fionn Pace        | Harleen Sheehan        | Pascal Jordan    | Isma Duke        | Anna Akhtar      |
| Iga Mcleod        | Fionn Pace             | Fionn Pace       | Pascal Jordan    | Pascal Jordan    |
| Isma Duke         | Iga Mcleod             | Iga Mcleod       | Elina Ford       | Finbar Gordon    |
| Elina Ford        | Keaton Charles         | Karl Coombes     | Macy Britt       | Shreya Armstrong |
| Mateo Murphy      | Pascal Jordan          | Shreya Armstrong | Mateo Murphy     | Harleen Sheehan  |
| Macy Britt        | Elina Ford             | Macy Britt       | Iga Mcleod       | Elina Ford       |
| Sarah Howell      | Macy Britt             | Mateo Murphy     | Amina Santana    | Macy Britt       |
| Nataniel Spears   | Mateo Murphy           | Isma Duke        | Gabrielius       | Mateo Murphy     |
| Jamel Orozco      | Nataniel Spears        | Gabrielius       | Fionn Pace       | Fionn Pace       |
| Atif Needham      | Aanya Andersen         | Keaton Charles   | Sarah Howell     | Iga Mcleod       |
| Amina Santana     | Sarah Howell           | Elina Ford       | Keaton Charles   | Keaton Charles   |
| Anna Akhtar       | Jamel Orozco           | Marsha York      | Siobhan Salinas  | Nataniel Spears  |
| Shreya Armstrong  | Atif Needham           | Taran Schaefer   | Nataniel Spears  | Mateusz Wyatt    |
| Aanya Andersen    | Amina Santana          | Sarah Howell     | Anna Akhtar      | Aanya Andersen   |
| Gabrielius        | Anna Akhtar            | Nataniel Spears  | Shreya Armstrong | Taran Schaefer   |
| Keaton Charles    | Shreya Armstrong       | Kymani Derrick   | Jamel Orozco     | Sarah Howell     |
| Siobhan Salinas   | Gabrielius             | Kylo Thorne      | Aanya Andersen   | Kymani Derrick   |
| Pascal Jordan     | Kylo Thorne            | Atif Needham     | Taran Schaefer   | Marsha York      |

|                |                 |                |                |                 |
|----------------|-----------------|----------------|----------------|-----------------|
| Taran Schaefer | Siobhan Salinas | Amina Santana  | Kylo Thorne    | Amina Santana   |
| Kylo Thorne    | Mateusz Wyatt   | Anna Akhtar    | Kymani Derrick | Gabrieliuss     |
| Kymani Derrick | Taran Schaefer  | Aanya Andersen | Atif Needham   | Kylo Thorne     |
| Mateusz Wyatt  | Kymani Derrick  | Mateusz Wyatt  | Mateusz Wyatt  | Siobhan Salinas |
| Marsha York    | Marsha York     | Jamel Orozco   | Marsha York    | Jamel Orozco    |

According to

Table 10, Karl Coombes has the highest rank in CV Melani Narpati, Karl Coombes has the highest rank in CV Ardianto Tbk, Finbar Gordon has the highest rank in PT Thamrin Tbk, and Atif Needham the highest rank in CV Mayasari.

## 5.1 Design

### 5.1.1 Use Case Diagram

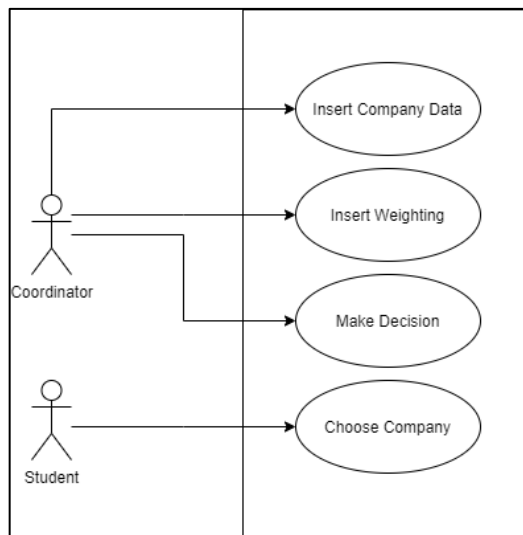


Figure 5: Use Case diagram of DSS

Use Case diagram in Figure 5 shows that the system that will be building has 2 users: internship coordinator and students. Students can select companies as their internship company. Internship coordinator can also select companies for student. Internship coordinator can enter weighting to the companies' required competency.

## 5.2 User Interface Design

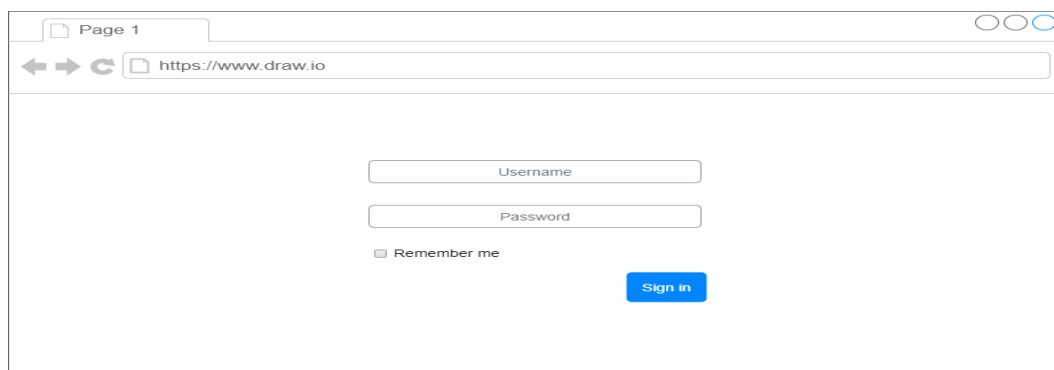


Figure 6: Login page



Figure 6 is the page that will be shown when non-logged in user access the system. It contains username, password, and remember me field.

5.3 Internship coordinator dashboard

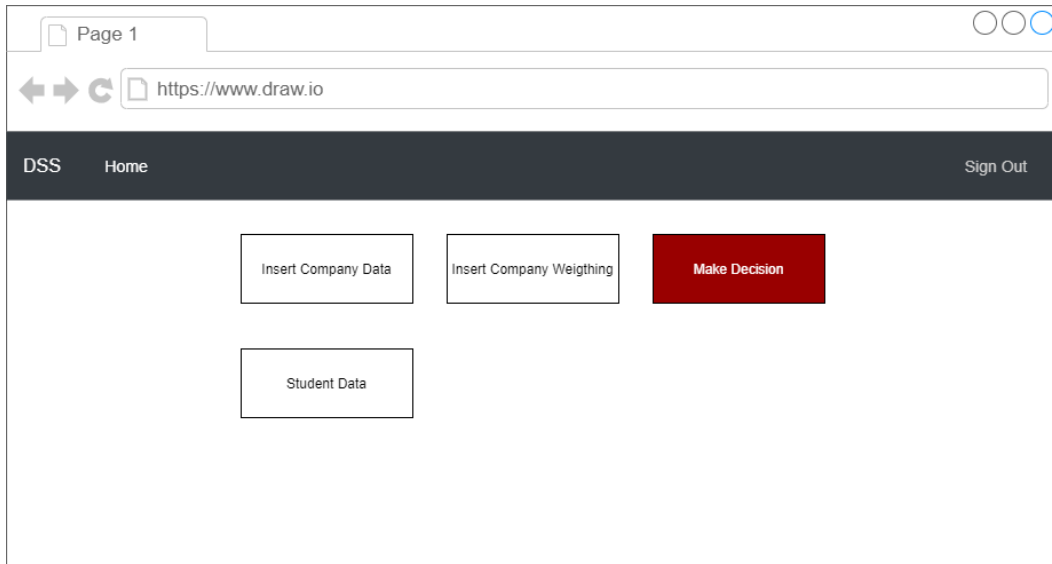


Figure 7: Internship coordinator dashboard

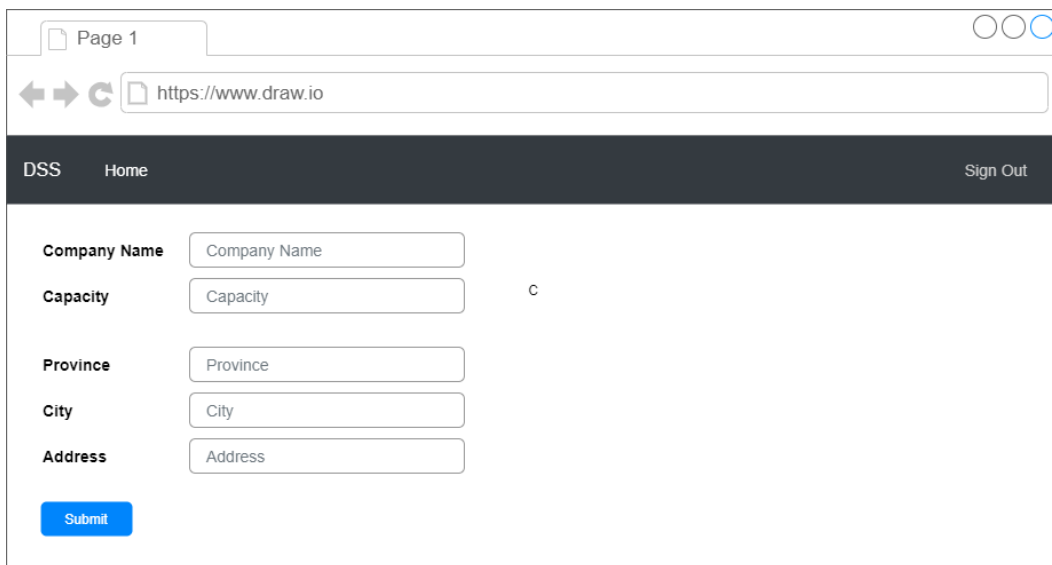


Figure 8: Insert Company Data For Internship Coordinator

Figure 8 is the design of internship coordinator dashboard. It is the page that will be shown after coordinator has logged in successfully. It contains several menu: insert company data, insert company weighting, make decision, and student data.

Figure is the design of insert-company-data page. This page is used to insert company data that is open for internship program. It contains company name, capacity, and address fields (province, city, and detailed address). This page is accessed from menu Insert Company Data in Internship Coordinator Dashboard page (Figure)

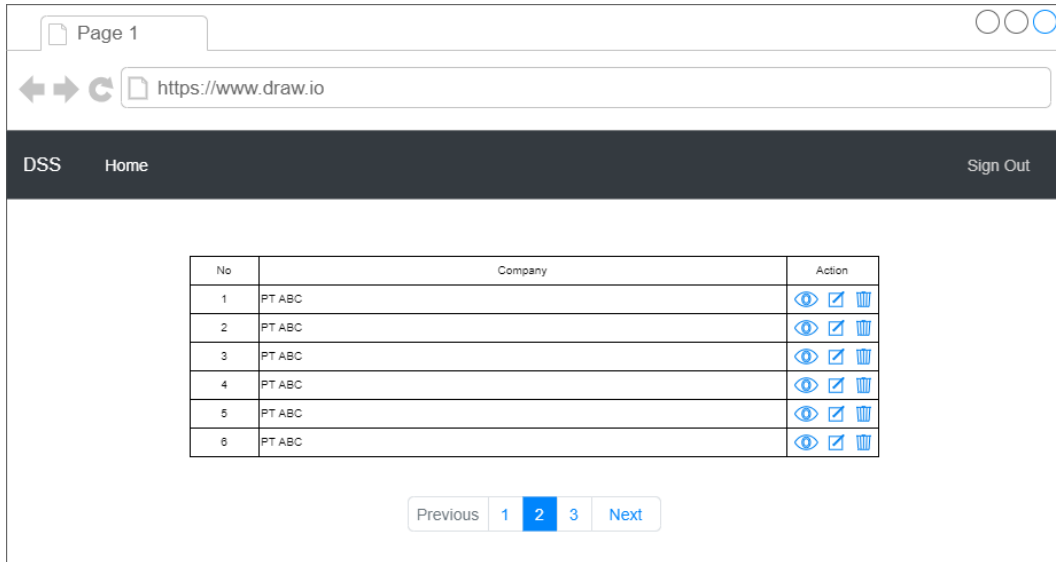


Figure 9: Company Listing Page for Coordinator

Figure 9 shows the company-listing page, which is used to list companies that have been inserted in insert company page (Figure).

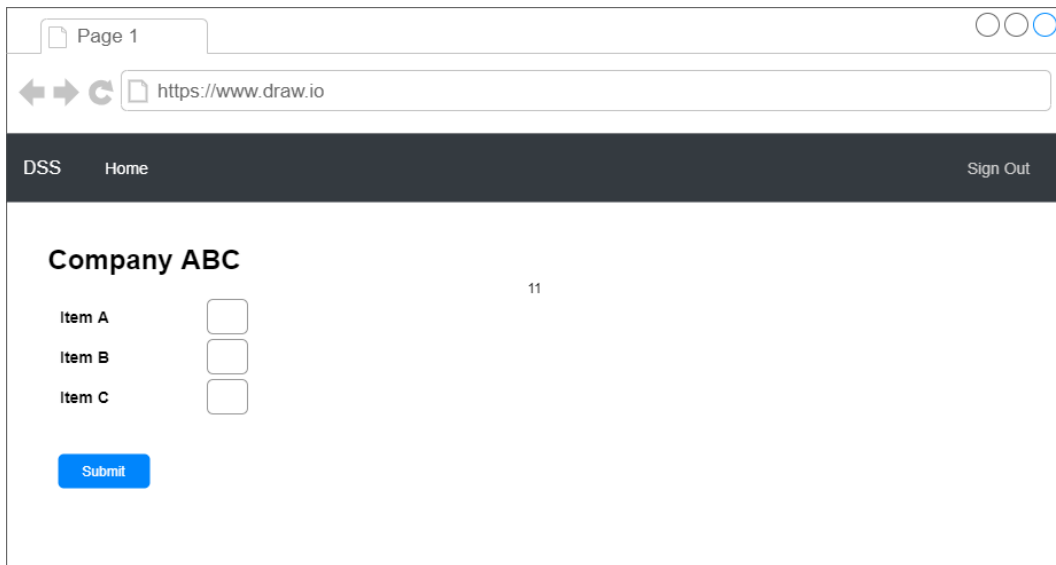


Figure 10: Form for Coordinator to Insert Criteria Weighting

Figure 10 shows form to insert company weighting. The form is accessed by internship coordinator. The value that is inserted will be used in MFEP calculation. The page contains list of competencies and form control to insert the value.

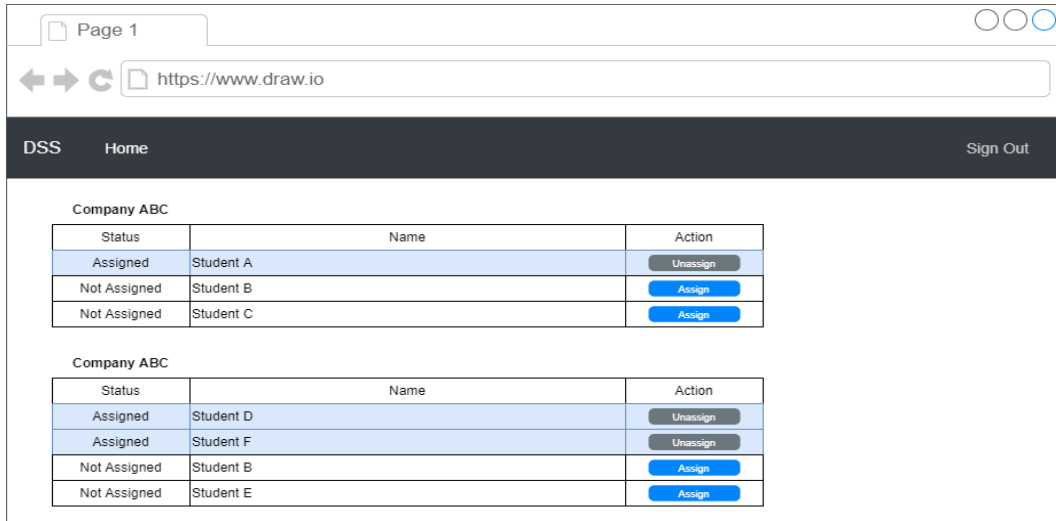


Figure 11: Result Page

Figure 11 is page to show result of MFEP calculation. In this page, internship coordinator can assign student to the company. This page can be accessed from menu Make Decision in Internship Coordinator Dashboard page (Figure)

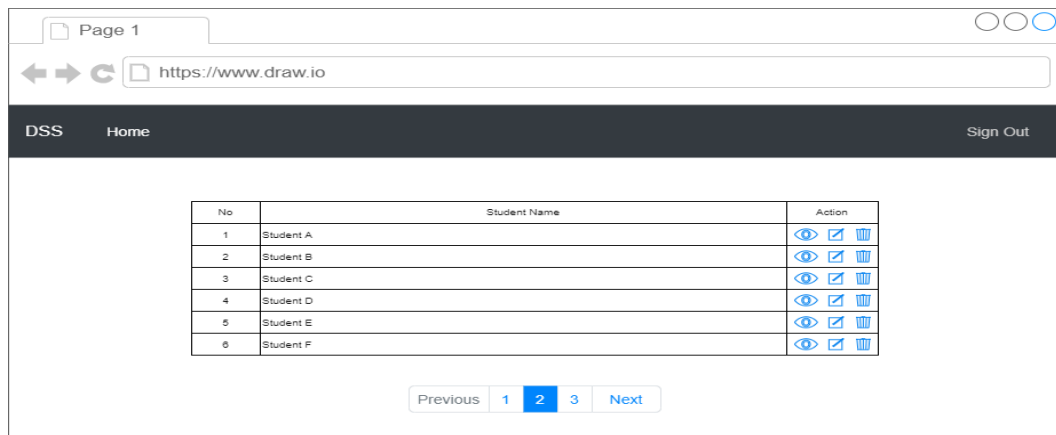


Figure 12: Student Listing Page for Coordinator

Figure 12 show the student-listing page that will be accessed by internship coordinator. Internship coordinator can edit, view, and delete student. This page can be accessed from menu Student Data in Internship Coordinator Dashboard page (Figure).

#### 5.4 Company Listing Page for Students

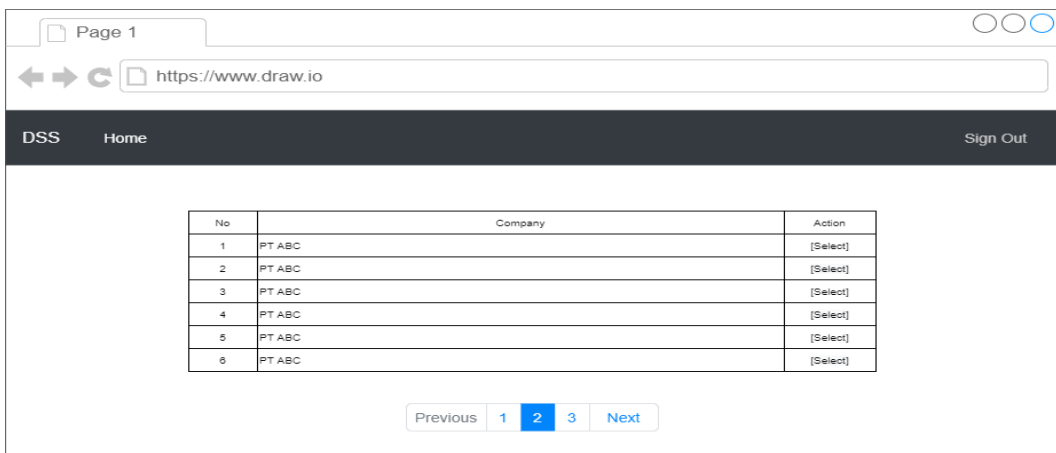


Figure 13: Company Listing Page for Students

Figure 13 shows the company-listing page for students. Student to see the companies that open for internship position can access this. Student to select the companies for internship can also use this page.

### **VI. Conclusion**

Decision Support System for Internship At Department Of Computer and Informatics Engineering Bandung State Polytechnic Using Multifactor Evaluation Process (MFEP) Method can be used to help internship coordinator to do placement or mapping student to companies for internship. However, the given result is only for recommendation, not a final decision. From the MEFP the highest and the lowest TBE is obtained. The highest TBE is 17 obtained by calculation on Karl Coombes that is assigned to CV Melani Narpati. Meanwhile the lowest TBE is 6 obtained by calculation on Marsha York, Amina Santana, Gabrielius , Kylo Thorne, Siobhan Salinas, and Jamel Orozco that is assigned to CV Mayasari.

### **References :**

1. Eom, S.B., et al., *A survey of decision support system applications (1988–1994)*. Journal of the Operational Research Society, 1998. **49**(2): p. 109-120.DOI: <https://doi.org/10.1057/palgrave.jors.2600507>.
2. Eom, S. and E. Kim, *A survey of decision support system applications (1995–2001)*. Journal of the Operational Research Society, 2006. **57**(11): p. 1264-1278.DOI: <https://doi.org/10.1057/palgrave.jors.2602140>.
3. Jessup, L.M. and D.A. Tansik, *Decision making in an automated environment: The effects of anonymity and proximity with a group decision support system*. Decision sciences, 1991. **22**(2): p. 266-279.DOI: <https://doi.org/10.1111/j.1540-5915.1991.tb00346.x>.
4. Harris, J.G. and T.H. Davenport, *Automated decision making comes of age*. MIT Sloan Management Review, 2005. **46**(4): p. 2-10.
5. Zhang, C., C. Liu, and Q. Li, *Multi-factor evaluation method for the assessment of trans-critical organic Rankine cycle with low GWP fluids*. Energy Procedia, 2019. **158**: p. 1626-1631.DOI: <https://doi.org/10.1016/j.egypro.2019.01.380>.