

Domain: Performance Evaluation

Application Name: Employee Performance Evaluation System.

Abstract:

Employee Performance Evaluation System, calculates the holistic rating of an employee depending on the following parameters.

- Number of years the employee has been in the company.
Note: The universe of Discourse is set such that the answer to this question must be above 2 and below 100. Do not enter an answer that is not between 2 and 100. It will result in a, values outside the range of Universe of Discourse exception.
- Number of years of experience the employee has in the domain.
Note: The universe of Discourse is set such that the answer to this question must be above 0.5 and below 50. Do not enter an answer that is not between 0.5 and 50. It will result in a, values outside the range of Universe of Discourse exception.
- Number of years of experience the employee has in the current team and the current project.
Note: The universe of Discourse is set such that the answer to this question must be above 0.5 and below 50. Do not enter an answer that is not between 0.5 and 50. It will result in a, values outside the range of Universe of Discourse exception.
- Rating of the employee in terms of knowledge and skillset.
- Rating of the employee in terms of accuracy and thoroughness.
- Rating of the employee in terms of their analytical ability.
- Rating of the employee given by the team members for team work.
- Rating of the employee given by the employee's manager.

The first three attributes that is, number of years the employee has been in the company, number of years of experience the employee has in the domain and number of years of experience the employee has in the current project and the current team have been fuzzified in the program. These fuzzy values are used to calculate and assert the fuzzy value, **rating** and stored in the knowledge base. The remaining attributes are not fuzzy values. These values and the defuzzied value of **rating**, is used to calculate the **calculated-rating**, which is the holistic rating of the employee, based on which suggestions and comments are given by the system to the employee. The holistic rating is calculated by adding, 20% of rating of the employee in terms of their skillset, 15% of the rating of the employee in terms of accuracy and thoroughness, 15% of the rating of the employee in terms of analytical ability, 15 % of the rating given by the team members for their team work ,15% of the rating given by the employee's manager and 20% of the defuzzied value of **rating**. **rating** is initialized to be a fuzzy set, which is asserted into the knowledgebase depending on the first three attributes, and then defuzzied to calculate the **calculated-rating**. It contributes to 20% of the **calculated-rating** value. Thus, based on the value of the **calculated-rating**, the system provides suggestions and comments to the user.

Features:

- The application starts off by asking the user's name and displays a welcome message.
- It then asks for the following questions to calculate the **calculated-rating**.
 1. Number of years the employee has been in the company? (The answer must be above 2 and below 100, as the value must be within the universe of discourse.)
 2. Number of years of experience the employee has in the domain? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)

3. Number of years of experience the employee has in the current team and the current project? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)
 4. What is the rating of the employee in terms of knowledge and skillset?
 5. What is the rating of the employee in terms of accuracy and thoroughness?
 6. What is the rating of the employee in terms of their analytical ability?
 7. What is rating of the employee given by the team members for team work?
 8. What is the rating of the employee given by the employee's manager?
- Depending on the answer to these questions, the value of **calculated-rating**, is calculated and the performance rating, comments and suggestion is given to the user.
 - The answer to each question contributes a certain percentage to calculate the **calculated-rating**, as explained above.

Rules and Description:

- The global variables company-year, industry-experience, currentteam-exp are fuzzy values, and are defined along with their universe of discourse. These values are used to assert the fuzzy value of the global variable **ranking** in the knowledge base.
- **Initial-terms:** The terms "low" "medium" and "high" are added to the global variables, company-year, industry-experience, currentteam-exp and rating, in this rule.
- **welcome-user:** In this rule, a welcome message is displayed, and the name of the user is asked.
- **assert-answers:** The system asks the user the following questions and answers to these questions are asserted in the knowledge base.
 1. Number of years the employee has been in the company? (The answer must be above 2 and below 100, as the value must be within the universe of discourse.)
 2. Number of years of experience the employee has in the domain? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)
 3. Number of years of experience the employee has in the current team and the current project? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)
 4. What is the rating of the employee in terms of knowledge and skillset?
 5. What is the rating of the employee in terms of accuracy and thoroughness?
 6. What is the rating of the employee in terms of their analytical ability?
 7. What is rating of the employee given by the team members for team work?
 8. What is the rating of the employee given by the employee's manager?
- **rating-set1:** If the values of the global variables company-year is "low", industry-experience is "low" and currentteam-exp is "low", the value asserted for the global variable ranking is "very low or low".
- **rating-set2:** If the values of the global variables company-year is "low", industry-experience is "high" and currentteam-exp is "low", the value asserted for the global variable ranking is "low or medium or high".
- **rating-set3:** If the values of the global variables company-year is "low", industry-experience is "medium" and currentteam-exp is "low", the value asserted for the global variable ranking is "low or medium".
- **rating-set4:** If the values of the global variables company-year is "high", industry-experience is "high" and currentteam-exp is "low", the value asserted for the global variable ranking is "high or medium or low".

- **rating-set5:** If the values of the global variables company-year is “high”, industry-experience is “low” and currentteam-exp is “low”, the value asserted for the global variable ranking is “high or medium or low”.
- **rating-set6:** If the values of the global variables company-year is “high”, industry-experience is “medium” and currentteam-exp is “low”, the value asserted for the global variable ranking is “high or medium or low”.
- **rating-set7:** If the values of the global variables company-year is “high”, industry-experience is “low” and currentteam-exp is “low”, the value asserted for the global variable ranking is “low or medium or high”.
- **rating-set8:** If the values of the global variables company-year is “medium”, industry-experience is “medium” and currentteam-exp is “low”, the value asserted for the global variable ranking is “low or medium”.
- **rating-set9:** If the values of the global variables company-year is “medium”, industry-experience is “low” and currentteam-exp is “low”, the value asserted for the global variable ranking is “medium or low”.
- **rating-set10:** If the values of the global variables company-year is “low”, industry-experience is “low” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “very low or low or medium”.
- **rating-set11:** If the values of the global variables company-year is “low”, industry-experience is “high” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “low or medium or high”.
- **rating-set12:** If the values of the global variables company-year is “low”, industry-experience is “medium” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “low or medium”.
- **rating-set13:** If the values of the global variables company-year is “high”, industry-experience is “high” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “high or medium”.
- **rating-set14:** If the values of the global variables company-year is “high”, industry-experience is “low” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “high or medium or low”.
- **rating-set15:** If the values of the global variables company-year is “high”, industry-experience is “medium” and currentteam-exp is “low”, the value asserted for the global variable ranking is “high or medium or low”.
- **rating-set16:** If the values of the global variables company-year is “medium”, industry-experience is “high” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “medium or high”.
- **rating-set17:** If the values of the global variables company-year is “medium”, industry-experience is “medium” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “medium”.
- **rating-set18:** If the values of the global variables company-year is “medium”, industry-experience is “low” and currentteam-exp is “medium”, the value asserted for the global variable ranking is “medium or low”.
- **rating-set19:** If the values of the global variables company-year is “low”, industry-experience is “low” and currentteam-exp is “high”, the value asserted for the global variable ranking is “low or medium or high”.

- **rating-set20:** If the values of the global variables company-year is “low”, industry-experience is “high” and currentteam-exp is “high”, the value asserted for the global variable ranking is “low or medium or high”.
- **rating-set21:** If the values of the global variables company-year is “low”, industry-experience is “medium” and currentteam-exp is “high”, the value asserted for the global variable ranking is “low or medium or high”.
- **rating-set22:** If the values of the global variables company-year is “high”, industry-experience is “high” and currentteam-exp is “high”, the value asserted for the global variable ranking is “high or very high”.
- **rating-set23:** If the values of the global variables company-year is “high”, industry-experience is “low” and currentteam-exp is “high”, the value asserted for the global variable ranking is “high or medium or low”.
- **rating-set24:** If the values of the global variables company-year is “high”, industry-experience is “medium” and currentteam-exp is “high”, the value asserted for the global variable ranking is “high or medium”.
- **rating-set25:** If the values of the global variables company-year is “medium”, industry-experience is “high” and currentteam-exp is “high”, the value asserted for the global variable ranking is “medium or high”.
- **rating-set26:** If the values of the global variables company-year is “medium”, industry-experience is “medium” and currentteam-exp is “high”, the value asserted for the global variable ranking is “medium or high”.
- **rating-set27:** If the values of the global variables company-year is “medium”, industry-experience is “low” and currentteam-exp is “high”, the value asserted for the global variable ranking is “medium or low or high”.
- **defuzzification and display:** The value of **calculated-rating**, is calculated, from the user’s inputs, and the rating, comments and suggestions are provided based on the rating.

User Manual-Instructions to run the application

- This application can be executed from eclipse.
- The file is called PerformanceEvalFuzzy.clp
- To run on Eclipse, create a new java project
- In the source folder, right click in the src folder->new->file.
- Name the file PerformanceEvalFuzzy.clp.
- Copy the contents of my file PerformanceEvalFuzzy.clp into the file that you created.
- Now go to run->run configuration and in Jess Main Class, replace jess.Main by nrc.fuzzy.jess.FuzzyMain.
- If this change is not made, the exception **jess.Token cannot be cast to nrc.fuzzy.jess.FuzzyToken** will be thrown, as shown below.

```

Jess reported an error in routine fuzzy-match
  while executing (fuzzy-match ?a(0,0,0) "low")
  while executing rule LHS (MTEQ)
  while executing rule LHS (MTELN)
  while executing rule LHS (TECT)
  while executing (assert (MAIN::companyYears (new nrc.fuzzy.FuzzyVal
  while executing defrule MAIN::assert-answers
  while executing (run)
  while executing deffunction run-application
  while executing (run-application)
  while executing (while TRUE (run-application)).
Message: Error during execution.
Program text: ( while TRUE ( run-application ) )  at line 344 in file C:\

```

Nested exception is:

```

jess.Token cannot be cast to nrc.fuzzy.jess.FuzzyToken

```

- After you run the program, the system will ask you to enter your name and ask you to answer the following questions.
 1. Number of years the employee has been in the company? (The answer must be above 2 and below 100, as the value must be within the universe of discourse.)
Note: The universe of Discourse is set such that the answer to this question must be above 2 and below 100. Do not enter an answer that is not between 2 and 100. It will result in a, values outside the range of Universe of Discourse exception.
 2. Number of years of experience the employee has in the domain? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)
Note: The universe of Discourse is set such that the answer to this question must be above 0.5 and below 50. Do not enter an answer that is not between 0.5 and 50. It will result in a, values outside the range of Universe of Discourse exception.
 3. Number of years of experience the employee has in the current team and the current project? (The answer must be above 0.5 and below 50, as the value must be within the universe of discourse.)
Note: The universe of Discourse is set such that the answer to this question must be above 0.5 and below 50. Do not enter an answer that is not between 0.5 and 50. It will result in a, values outside the range of Universe of Discourse exception.
 4. What is the rating of the employee in terms of knowledge and skillset?
 5. What is the rating of the employee in terms of accuracy and thoroughness?
 6. What is the rating of the employee in terms of their analytical ability?
 7. What is rating of the employee given by the team members for team work?
 8. What is the rating of the employee given by the employee's manager?
- **Note: The universe of Discourse is set such that the answer to the questions must be in the range specified in the question. Do not enter an answer that is not in this range. It will result in a, values outside the range of Universe of Discourse exception, as shown below.**

```

| Jess reported an error in routine new
      while executing (new nrc.fuzzy.FuzzyValue ?*company-years* (new nrc.fu
      while executing (assert (MAIN::companyYears (new nrc.fuzzy.FuzzyValue
      while executing defrule MAIN::assert-answers
      while executing (run)
      while executing deffunction run-application
      while executing (run-application)
      while executing (while TRUE (run-application)).
Message: Constructor threw an exception.
Program text: ( while TRUE ( run-application ) )  at line 344 in file C:\Use

```

Nested exception is:

FuzzySet for FuzzyValue has X values outside range of Universe of Discourse

Output samples:

Below are the output samples of the application:

- Image1-Welcome message after typing the user's name.

Welcome to the Performance Evaluation System!

Type employee's name press Enter>

PersonA

| Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

- Image2-Answer to the first question.

Note: The universe of Discourse is set such that the answer to this question must be above 2 and below 100. Do not enter an answer that is not between 2 and 100. It will result in a, values outside the range of Universe of Discourse exception.

Welcome to the Performance Evaluation System!

Type employee's name press Enter>

PersonA

Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

| How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

- Image3-Answer to second question

Welcome to the Performance Evaluation System!

Type employee's name press Enter>

PersonA

Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

- Image4-Answer to third question

Welcome to the Performance Evaluation System!

Type employee's name press Enter>

PersonA

Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

0.5

What is the rating of the employee in terms of their knowledge and skillset in the domain?

The answer must be in the range(1-10)

- Image5-Answer to fourth question.

Welcome to the Performance Evaluation System!

Type employee's name press Enter>

PersonA

Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

0.5

What is the rating of the employee in terms of their knowledge and skillset in the domain?

The answer must be in the range(1-10)

8

What is the rating of the employee in terms of accuracy and thoroughness in their work?

The answer must be in the range(1-10)

- Image6-Answer to the fifth question

Type employee's name press Enter>

PersonA

Performance evaluation will now begin for PersonA.

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

0.5

What is the rating of the employee in terms of their knowledge and skillset in the domain?

The answer must be in the range(1-10)

8

What is the rating of the employee in terms of accuracy and thoroughness in their work?

The answer must be in the range(1-10)

5

What is the rating of the employee in terms of their analytical ability?

The answer must be in the range(1-10)

- Image 7-Answer to the sixth question

Please answer the below questions and

the system will provide the performance rating and suggestions.

Number of years the employee has been in the company?

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

0.5

What is the rating of the employee in terms of their knowledge and skillset in the domain?

The answer must be in the range(1-10)

8

What is the rating of the employee in terms of accuracy and thoroughness in their work?

The answer must be in the range(1-10)

5

What is the rating of the employee in terms of their analytical ability?

The answer must be in the range(1-10)

8

What is the rating of the employee given by the team members for team work?

The answer must be in the range(1-10)

- Image 8-Answer to seventh question

Number of years the employee has been in the company:

The answer must be above 2 and below 100

7

How many years of experience does the employee have in this domain?

The answer must be above 0.5 and below 50

0.5

How many years of experience does the employee have in the current team and the current project?

The answer must be above 0.5 and below 50

0.5

What is the rating of the employee in terms of their knowledge and skillset in the domain?

The answer must be in the range(1-10)

8

What is the rating of the employee in terms of accuracy and thoroughness in their work?

The answer must be in the range(1-10)

5

What is the rating of the employee in terms of their analytical ability?

The answer must be in the range(1-10)

8

What is the rating of the employee given by the team members for team work?

The answer must be in the range(1-10)

9

What is the rating of the employee, given by the employee's manager?

The answer must be in the range(1-10)

Image 9-Performance Rating and the suggestion provided by the system.

What is the rating of the employee in terms of accuracy and thoroughness in their work?

The answer must be in the range(1-10)

5

What is the rating of the employee in terms of their analytical ability?

The answer must be in the range(1-10)

8

What is the rating of the employee given by the team members for team work?

The answer must be in the range(1-10)

9

What is the rating of the employee, given by the employee's manager?

The answer must be in the range(1-10)

8

Rating:6

Comments:

The holistic rating of the employee is average

Suggestion:

The employee can improve their rating

by enhancing their skills and by improving their working style, in the team.

- Image 10-Sample Suggestion

```

What is the rating of the employee in terms of their knowledge and skillset in the domain?
The answer must be in the range(1-10)
3
What is the rating of the employee in terms of accuracy and thoroughness in their work?
The answer must be in the range(1-10)
2
What is the rating of the employee in terms of their analytical ability?
The answer must be in the range(1-10)
6
What is the rating of the employee given by the team members for team work?
The answer must be in the range(1-10)
6
What is the rating of the employee,given by the employee's manager?
The answer must be in the range(1-10)
7
Rating:4
Comments:
The employee has a low holistic rating.
Suggestion:
The employee must work hard to improve their rating
They can get help from the team to enhance their skillset
They can set up meetings with their manager frequently.

```

- Image 11-Sample output

```

What is the rating of the employee in terms of their knowledge and skillset in the domain?
The answer must be in the range(1-10)
6
What is the rating of the employee in terms of accuracy and thoroughness in their work?
The answer must be in the range(1-10)
7
What is the rating of the employee in terms of their analytical ability?
The answer must be in the range(1-10)
3
What is the rating of the employee given by the team members for team work?
The answer must be in the range(1-10)
1
What is the rating of the employee,given by the employee's manager?
The answer must be in the range(1-10)
2
Rating : 10
Comments:
The employee has a great holistic rating
The employee is very resourceful in the team and is
subjected to a raise in the salary annually
Congratulations!

```

Conclusion:

Thus, as explained above, this application provides the performance rating, comments and suggestions to the user depending on the inputs given by the user. The screen shots of the comments and suggestions, depending on the inputs are displayed in the section **Output Samples**.