**Problem Statement:** Co-relation of Attendance and Performance in Internal Assessment(s).

**Problem Explained:**

The performance of students in the courses offered by the educational institution is measured via the multiple internal assessments and via the university examination. The type and number of such internal assessments can be varied, based on the nature of the course – theory or lab.

This problem statement sheds light on the performance of the students in the various internal assessments (IAs) in relation to the attendance of the students in the classes conducted for those respective courses. While it is natural to expect a higher attendance percentage would lead to better performance in the IAs, there may be some exceptions with students having lesser attendance outperforming those with higher attendance. Such students can be identified, and their study methods analyzed to determine if the same can be employed to help other students perform better. On the flip side, under-performance in the IAs with a corresponding low percentage of attendance indicates an area of concern for such students.

In this problem statement, while the student gets to see only his/her performance in IAs of various courses in relation to the corresponding attendance in those courses for the selected academic year and term, the faculty can see this data for all those courses that he/she is in-charge of. The HoD gets to see this data for all the students of his/her department, and the Principal can see the data of students across all the departments of the institution.

**Selection Screen**

* Academic year (single select)
  + Mandatory/Optional: Mandatory
  + Default Value: Current academic year
  + List of Values: Yes
* Term: The multi-select values to be displayed will be based upon the type of user, as described below. Details of the terms applicable for an academic year are available in the collection *dhi\_term\_detail*.
  + Student/Faculty: All the terms applicable per the entered academic year but only those during which the faculty had taken courses. Note that the faculty may not have taken courses during all the terms of an academic year.
  + HoD: All the terms that are applicable for the selected academic year.
  + Principal: All the terms that are applicable for the selected academic year.
* Branch (Option available only to the Principal. For the other users – HoD, Faculty and Student, it is limited to their respective branch only; for them, it should be defaulted from their user profile which they cannot change.)
  + Mandatory/Optional: Optional
  + Default Value: Spaces (as described above)
  + List of Values: Yes

**Detailed Procedure:**

1. Based on the entered selection criteria, scan the documents within the collection ***dhi\_internal***.
2. For each of the selected courses, there can be multiple documents – one for each internal assessment (IA).
3. For each internal assessment of the course get the following:
   * maximum marks (*collegeMaxMarks*)
   * details of each student who has taken that internal assessment and the marks scored (*usn, name, candidateId, totalScore*)
4. For each of the students selected above and for the course selected above, get the attendance percentage (*percentage*) from the collection *dhi\_student\_attendance*.

**Presentation of Results:**

The initial selection screen has the following fields – *Academic Year*, *Term*, *Branch*. While *Academic Year* is a single-select field, *Term* is multi-select. The values for these can be selected from drop-downs. The value for the field *Branch* is defaulted from the user profile for Student, Faculty and HoD; the Principal gets to select any single value from the drop-down list.

Depending on the type of user, the results should be presented in the following ways.

Student:

* Based on the selection criteria, details of the courses studied by the student should be displayed using a bar graph. Two bars should be displayed along the x-axis for each course – the first bar for the performance of the student in all IAs of that course as a percentage value, and the second bar for the attendance of that student in that course, again as a percentage value. The length of these bars along the y-axis represents the percentage values for these bars.
* Hovering over either of the bars of any course should display the exact values of the combined performance in all IAs for that course and that of the corresponding attendance percentage.
* Clicking on either of the bars of any course should display the following details:
  + The maximum marks for each IA of the course, and the marks secured by the student in that IA of the course
  + Finally, the number of classes conducted in that course and the number of classes attended by the student

Faculty:

* Based on the selection criteria, the courses taught by the faculty should be displayed using a bar graph. Two bars should be displayed along the x-axis for each course – the first bar being the average performance of all the students taking that course in all IAs of that course as a percentage value, and the second bar being the average attendance percentage of all the students who have taken that course. The length of these bars along the y-axis displays the percentage values for these bars.
* Hovering over either of the bars of any course should display the exact values of these graphs – average of the students’ performance across all IAs and the average of their attendance in that course as a percentage value.
* Clicking on either of the bars of any course should display the following details:
  + The maximum marks for each IA of the course, and the average marks secured by the students in that IA of the course
  + Finally, the average of the attendance percentage of all the students in that course

HoD:

* When the user happens to be an HoD, all the faculty members of the department who have taken one or more courses per the entered selection criteria are listed in the left panel.
* On selecting any of the faculty members listed in the left panel, the functionality of the program remains the same as that when a faculty member logs in.
* The scrollable list of faculty members names displayed in the left panel can be sorted in ascending/descending order of their names.

Principal:

* When the Principal logs in, the *Branch* field on the initial selection screen becomes available for input. On selecting a branch from the available list of values, the functionality will be like what is made available to the HoD user.

**List of attributes / Information needed to analyze the problem statement:**

dhi\_term\_details

* academicYear
* termStartDate
* termEndDate
* current

academicCalendar (can be more than one)

* termNumber
* termName
* scheme
* current
* year
* termStartDate
* termEndDate
* termType
* degreeId
* degreeBatch

dhi\_internal (can be multiple for a student who is taking a course during a semester)

* academicYear
* degreeId
* iaNumber

departments

* deptId
* deptName
* section
* termNumber
* termName

faculties

* facultyGivenId
* facultyName
* completionStatus

studentScores (can be more than 1)

* usn
* candidateId
* name
* totalScore

evaluationParameters

* collegeMaxMarks
* courseCode
* courseName
* termStartDate
* termEndDate

dhi\_student\_attendance

* degreeId
* courseCode
* courseDeptId

students (can be more than 1)

* usn
* candidateId
* studentName
* totalNumberOfClasses
* presentCount
* absentCount
* academicYear
* termStartDate
* termEndDate

(Add other collections, documents and embedded objects that supplement the information that is provided by those listed above.)