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**“AN INTELLIGENT MOBILE-BASED SYSTEM FOR STUDENT
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AN INTELLIGENT MOBILE-BASED SYSTEM FOR STUDENT ACADEMIC PERFORMANCE PREDICTION, RISK ASSESSMENT, AND PERSONALIZED LEARNING

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ABSTRACT

Management systems used within educational institutions mainly serve the purpose of storing and displaying student information, such as attendance and marks. However, these management systems do not have any form of intelligence for analysing data and offering useful suggestions to the student population. This study discusses the development of an Academic Support System that uses Android and Artificial Intelligence to improve the performance of the students based on data analytics. The Academic Support System uses Android to collect academic data from students, such as attendance and marks. The system analyses the collected data to predict future academic risks and come up with study plans customized to individual students. The system also comes equipped with an AI Chat bot that assists the student academically by answering all sorts of questions that he/she may have. The system has been built using Android at the front end and Firebase at the back end.

Keywords: Android, Artificial Intelligence, Academic Support System, Chatbot, Student Performance, Risk Prediction

1. INTRODUCTION

There has been an enormous increase in digital technology that has greatly changed the way people use it in different industries. For example, most institutions of learning have adopted academic management systems. Such a system is also referred to as an enterprise resource planning (ERP) system whose main function is the storing and managing of data pertaining to students' attendance, marks, and other personal details. While such a system is quite efficient and effective, its main problem is that it does not offer any useful insight concerning how to improve academic performance. Thus, many students face difficulty in analyzing their performance and discovering areas of improvement.

The development of artificial intelligence (AI) has presented an opportunity for improving the current state of academic performance. AI technologies have the ability to analyze large amounts of data from different areas of learning and identify various trends. As a result, the system will be able to come up with recommendations that can help students

enhance their academic achievements. The project demonstrates the Academic Support System using Android and Artificial Intelligence, which aims at enhancing the performance of students by offering intelligent assessment and providing them real-time help. The system uses academic information like attendance and marks, analyses it to determine the performance trends, and provides prediction for the risk level of academic problems for each individual. Accordingly, a personal study schedule is recommended to them. Furthermore, a chatbot that operates based on AI is built to offer instant academic support to students and respond to their queries.

1. LITERATURE REVIEW

Several studies have explored the use of machine learning and educational data mining for predicting student academic performance. Alturki et al. reviewed different approaches for academic outcome prediction and highlighted the importance of historical student data. Ersozlu et al. examined various machine learning techniques used in educational applications, demonstrating their potential for performance prediction and student classification. Other studies focused on identifying academically at-risk students through attendance, grades, and other academic attributes, enabling early intervention. Research on educational chatbots has also shown their usefulness in providing academic assistance and answering student queries. Recent studies have further integrated prediction with personalized recommendations and learning plans. However, most existing systems focus on individual functionalities such as prediction, risk identification, or chatbot-based assistance. Therefore, there is a need for an integrated, simple, mobile-based intelligent system that combines academic performance prediction, risk assessment, personalized study recommendations, and AI chatbot support in a single platform.

S.No.	Study	Major Focus	Limitation / Research Gap	Relevance to Proposed System
1	Alturki et al. (2022)	Academic outcome prediction	Focus mainly on prediction	Performance prediction
2	Ersozlu et al. (2024)	ML in educational data	Different ML methods studied separately	ML algorithm selection
3	EDM study (2022)	Academic performance prediction	Need for timely intervention	Risk identification
4	Academic Success Review (2020)	Early prediction of student success	Implementation complexity	Early-warning mechanism
5	Exam Performance Prediction (2024)	Classification algorithms	Algorithm-dependent performance	Risk classification
6	Ramandanis&Xinogalos (2023)	Educational chatbots	Challenges in effective chatbot implementation	AI chatbot
7	Kalita et al. (2025)	Educational Data Mining	Privacy, ethics and integration challenges	Overall AI-EDM framework
8	Kord et al. (2025/26)	Prediction + course recommendation	Complex multi-model approach	Personalized study planning
9	2026 XAI Review	ML/DL/XAI prediction	Limited explainability	Explainable predictions

2. PROPOSED SYSTEM

An academic support system will involve mobile application with the incorporation of android technology along with artificial intelligence techniques aimed at boosting student's performance academically. It entails collecting of relevant data like attendance and marks from users for storing in one single place through the use of Firebase database, then analysis is done on that data using logical analysis technique for determining student performance. Students will be asked to authenticate themselves on this application by entering their login details for accessing the system. Once successfully logged in, users will be presented with dashboards for accessing the different modules in the application including Attendance, study plans, chatbot, and Performance Analysis. Attendance is used for tracking attendance percentage while performance analysis is used for evaluating the performance based on marks obtained in order to find out weak subjects for students. Based on such analysis, prediction is made on the level of danger of students' performance that can either be low, medium, or high. The next process after prediction is for the study plans to make relevant recommendations for improving academic performance. Also included in the application is chat bot that provides immediate response on student queries.

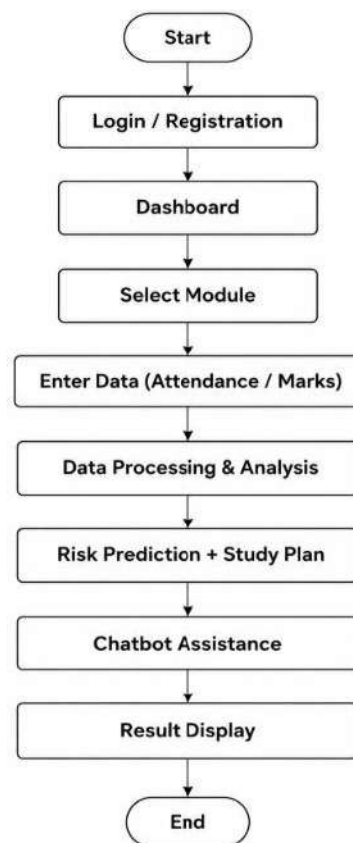


Fig. 1: Workflow of the Academic Support System

4. SYSTEM ARCHITECTURE

The architecture of the proposed system is formulated to combine mobile app development, cloud storage of data, and intelligent data processing. The system is built with an application development environment called Android that is used as the front end for interaction of the application with users. Firebase is employed as the backend, along with the use of a database management system (DBMS) that stores academic data like attendance and marks.

The system consists of three tiers: the user interface tier, the application logic tier, and the data storage tier. The UI tier controls interactions of the user with the system by implementing all functions related to login, dashboard display, and modules' usage. The application logic tier processes the inputs from users, analyses information, and calculates results that include predictions of students' risks and personalized studying schedules. Finally, the data storage tier, implemented with Firebase, takes care of the safety of data and their real time synchronization. Chatbot functionality is included in the system based on API communications or rule-based logic applied by students during interactions.

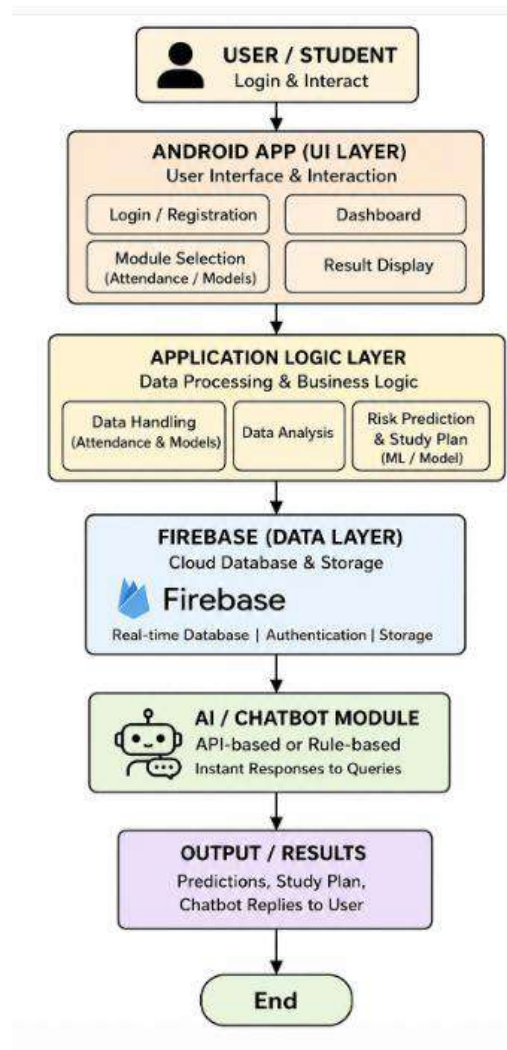


Figure 2: System Architecture of the Academic Support System

5. MODULE DESCRIPTION

The Academic Support System comprises various modules that interact in order to offer a full fledged solution for monitoring and enhancing the performance of the learners in the classroom environment. Each module plays a particular role in the functionality of the system as well as the ease of use.

The Student Authentication Module deals with the registration and authentication processes in the system. It makes sure that no unauthorized user can log into the system. In other words, this module is meant for protecting users' data and maintaining security in the system.

The Home Dashboard Module is the home page of the system. This module displays information about student attendance and performance. Additionally, the module enables navigation through the application by means of displaying other available modules for use.

The Attendance Management Module handles student attendance information. It computes the attendance percentage and assists students in keeping track of their attendance status. The Attendance Management Module is vital in determining students with poor attendance records.

The Study Plan Generation Module offers customized study guidance according to the performance of the students. It detects weaknesses and recommends how the student can improve his/her performance.

The AI Chatbot Module offers students an opportunity to communicate with the system instantly and receive feedback regarding their questions. The chatbot module assists the students academically. The Performance Analysis and Risk Prediction Module evaluates the performance of the student by analyzing his/her marks and attendance to classify his/her performance status. Students are grouped into various risk categories such as low risk, medium risk, or high risk.

6. DATASET DESCRIPTION

Performance of the developed Academic Support System is determined by the academic data set collected from the students. In this project, data set contains basic academic information such as student ID, subjects, attendance percentage, internal marks, assignment marks, and overall performance of each student. These data sets are considered as the primary inputs for evaluating students' performance and developing academic support. Attendance data allows identifying whether the student attends classes regularly or not. While marks and assignments indicate the academic performance of the students in particular subjects.

Through these academic parameters, the system will be able to identify the learning state of each student and predict which students need extra help. The data set is quite straightforward, systematic, and appropriate for education purpose.

In this project, the dataset is developed mostly for demonstration and evaluation purposes. Values contained in the dataset are generated considering hypothetical student academic information in a realistic way. These datasets are then saved in the database and retrieved by the Android application to perform specific functions like generating study plans, chatbot support, and predicting students' performance.

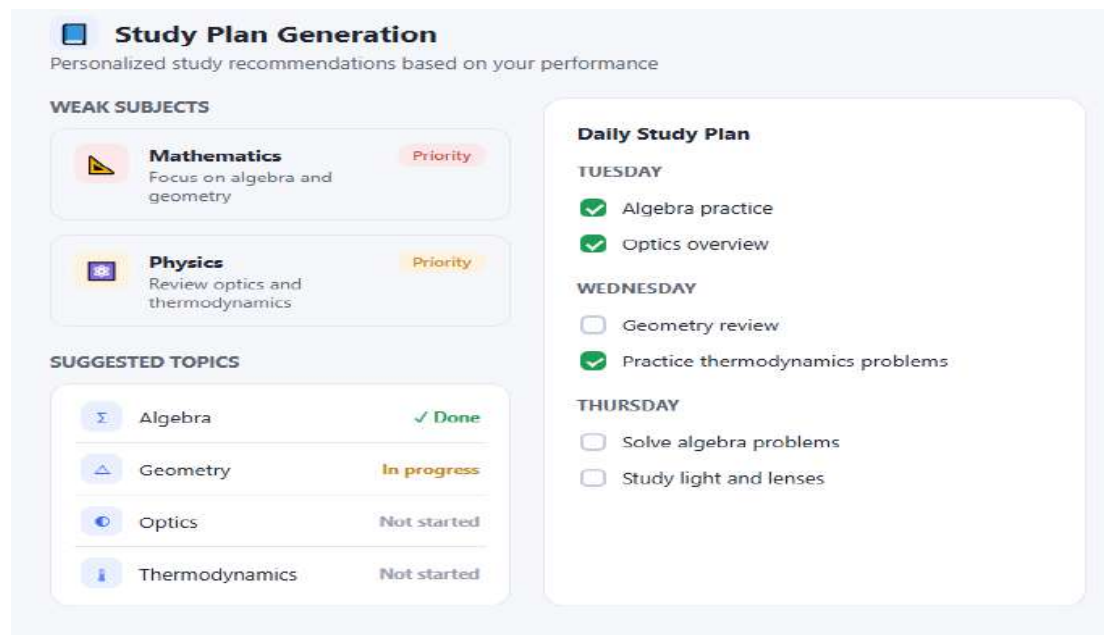


Fig. 3: Attendance Management Screen

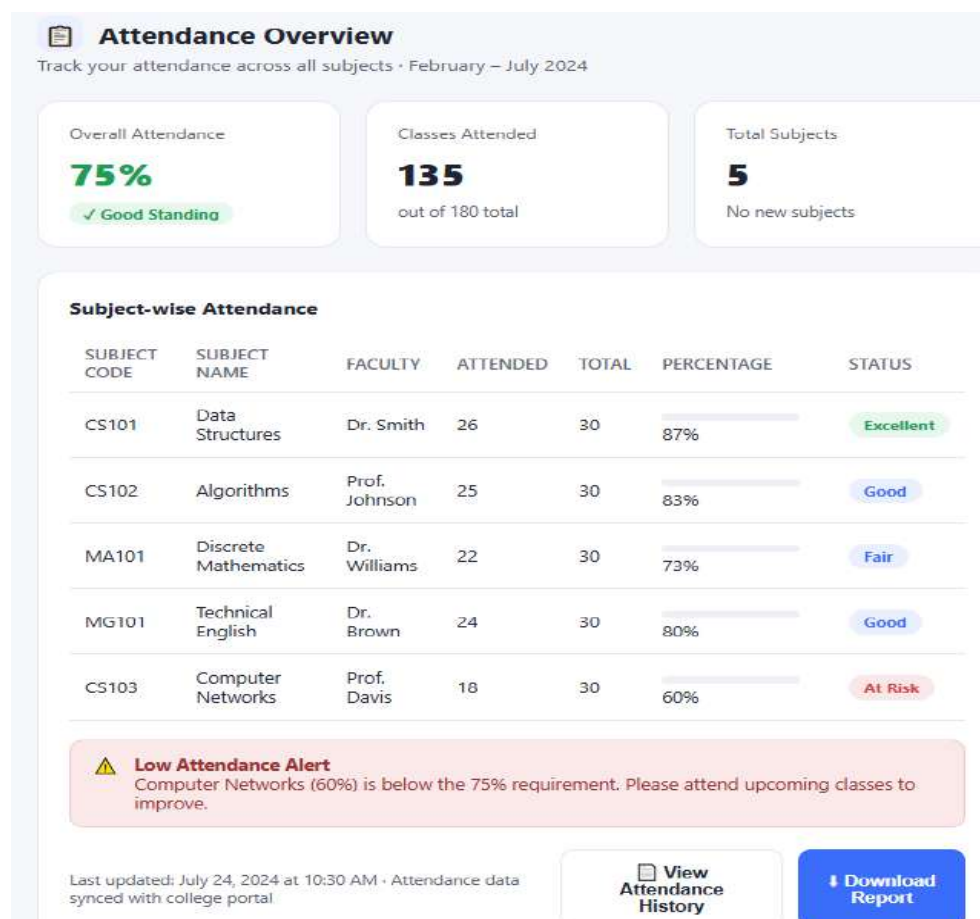


Fig. 4: Study Plan Generation Screen

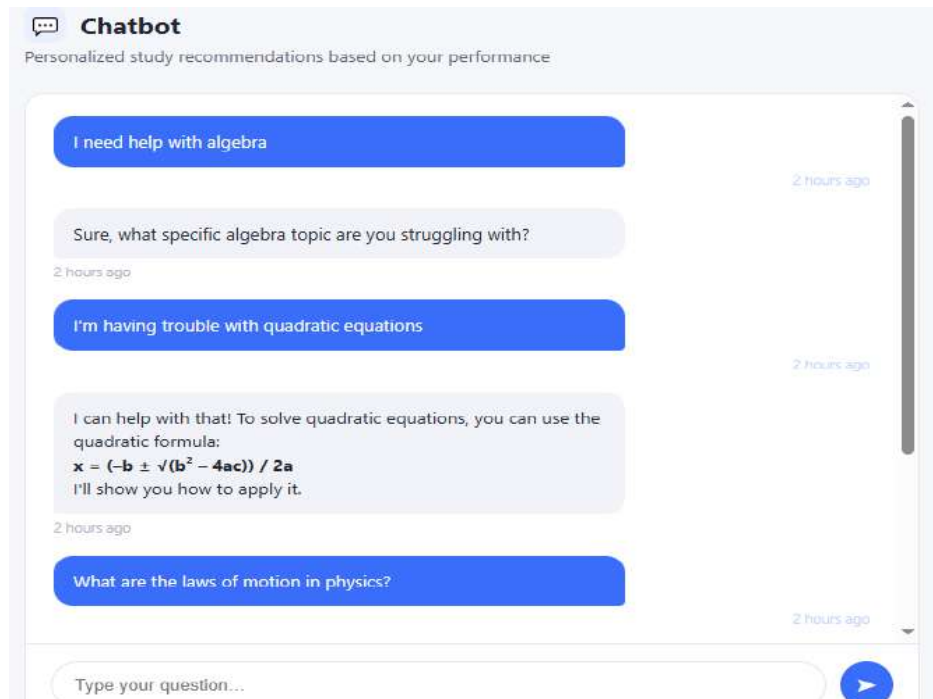


Fig. 5: AI Chatbot Interface

7. AI / ML IMPLEMENTATION

Intelligence techniques that can be employed to analyse student academic information in order to give proper academic assistance. The primary goal of this AI technique will be the determination of poor performance area, monitoring of the performance of the student, and provision of academic guidance. The intelligent approach adopted in this project is based on rule-based analysis and prediction. The intelligence of the system is appropriate for the purpose of academic monitoring since it involves easy prediction and analysis methods.

The AI will consider some of the important variables related to academic performance, including percentage of attendance, internal marks, and subject wise performance level. These values will be retrieved from the student information set and analysed using the academic thresholds defined. As a result of this analysis process, the students will be classified depending on their level of academic performance as low risk, medium risk, and high risk students. For instance, if a student has poor attendance and consistently gets poor marks in several courses, the system identifies such a student as being at academic risk. For this kind of student, there are various recommendations made by the application such as putting focus on poor subjects, spending more time studying, better attendance, and adopting a study plan. However, for those having good academic values, they get normal learning suggestions by the application. This makes the application flexible and student oriented.

A simple prediction system is adopted in this project compared to a complicated machine learning system since the objective of the project is to develop an effective academic assistance system. It has been ensured that the logical structure is easy enough to process academic values and suggest necessary recommendations within a short time frame. Such an approach is appropriate for academic applications involving students.

Apart from predicting the academic outcomes, the AI/ML technology can be used to improve user interaction through the use of the AI/ML chatbot. The chatbot will help in answering any academic questions raised by the learner regarding attendance, study

schedule, academic uncertainties, and general learning recommendations. The chatbot will assist in acting as a supplementary academic assistant in the application and help learners receive answers immediately without having to contact faculty members for all the small queries. Hence, AI/ML application in the suggested model is very important as it will help in converting the collected data on students' academic performance into useful academic insights.

8. RESULTS AND ANALYSIS

To assess the efficiency and performance of the proposed Academic Support System, a number of sample student academic records were used. The system proved successful in collecting the data regarding attendance, marks, and subject wise academic data of the user. On the basis of the provided inputs, the software yielded valuable output such as attendance details, study plans, response from chatbots, and level of academic risks.

The Attendance Calculation Module worked efficiently in calculating attendance percentage and identifying students with poor attendance. The Study Plan Generator Module recommended individualized academic guidance according to the student's academic performance of different subjects. This enabled the students to emphasize their weak areas.

Results from the Performance Analysis and Risk Prediction feature were very useful since it could help categorize the students based on their level of risk, which ranged from low, medium, and high risk. Low attendance and marks led to being categorized under high risk while high attendance and marks led to being categorized under low risk. The process assisted in comprehending the state of academic performance of the learners.

The whole functionality of the program was satisfactory because it provided useful real-time academic information in a very simple manner. The results suggest that the proposed program is quite reliable and can be used effectively as an academic assistance tool.

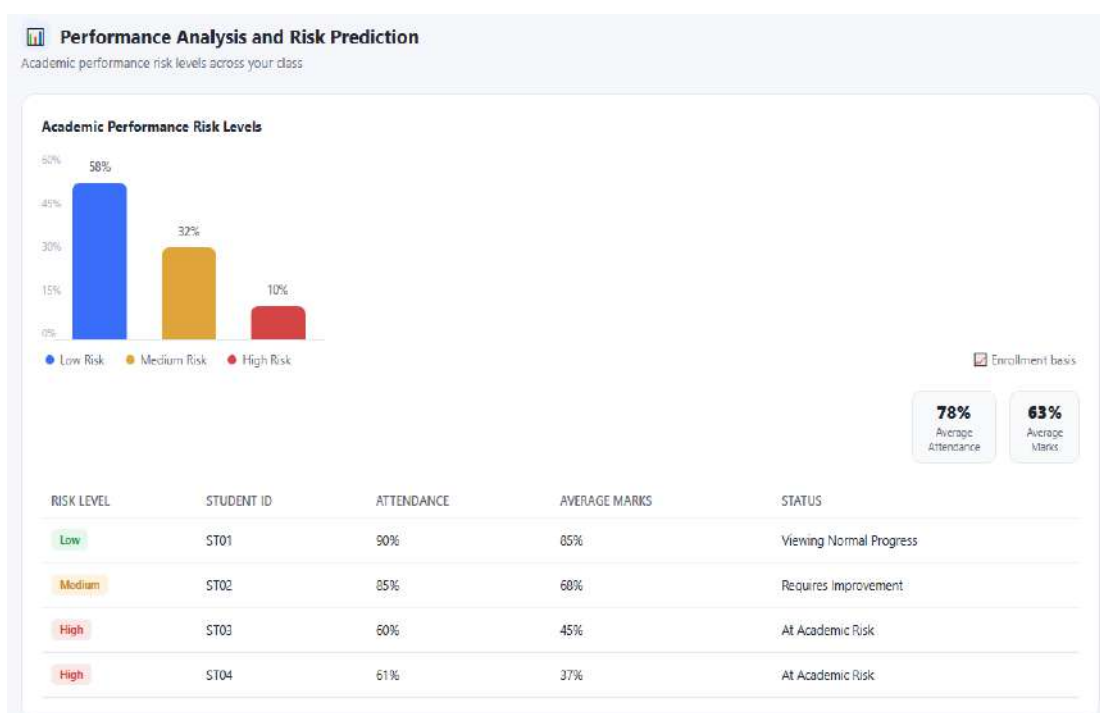


Fig. 6: Performance and Risk Analysis Output

9. CONCLUSION

The Academic Support System based on Android and Artificial Intelligence has been designed with an intention to overcome the limitations in the conventional academic management systems and make the process of learning more effective for the students. Most of the time, the existing academic management system is used only to maintain and show the information regarding attendance, grades, and other details about the students. Though the conventional academic management system is useful for keeping track of the academics of the students, there are some intelligent things that cannot be done through these systems.

In order to mitigate the disadvantages faced by these existing applications, this application will have additional functionalities other than just being a platform for recording attendance and academic performance of the students. The application has an attendance analysis module, an individual study plan generation module, an AI chatbot to assist the users, and a performance risk prediction module. All these added functionalities enable the platform to be more user-friendly, engaging, and academically useful as opposed to the traditional methods available.

This project has successfully shown that it is possible to provide valuable insights on the academics of a student based on intelligent processing of their academic data. The Attendance Management Module will assist in identifying students with low attendance, whereas the Study Plan Generation Module will assist students in concentrating on their weak areas through effective academic suggestions. Additionally, the AI Chatbot Module will assist the user in obtaining quick academic help while increasing the application's engagement, and finally, Performance Analysis and Risk Prediction Module will help in identifying students at risk.

In summary, the project represents a cutting edge methodology for managing students' academic performance through a blend of academic monitoring and artificial intelligence. The need for relying completely on manually controlled approaches is minimized while encouraging students to make academic decisions that benefit them. Future improvements in the project could involve using machine learning algorithms, faculty academic monitoring, notification systems, recommendations per subject matter, and predictive academic analytics.

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