Automated Student Grade Calculation Using RPA

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report **"Automated Student Grade Calculation Using RPA"** is the bonafide work of **"KRISHNAVARTHINI K H (220701136)"** who carried out the project work for the subject OAI1903 - Introduction to Robotic Process Automation under my supervision.

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Internal Examiner   **External Examiner**

ABSTRACT

This project, titled "Automated Student Grade Calculation Using RPA," focuses on streamlining the process of calculating student grades using Robotic Process Automation (RPA). In educational institutions, grading large numbers of students manually can be time-consuming and prone to human error. This project presents a solution that automates the process, ensuring efficiency, accuracy, and consistency. The RPA bot reads student data from an Excel file, calculates total marks by aggregating individual subject scores, and then assigns grades based on predefined criteria. The project uses UiPath as the RPA tool to build a workflow that automatically loops through student records, applies grade conditions (e.g., A for marks above 90, B for 80–89, etc.), and updates the Excel sheet with the calculated grades. This automated process minimizes manual effort and provides scalability for handling larger datasets. Additionally, error-handling mechanisms are integrated to manage empty cells or invalid data, ensuring robust performance. The project demonstrates how RPA can be applied to academic workflows, reducing administrative burdens and improving overall accuracy in grading systems. This project is ideal for educational institutions looking to enhance operational efficiency with minimal resource investment.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

CHAPTER NO.   **TITLE**   **PAGE NO.**

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATION	ACRONYM
RPA	Robotic Process Automation
AI	Artificial Intelligence
API	Application Programming Interface

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The process of calculating student grades is a crucial aspect of academic administration, but it can often be a time-consuming and error-prone task when performed manually. As educational institutions grow and the number of students increases, manual grading becomes inefficient and challenging to scale. This project, titled "Automated Student Grade Calculation Using RPA," aims to address these challenges by leveraging Robotic Process Automation (RPA) to streamline the grade calculation process, ensuring accuracy, consistency, and efficiency.

By employing UiPath as the RPA tool, the system automates the entire workflow of grade calculation. It reads student data from an Excel file, computes total marks by aggregating individual subject scores, and assigns grades based on predefined criteria. For example, the system assigns an 'A' grade for scores above 90 and a 'B' grade for scores between 80 and 89. This automation eliminates human errors, accelerates the grading process, and ensures consistent application of grading policies.

To enhance reliability, the system incorporates robust error-handling mechanisms to address common data issues, such as empty cells or invalid entries. It not only flags errors for review but also ensures that the automated process can handle real-world data complexities effectively. Additionally, the solution is designed to be scalable, allowing institutions to process large datasets effortlessly.

This project demonstrates the transformative potential of RPA in academic workflows, significantly reducing administrative burdens and enhancing operational efficiency. By automating repetitive tasks like grade calculation, educational institutions can allocate their resources to more strategic and value-added activities, ensuring improved accuracy, consistency, and a streamlined grading system.

1.2 OBJECTIVE

The objective of the project "Automated Student Grade Calculation Using RPA" is to develop an efficient and reliable system for automating the process of student grade calculation. By leveraging Robotic Process Automation (RPA), the project aims to streamline the grading process, reducing the time and effort required for manual calculations. The system is designed to ensure high accuracy by minimizing human errors and applying consistent grading criteria across all student records. It is scalable, allowing educational institutions to handle large datasets effortlessly, and integrates robust error-handling mechanisms to address issues like missing or invalid data. Overall, the project seeks to reduce the administrative burden on institutions, enabling them to allocate resources to more strategic tasks while maintaining accuracy, efficiency, and consistency in their academic workflows.

1.3 EXISTING SYSTEM

In the existing system, the process of calculating student grades is predominantly manual, requiring significant time and effort from educators and administrative staff. Student scores are typically compiled from various sources, aggregated, and evaluated against predefined grading criteria. This manual approach is prone to errors such as miscalculations, data entry mistakes, and inconsistencies in applying grading rules. Furthermore, as the number of students increases, the workload and the risk of inaccuracies grow, making the system inefficient and difficult to scale. There is often no integrated mechanism for handling anomalies like missing or invalid data, which further complicates the process and may lead to delays or incorrect grade assignments. This traditional method lacks the efficiency, accuracy, and scalability required to meet the demands of modern educational institutions.

1.4 PROPOSED SYSTEM

The proposed system introduces an automated solution for student grade calculation using Robotic Process Automation (RPA). Leveraging UiPath, the system is designed to streamline the grading process, ensuring efficiency, accuracy, and scalability. It automates the workflow by reading student data from an Excel file, aggregating individual subject scores to compute total marks, and assigning grades based on predefined criteria. For instance, grades like 'A' for scores above 90 and 'B' for scores between 80 and 89 are consistently applied across all records.

The system incorporates robust error-handling mechanisms to manage issues such as empty cells, invalid data, or formatting errors, ensuring reliable performance. It updates the Excel sheet in real time with calculated grades, providing immediate and accurate results. Additionally, the system is highly scalable, allowing it to handle large datasets efficiently, making it suitable for institutions of varying sizes. By automating repetitive tasks, the proposed system reduces manual effort, minimizes human error, and ensures consistency in grade assignment, offering an efficient and reliable solution for academic institutions.

CHAPTER 2

LITERATURE REVIEW

2.1 Survey on RPA in Education

Robotic Process Automation (RPA) is increasingly recognized as a valuable resource in education, streamlining teaching processes. For instance, RPA has been successfully implemented in grading assignments and managing student records, significantly reducing the workload of educators. However, challenges remain, particularly in automating tasks that require social interaction and adaptation to individual learning needs. The literature review of research papers related to RPA in Education is listed below:

Robotic Process Automation (RPA) has gained significant attention for its ability to streamline repetitive and time-consuming tasks across industries, including education. Studies have demonstrated the potential of RPA in automating administrative workflows such as student data management, attendance tracking, and grade calculation. By replacing manual processes, RPA reduces human error, improves operational efficiency, and allows institutions to focus on strategic academic activities. The adoption of RPA in education reflects a growing trend towards leveraging technology to address administrative challenges effectively.

2.2 Survey on Challenges in Manual Grading:

Manual grading processes are often inefficient, especially in institutions with large student populations. Research highlights common issues, such as inconsistencies in grade assignment, miscalculations, and data entry errors. These challenges not only affect accuracy but also increase the workload on educators and administrative staff. Studies underline the limitations of manual methods in handling larger datasets, where the risks of delays and errors are amplified. This has created a demand for automated solutions capable of addressing these inefficiencies.

2.3 Survey on Benefits of Automation in Academic Workflows:

Automation, particularly through tools like RPA, has shown significant benefits in academic workflows. Literature points to improvements in speed, accuracy, and consistency when automated systems are implemented for tasks such as grade calculation and record management. Automated systems also offer scalability, enabling institutions to manage large datasets without compromising reliability. Furthermore, error-handling capabilities in RPA ensure that data anomalies, such as missing or invalid fields, are addressed systematically, improving overall data integrity.

2.4   Summary of the Case Studies and Practical Applications:

Case studies from educational institutions adopting automated grading systems highlight remarkable improvements in operational efficiency and accuracy. For example, schools and universities using RPA for grade calculation have reported reduced processing times and near-zero error rates. These real-world applications demonstrate how automation can transform academic processes, making them more reliable and scalable. The literature underscores the practicality of integrating RPA into education, reinforcing its value as a modern solution to traditional administrative challenges.

CHAPTER 3

SYSTEM DESIGN

3.1 SYSTEM FLOW DIAGRAM

A flowchart is a type of diagram that represents an algorithm, workflow or process. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem. The system flow diagram for this project is in Fig. 3.1.
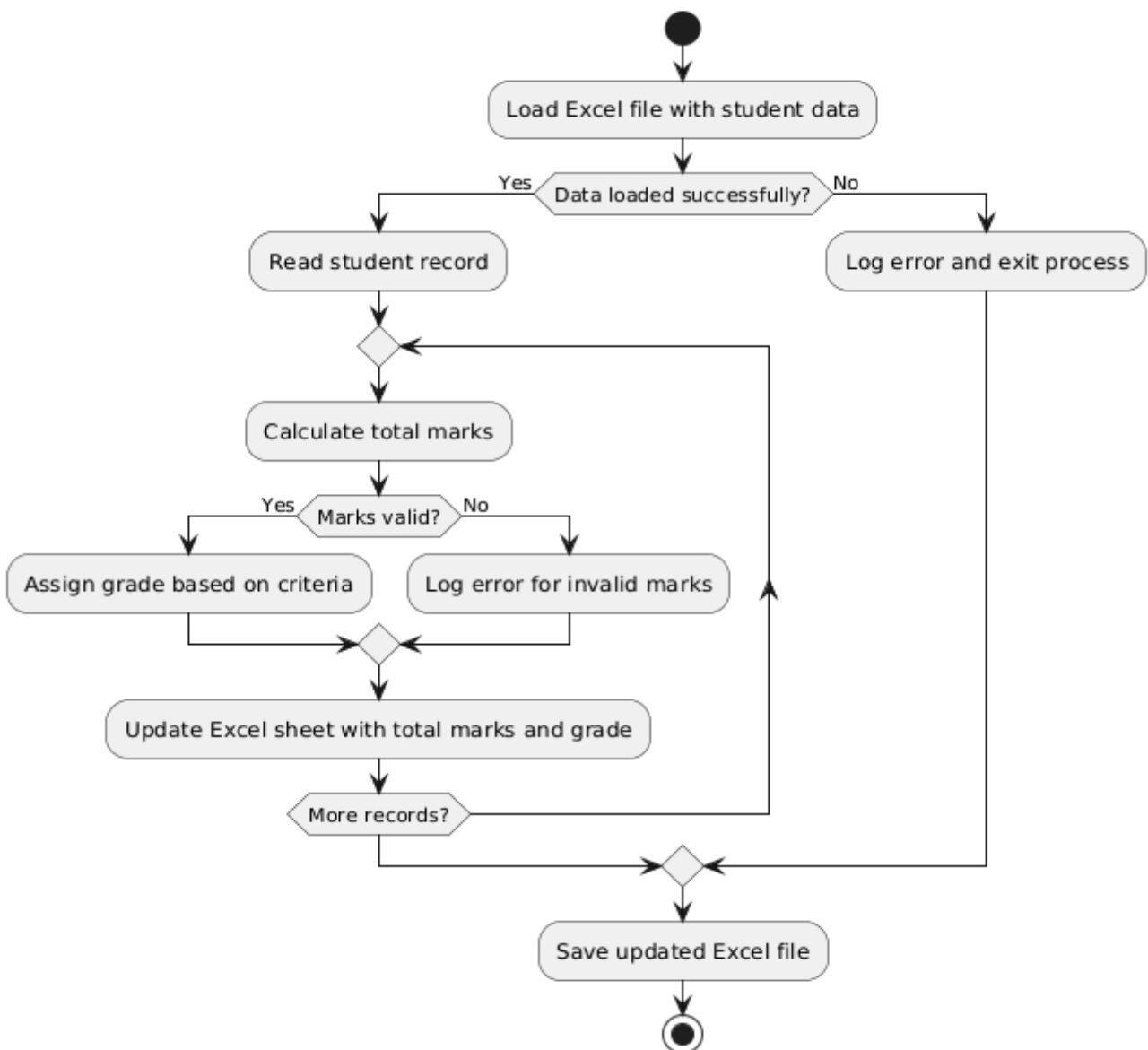

Fig 3.1 System Flow Diagram

3.2 ARCHITECTURE DIAGRAM

An architecture diagram is a graphical representation of a set of concepts that are part of an architecture, including their principles, elements and components. The architecture diagram for this project is in Fig. 3.2.
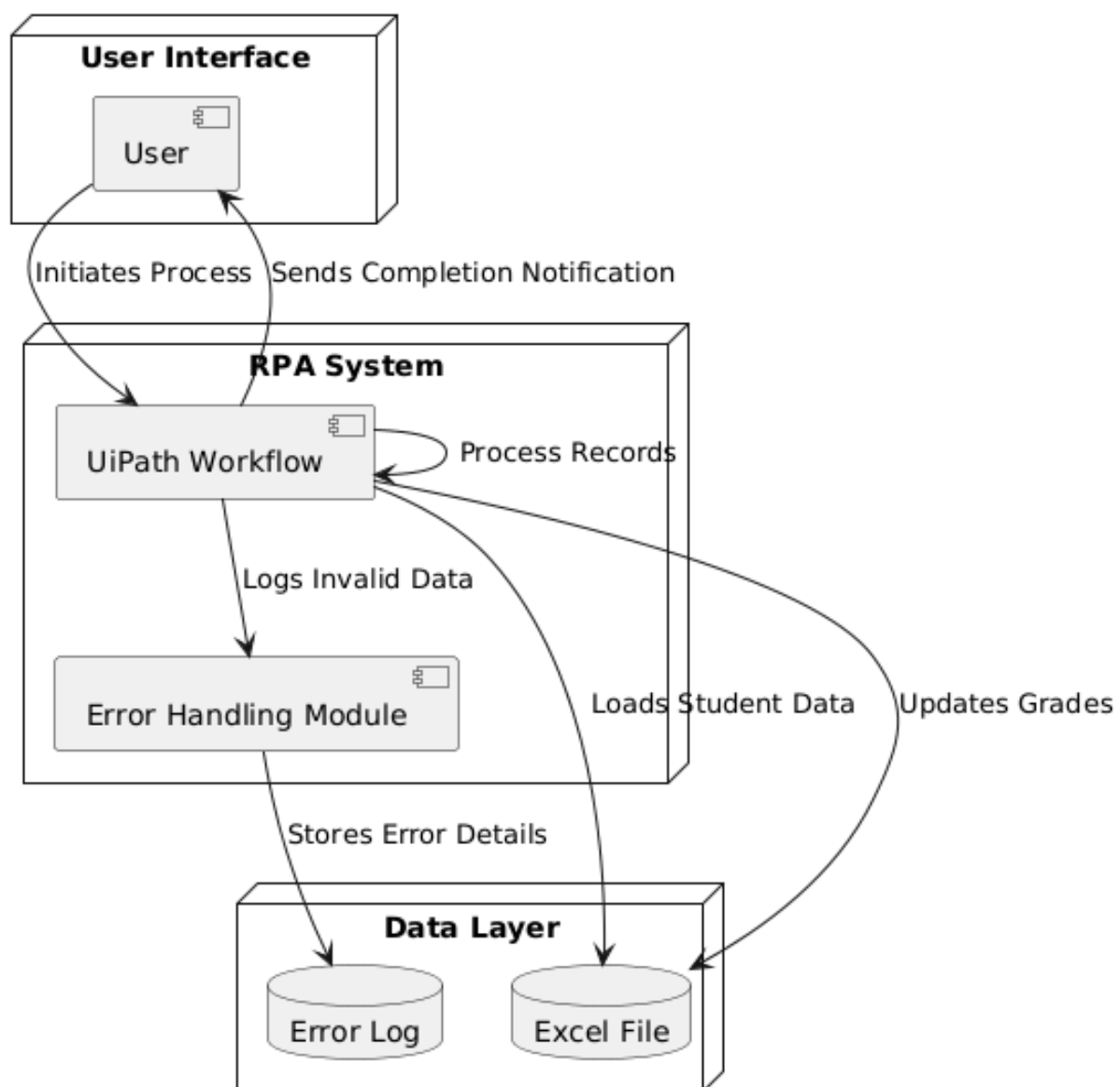

Fig 3.2 Architecture Diagram

3.3 SEQUENCE DIAGRAM

A sequence diagram is a type of interaction diagram because it describes and shows in what order a group of objects works together. The sequence diagram for this project is in Fig. 3.3.
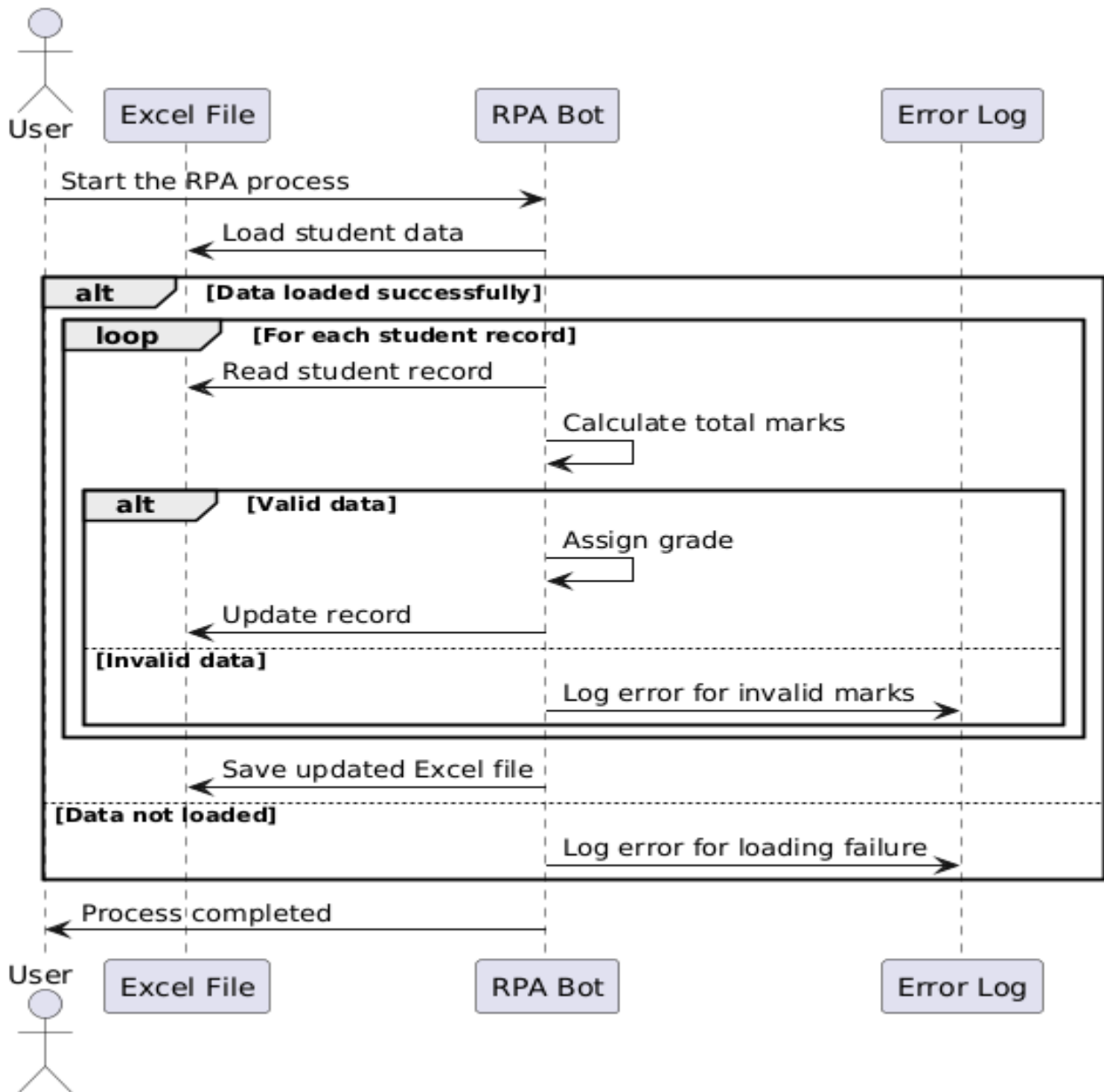

Fig 3.3 Sequence Diagram

CHAPTER 4

PROJECT DESCRIPTION

The project, titled "Automated Student Grade Calculation Using RPA," aims to revolutionize the traditional grade calculation process by implementing Robotic Process Automation (RPA) to enhance efficiency, accuracy, and scalability. Utilizing UiPath as the RPA tool, the system automates the workflow, starting from reading student data stored in an Excel file to calculating total marks by aggregating individual subject scores and assigning grades based on predefined criteria. For example, the system categorizes scores above 90 as 'A' and those between 80 and 89 as 'B,' ensuring consistent application of grading rules.

The system is equipped with error-handling capabilities to manage anomalies like missing or invalid data, thus ensuring robust and reliable performance. It updates the Excel file in real time, providing immediate results while eliminating manual intervention. Designed to be scalable, the solution can handle large datasets effortlessly, making it suitable for educational institutions of varying sizes. By automating repetitive tasks, this project minimizes human errors, reduces administrative workload, and enhances the consistency and reliability of grade calculation. This innovative application of RPA demonstrates the potential for automation to transform academic workflows, providing a cost-effective and scalable solution for institutions aiming to optimize their operations.

4.1. MODULES:

The project "Automated Student Grade Calculation Using RPA" is divided into the following modules, each designed to streamline the workflow and ensure robust functionality:

1. **Data Input Module**:

   This module reads student data from an Excel file. It acts as the starting point for the automation, extracting information such as subject scores and student details for processing.

2. **Data Validation Module**:

   This module ensures the accuracy and completeness of the input data by identifying and managing empty cells, invalid entries, or improperly formatted data. It flags issues for review or applies predefined correction mechanisms to proceed.

3. **Processing Module**:

   The core of the system, this module calculates total marks for each student by aggregating their subject scores and assigns grades based on predefined criteria (e.g., 'A' for marks above 90, 'B' for 80–89).

4. **Error Handling Module**:

   Integrated throughout the workflow, this module addresses exceptions such as missing or corrupted data. It ensures that the process runs smoothly by implementing fallback mechanisms and generating error logs for unresolved issues.

5. **Output Module**:

   This module updates the Excel file with the calculated total marks and assigned grades. It also generates summary reports or visualizations if required, ensuring the results are accessible and easy to interpret.

6. **Scalability and Reporting Module** :

   For larger datasets, this module handles batch processing and generates comprehensive reports summarizing overall performance, grade distributions, or

trends for institutional use.

Each module plays a critical role in achieving the project's goals of automation, accuracy, and efficiency in the grade calculation process.
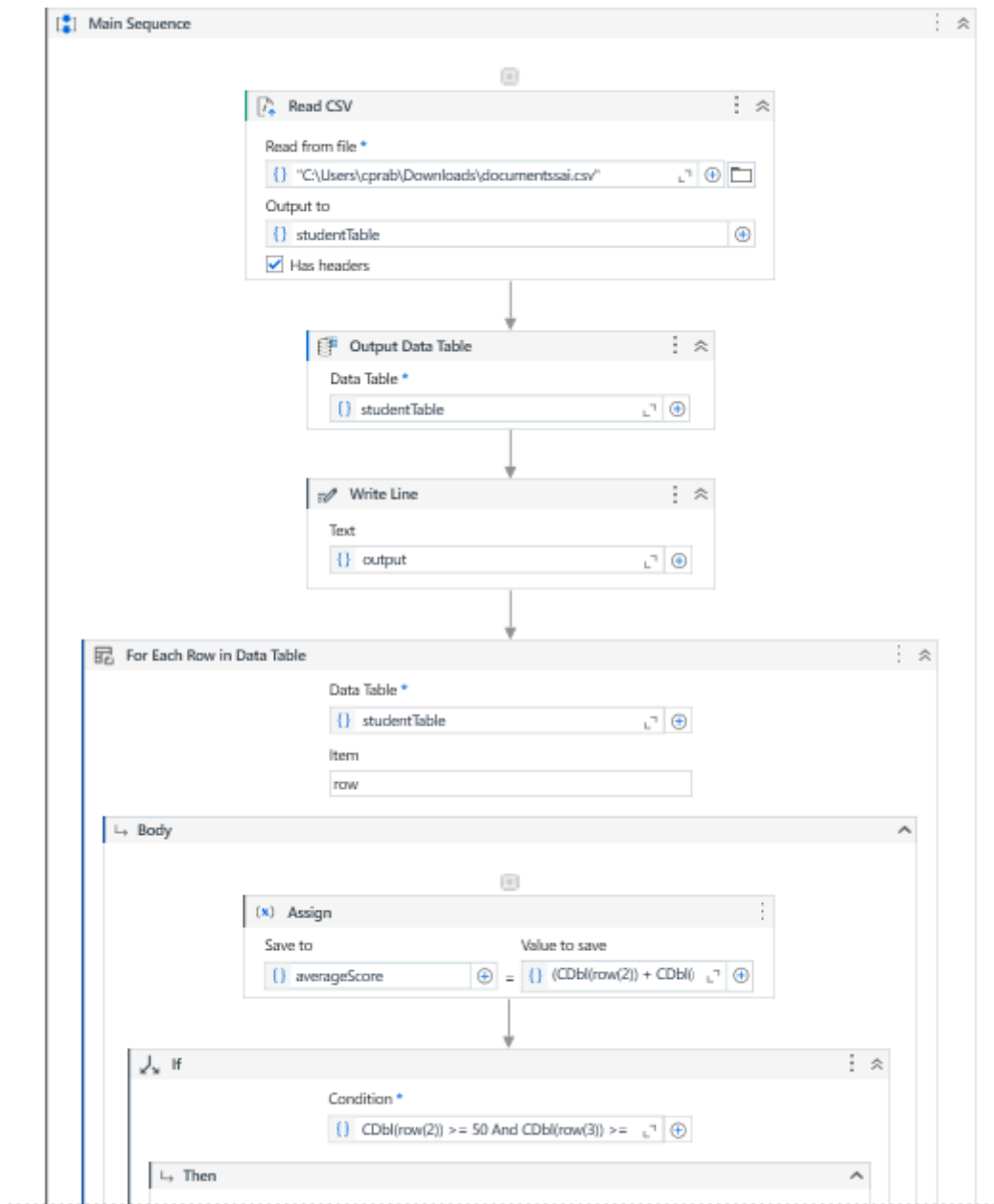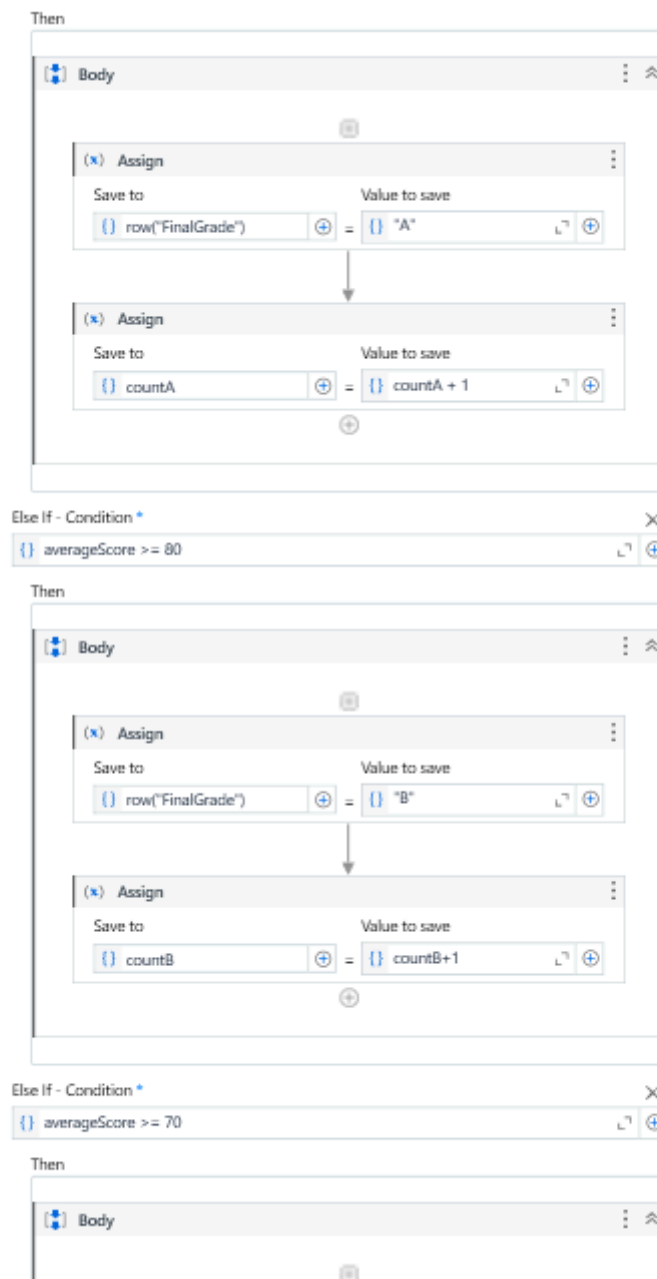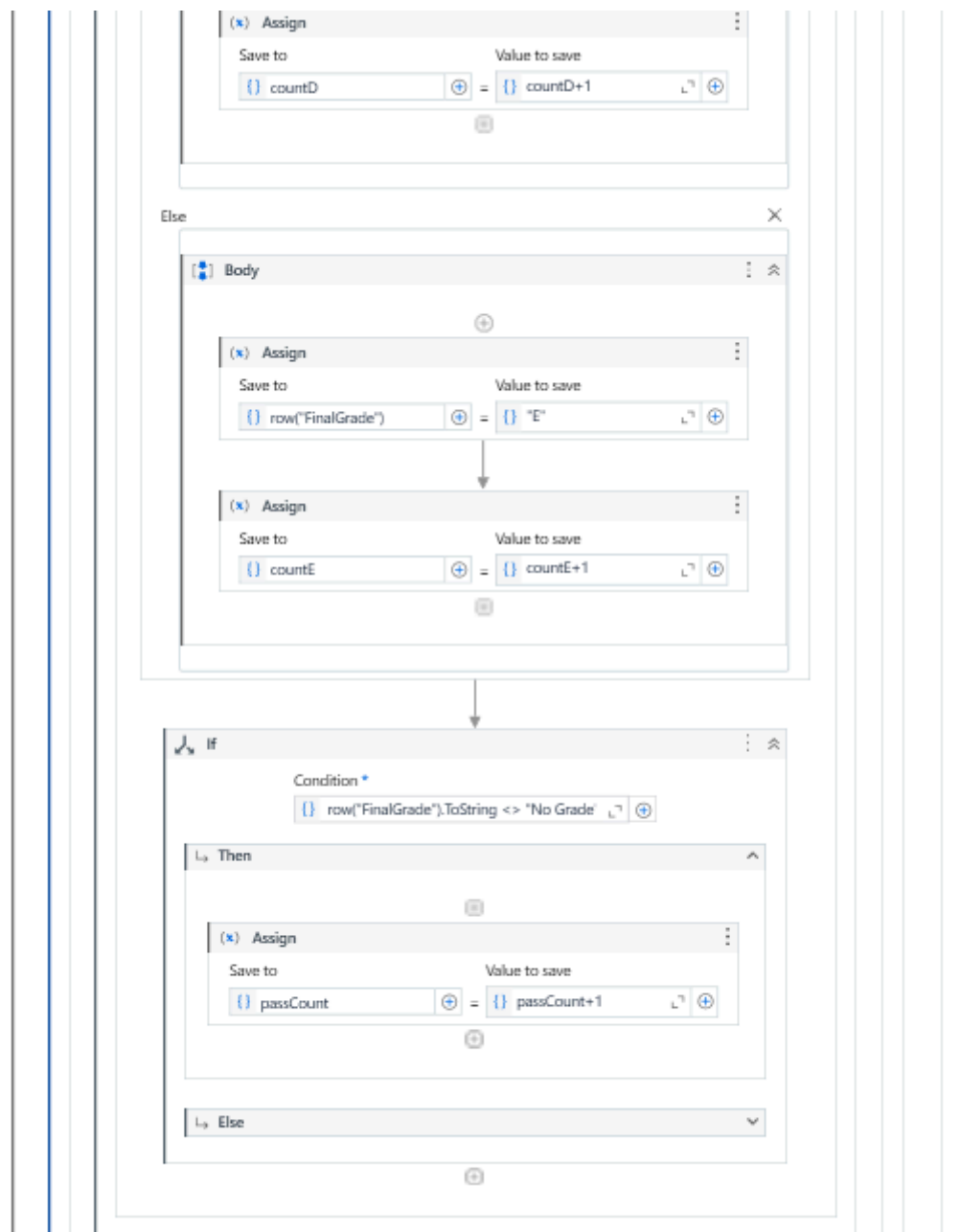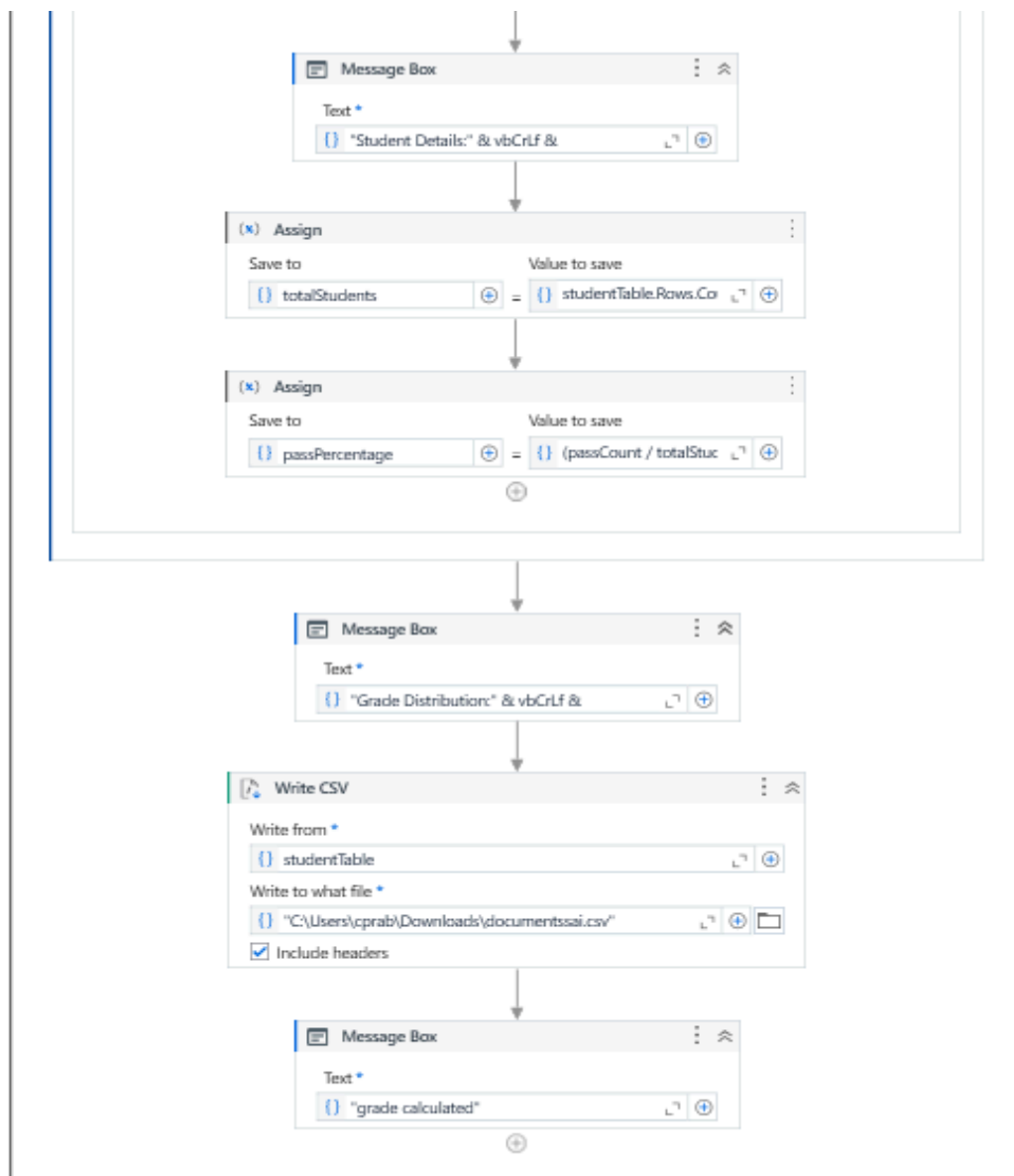
CHAPTER 5

OUTPUT SCREENSHOTS

Fig 5.1

Then

[⠿] Body   ⋮ ≫

(×) Assign   ⋮

Save to   Value to save

{} row("FinalGrade")   ⊕ = {} "A"   ⌐ ⊕

(×) Assign   ⋮

Save to   Value to save

{} countA   ⊕ = {} countA + 1   ⌐ ⊕

⊕

Else If - Condition *   ×

{} averageScore >= 80   ⌐ ⊕

Then

[⠿] Body   ⋮ ≫

(×) Assign   ⋮

Save to   Value to save

{} row("FinalGrade")   ⊕ = {} "B"   ⌐ ⊕

(×) Assign   ⋮

Save to   Value to save

{} countB   ⊕ = {} countB+1   ⌐ ⊕

⊕

Else If - Condition *   ×

{} averageScore >= 70   ⌐ ⊕

Then

[⠿] Body   ⋮ ≫

Fig 5.2

Fig 5.3

Message Box

Text *

`{}` "Student Details:" & vbCrLf &

(x) Assign

Save to **Value to save**

`{}` totalStudents = `{}` studentTable.Rows.Co

(x) Assign

Save to **Value to save**

`{}` passPercentage = `{}` (passCount / totalStuc

Message Box

Text *

`{}` "Grade Distribution:" & vbCrLf &

Write CSV

Write from *

`{}` studentTable

Write to what file *

`{}` "C:\Users\cprab\Downloads\documentssai.csv"

☑ Include headers

Message Box

Text *

`{}` "grade calculated"

Fig 5.4

Fig 5.5 – Excel Report

CHAPTER 6

CONCLUSION

In conclusion, the project "Automated Student Grade Calculation Using RPA" offers a reliable and efficient solution to the challenges of manual grading in educational institutions. By automating the process with UiPath, the system ensures accuracy, consistency, and scalability, addressing the limitations of traditional methods. The integration of robust error-handling mechanisms further enhances the reliability of the workflow, managing issues like missing or invalid data effectively. This project not only minimizes administrative effort but also sets a foundation for adopting automation in academic processes. It demonstrates how RPA can streamline operations, reduce errors, and improve overall efficiency, making it a valuable tool for modern educational institutions.

APPENDIX

PROCESS WORKFLOW

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