THE DEVELOPMENT OF A COMPUTER SOFTWARE SYSTEM FOR DATABASE MANAGEMENT SYSTEM FOR EXAMS AND RECORDS OF ABIA STATE COLLEGE OF EDUCATION (TECHNICAL), AROCHUKWU..

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Abstract
Abia state college of Education (Technical) has Exams and Records unit which operates manually. This has brought untold hardship to both the staff and students of the college. Recalled that this unit is where results of students are stored. Some of the results stored in this unit since inception cannot be seen or retrieved due to tears and wears. Sometimes students have to retake a paper they have taken because of improper filing or non-availability of their result. Even the staff of the unit finds it difficult to search or locate some of the results. This research is aimed at the Developing of a Computer Software System for Database Management System for Exams and Records ofAbia State College .This research work adopted both primary and secondary methods for gathering data through questionnaire, personal interview with some staff of the institution as well as journals, books and online articles on Database Management System for Exams and Records Unit of the College. Unified Modelling Language was used for the design of the proposed system. The Tools for system was developed using Visual Basic Studio 2015 with other tools such as Standard Development Kit (SDK) for Visual Basic DotNet Framework, Crystal Report, VB.net as programming language and SQLiteRelational database for data storage. The Result: After the proposed system has been tested and evaluated, it showed that the system helped to accept results of different levels, store them, update and answer queries from the Administrator.

Keywords: Institution, Database, Database Management, Exams & Records Unit.

1.   Introduction
When schools finished admission, the next level is lecturing and at the end examination will be taken. The results of this examination will be sent to Exams & Records Unit for proper storage which will be used to compute their grade point average (GPA) or cumulative grade point average (CGPA) to ascertain the student's performance. The students from time to time consult exams & Records Unit to know their term or final results for those who have finished their programme.

In Abia State College of Education (Technical), this operation is done manually where results are displayed on shelves, as a result there are lots of frauds in the unit as some unscrupulous staff of the unit see it as an opportunity to change scores for money, mutilation of results, misplacement of results, tearing and wearing of results paper as they carry them from one place to another, missing results etc.

All this has brought untold hardship to the students while some them are forced to retake a course they had already passed, in some cases they have to spend extra year(s). The situation has resulted to some students been denied admission into higher education while others have lost juicy jobs.

Over the years since the inception of the college, database management for Exams and Records for students results have been on manual filling which has resulted to mutilation of results by the staff of the unit, in fact, in some cases, some staff of the unit have turn it to a high business activity where score are indiscriminately awarded to the highest bidder, compilation of statement of results and Original certificates takes months or even years. Missing results have become the order of the day while the students suffer it In some cases the affected students are forced to re-take the examination they have passed due to poor manual filling. All these

shall be a thing of the past if the commission approves the development of the software for database management for Exams and records Unit.

 The expected Output will be **A Robust,** fast processing, User friendly Computer Software using Visual Basic.Net Programming language with Version 15 (an Object Oriented Programming Language). for Database Management System for Exams & Records of Abia State College of Education (Technical), Arochukwu. The software is expected to:

1. Accept/add new data into the database
2. Delete unwanted data from the database
3. Accept queries and response promptly
4. Update data from time to time.
5. Analyze students' progress report.
6. To ensure that data remains the universe of discuss that always remain the same all time,

2.   Related Work

The developer went through series of similar developed software to find out its problems and prospects. Many Object Oriented Programming Languages were also reviewed and the choice of this language was obvious such as easy to use, very efficient, durable and user friendly.

Şahinbaş, K. (2022) proposed a prediction model for employee promotion using machine learning algorithm. A decision support system designed for a Human Resource (HR) departments about eligibility of employees' promotion. Synthetic Monitoring Oversampling Technique (SMOTE) and Random Oversampling (ROS) imbalanced techniques are used; then, classification algorithms are applied to predict employee promotion such as Support Vector Machine, Artificial Neural Network and Random Forest. RF outperformed the other algorithms with 98% accuracy, 96% precision, 1.0 recall and 98% f1-score rate obtained among SVM and ANN.

Sundari and Venkatesan (2020) Analyzed the use of E-monitoring from the employee point of view as a technology that helps in improving his or her behaviour during the work and increase his or her productivity using a questionnaire. They revealed that the employees have a high desire to be monitored to improve their behaviour in the work and to improve the relationship between the employees themselves to make the work environment more peaceful and more welcome environment. However, the employees do not care about the organization performance. Hence, the results showed that the percentage of the people that favour E-monitoring is not higher than that for those who do not favour and that is justified as high percentage of people who accept the E-

4.   Methodology

The proposed system is Desktop-based functional Software application for database Management in Exam & Records for storage of students' results using Visual Basic.Net Programming language with Version 15.0 (an Object Oriented Programming Language). This application would help maintain data integrity and ensure that data in the database remain a universe of discourse (data remains the same no matter the number of years). It will also ensure that the vices in exams & records are completely eliminated or eradicated.

Methodology for Collecting and Analysing data

A combined Descriptive survey and Simulation methods were adopted. On Descriptive Survey; Structured questionnaires were developed to illicit response from Academic Staff, non-Academic Staff and Students. The method of responds were strongly agree (SA), agree (A), strongly disagree (SD), disagree (D), and undecided (U).

Cronbach Alpha coefficient formula was used to check it reliability of the opinions of the target groups in the questionnaire

The measure can be viewed as an extension of the Kuder–Richardson Formula 20 (KR-20), which is an equivalent measure for dichotomous items.

Cronbach Alpha formula; $\alpha = \frac{K}{K-1}\left(1 - \frac{\sum S2i}{S2}\right)$

Where α= Cronbach Coefficient alpha

K= the total number of the items in the test

$\sum S^2_i$ = sum of items variance

S^2 = the variance of the total test

Cronbach's alpha Internal consistency

$\alpha \geq 0.9$ — Excellent

$0.9 > \alpha \geq 0.8$ — Good

$0.8 > \alpha \geq 0.7$ — Acceptable

$0.7 > \alpha \geq 0.6$ — Questionable

$0.6 > \alpha \geq 0.5$ — Poor

$0.5 > \alpha$ — Unacceptable

A commonly-accepted rule of thumb is that an alpha of 0.7 (some say 0.6) indicates acceptable reliability and 0.8 or higher indicates good reliability. Very high reliability (0.95 or higher) is not necessarily desirable, as this indicates that the items may be entirely redundant. These are only guidelines and the actual value of Cronbach's alpha will depend on many things. E.g. as the number of items increases, Cronbach's alpha tends to increase too even without any increase in internal consistency.

While, Chi-Square Statistical Analysis was used to Analyzed the data collected from the questionnaire. The design methodology was adopted in this study was. Five persons from each of the target groups were sampled

Sample and Sampling Techniques

Systematic sampling method was adopted for sampling. The Chi –Square statistical tool was used to analyze the data. The following codes were used: SA=strongly agree, A=agree, SD=strongly disagree, D=disagree, and UD=undecided

Research Questions

S/N	Questions
1	The exam & Records unit of the college operates on manual filing
2	The students find it easy to get information about their results from Exams & Records
3	The college has a computer software for database management
4	The results submitted by lectures to Exams & Record are not tempered with.
5	Academic and non- academic staff are happy with the way result issues are handled in the college?

The Table below shows the sum of the responses from six tables, each table shows the responses from each question (Observed Frequency)

S/N	Target groups	SA	A	SD	D	UD	TOTAL ROW
1	Academic staff	1	2	2	15	30	50
2	Non-Academic Staff	25	10	3	8	4	50
3	Students	5	10	-	20	15	50
4	Worker of Exams & Units	10	5	5	10	20	50
5	Parent of the Student	8	10	2	20	10	50
	TOTAL COLUMN	49	37	12	73	79	250

Using the formula (Rt X Ct)/CRt we can find the Expected frequency

Where Rt=Row total, Ct = Column total, and CRt =Column and Row total. Hence, the Expected frequency can be computed.

The Table below shows the Expected Frequency (computed from the Observed frequency using the above formula.

S/N	Groups	SA	A	SD	D	UD
1	Academic staff	9.8	7.4	2.4	14.6	15.8
2	Non-Academic Staff	9.8	7.4	2.4	14.6	15.8
3	Students	9.8	7.4	24	14.6	15.8
4	Worker of Exams & Units	9.8	7.4	2.4	14.6	15.8
5	Parent of the Student	9.8	7.4	2.4	14.6	15.8

To obtain the X^2 calculated: $X^2cal=\sum (O-E)^2 / E =78.59$.

Where X^2cal = Chi-Square calculated, O = Observed frequency, E = Expected frequency and $\sum$=summation. Chi-square tabulated (X^2tab) = (R-1)(C-1) degree of freedom @ 0.05 level of significance. Where R=row and C=column. Hence, X^2tab=(5-1)(5-1)df @ 0.05 level of significance=4 x4=16df@0.05 level of significance =7.96

Hypothesis test

Null hypothesis (Ho): there is no significant difference of the activities in the Exams & Records due to manual filling and that of Computer Software

Alternative hypothesis (H1): there is significant difference of the activities in the Exams & Records due to the uses of manual filling and computer Software

Decision Rule : IfX^2cal<X^2tab accept the Ho and reject H1 else reject Ho and accept H1

Conclusion: Since the Chi-Square calculated (X^2cal) 78.59> Chi-Square tabulated (X^2tab) 7.96, we reject Ho and accept Hi. Hence, there is significant difference between manual filling and development of a software system for database management

The Functional Model of the Proposed System

The Unified Modelling Language (UML) Use Case diagram for proposed system is shown in Figure 1. The Use case diagram illustrates how the users interact with the system. It also describes the graphic diction of the interaction among the element of the system and the methodology used in system analysis to clarify and organize system requirement. It shows how functionalities relate between the internal/external actors.

The following are actors are the participants of the system:

Actors: System administrator/ Result Officer

System administrator/Result Officer: The system administrator / Result Officer registers, logins into the system, View profile, modify password, quit the application, add new school and department, remove school and department, add new result, edit result, delete result, view semester result view activity log and view user manual.
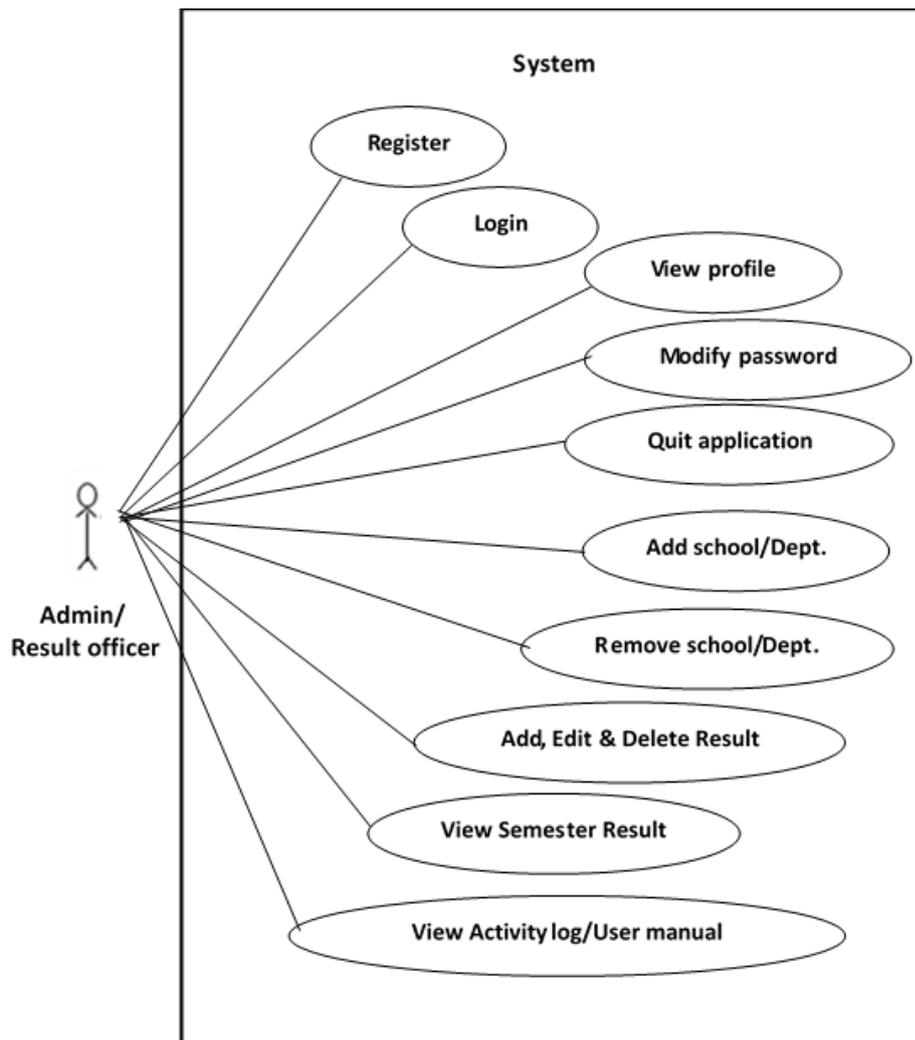
Figure 1: Use case diagram of the proposed system

ii.   **Block Diagram of the Proposed system**

The block diagram illustrates different blocks or modules of the proposed system, which is shown in figure 2.
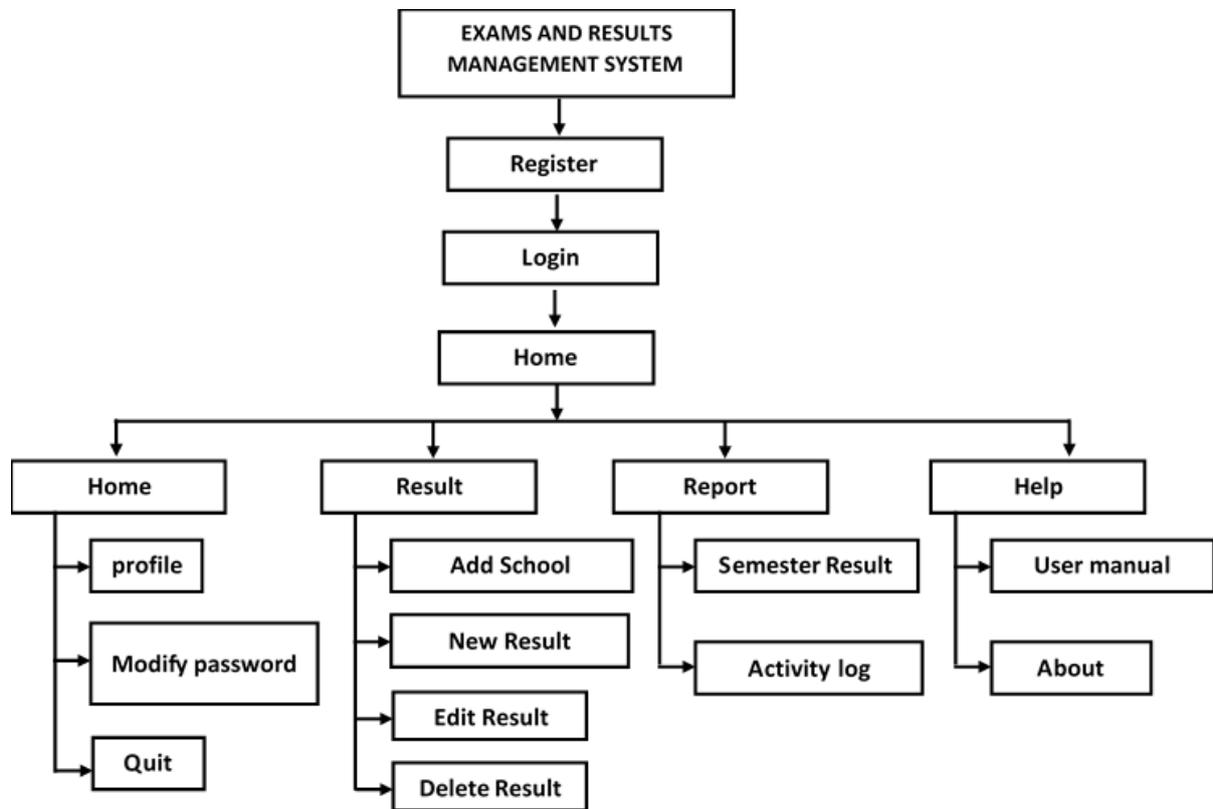
iii.   **Activity Diagram of the Proposed system**

The activity diagram illustrates the behavior of the proposed system with regards to various activities. These activities are modelling elements that depicts the execution of a set of operations. However, the execution of these activities can betriggered by the completion of other activities, by the availability of objects, or by internal/external events. Figure 3 shows different activities for the proposed system, with rounded rectangles representing activities; arrows between activities representing control flow and thick bars representing the synchronization of control flow. Figure 3 shows activities for administrator.
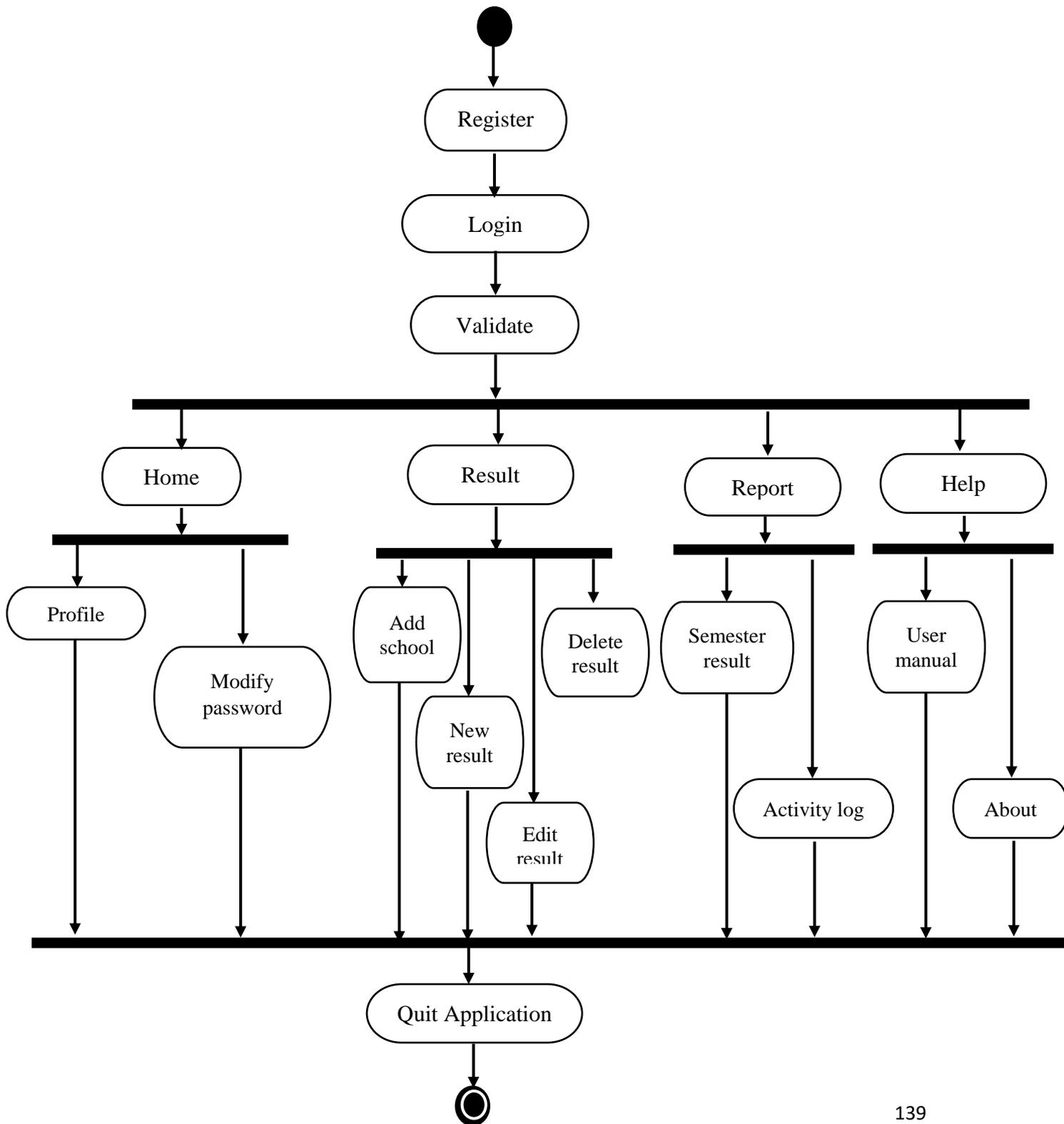
Figure 3: Activity Diagram of the proposed system

I.   **System manual for easy operation**

REGISTRATION/ LOGIN

- After successful loading, the **Result Officer Registration** page below appears allowing the result officer to register his or her details. Click on **Register** button to save the details or click on **Exit App** button to quit the application.

- For Result officer login, click on **Already Registered? Login here>>** button, the **Result Officer Login** page appears. Enterlogin details and click on **Login** button to gain access to the application or click on **Exit App** button to quit the application.

Result Officer Registration

First Name:
Last Name:
Email:
Phone:
Username:
Password:

Register   Exit App

Already Registered? Login here>>

Result Officer Login

Username:
Password:

Login   Exit App

Not Registered? Register here>>

HOMEPAGE

After successful login, the **Home** page displays items on **menu bar** like **File**, **Result**, **Report** and **Help**, and **standard tools bar** like **Quit**, **Profile**, **Modify**, **Add School**, **New Result**, **Edit Result**, **Delete Result**, **Semester Result** and **Log**. It also displays the Username, date and time.

RESULT ARCHIVING APPLICATION

USER PROFILE

- For Viewing of User Profile, click on **File** menu and select **Profile** or click **Profile** on standard tool bar, then the form below appears.
- Click on the **Close** button to close the **profile page**

MODIFY PASSWORD

- For Modifying of User Password, click on **File** menu and select **ModifyPassword** or click **Modify** on standard tool bar, then the form below appears.

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- Enter the Old Password, enter the new password, confirm the new password and click on **Modify** button.
- Click on the **Close** button to close the M**odify Password page**

Modify Password

Modify Password
Enter Old Password

Enter New Password

Confirm New Password

| Modify | Close |
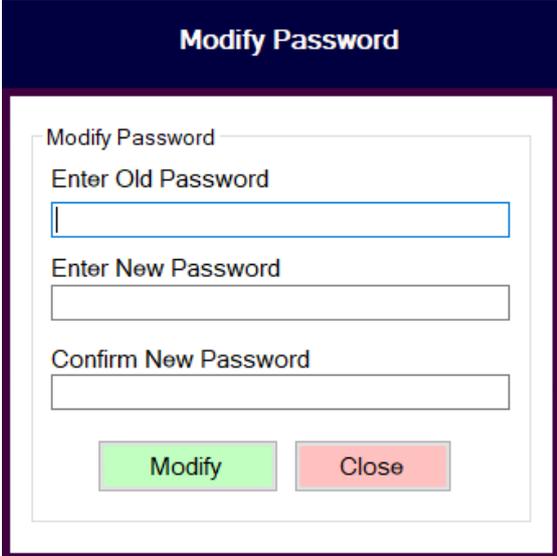
QUIT APPLICATION

- For Quitting the application, click on **File** menu and select **QuitApplication** or on Standard tools bar click on **Quit**, when the **message box** below appears, select **Yes** to quit the application, or **No** to cancel.

Exit ✕

⚠ You really wanna Quit?

| Yes | No |
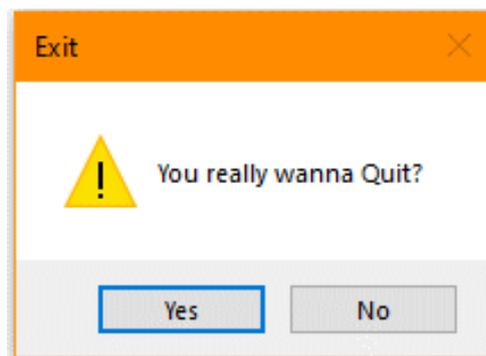
ADD SCHOOL

- For adding new schools, click on **Result** menu and select **Add School** or on Standard tools bar click on **Add School**, when the **School and Department Registration** form below appears, under **Add & Remove School section**, type in the **new school** and click on **Add** button or select any existing school from the dropdown list to remove it.
- For adding new department, under **Add & RemoveDepartment section**, type in the new department and click on **Add** button to add the new department. Click on **Remove** button to remove

the department from the departmental list. Click on **View Department** button to refresh the departmental list.

- Click on the **Close** button to close the **School and Department Registration page**

School & Department Registration

Add & Remove School

New School: [   ] Add

[SCIENCE EDUCATION ▾] Remove

Add & Remove Department

CHEMISTRY/PHYSICS
MATHEMATICS/PHYSICS

New Department:
[   ]

Add   Remove

View Department   Close

NEW RESULT

- For adding new result, click on **Result** menu and select **New Result** or on Standard tools bar click on **New Result**, and the **NewStudent Result** form appears,
- Under **Academic details section**, select the school, department, semester, session and level from the dropdown list.
- Under **Student details section**, type in the page S/N, Registration No., surname, other names and total current semester courses, check **Carry Over** button if the result has carry over courses, type in the total carry over courses and click on **Display** button.
- **Under Current Courses Section,** type in the course code, credit hours and course score.
- **Under Carry Overs Section,** type in the course code, credit hours, and course score.
- **Under Current Semester Section,** TCL, GP, GPA and SRT would be calculated automatically.
- **Under Previous Semester Section,** type in Previous semester's TCL, GP and GPA.
- **Under Cumulative GPA & Remarks section,** TCL, GP and GPA would be calculated automatically.
- **Under Result Approval Details section,** type in HOD's name and Board Chairman name as well as the date in which the result was signed.
- Click on **Compute** button to compute and confirm the entries. Thereafter click on **Save** button the save the result to the storage.

- Click on the **Close** button to close the **New Student Resultpage**

EDIT RESULT

- For Editing of result, click on **Result** menu and select **Edit Result** or on Standard tools bar click on **Edit Result**, and the **EditStudent Result** form appears,
- Under **Academic details section**, select the school, department, semester, session and level from the dropdown list.
- Under **Student details section**, enter student's Reg. No and click on **Retrieve Record** button to retrieve the student's result. After successful retrieval of result, total current semester courses can be edited, check **Carry Over** button if the result has carry over courses, type in the total carry over courses and click on **Display** button.
- **Under Current Courses Section,** edit the course code, credit hours and course score.
- **Under Carry Overs Section,** edit the course code, credit hours, and course score.
- **Under Current Semester Section,** TCL, GP, GPA and SRT would be calculated automatically.
- **Under Previous Semester Section,** edit Previous semester's TCL, GP and GPA.
- **Under Cumulative GPA & Remarks section,** TCL, GP and GPA would be calculated automatically.
- **Under Result Approval Details section,** edit HOD's name and Board Chairman name as well as the date in which the result was signed.
- Click on **Compute** button to compute and confirm the entries. Thereafter click on **Update** button the save the result to the storage.
- Click on the **Close** button to close the **Edit Student Resultpage.**

DELETE RESULT

- For deleting of result, click on **Result** menu and select **Delete Result** or on Standard tools bar click on **Delete Result**, and the **DeleteStudent Result** form appears,
- Under **Academic and Student details section**, select the school, department, semester, session and level from the dropdown list, enter student's Reg. No and click on **Retrieve Details** button to retrieve the student's result. After successful retrieval of result, click on **Delete** button to delete off the record.
- Click on **Yes** button to confirm and proceed with the result deletion and **No** button to cancel the operation.
- Click on the **Close** button to close the **Delete Student Resultpage.**

SEMESTER RESULT

- For printing of student's result, click on **Report** menu and select **Semester Result** or on Standard tools bar click on **Semester Result**, and the **Student Semester Result** form appears,
- Under **Academic and Student details section**, select the school, department, semester, session and level from the dropdown list, enter student's Reg. No and click on **Retrieve Details** button to retrieve the student's result. After successful retrieval of result, click on **Print Result** button to display the result.
- Click on the **Close** button to close the **Student Semester Resultpage.**
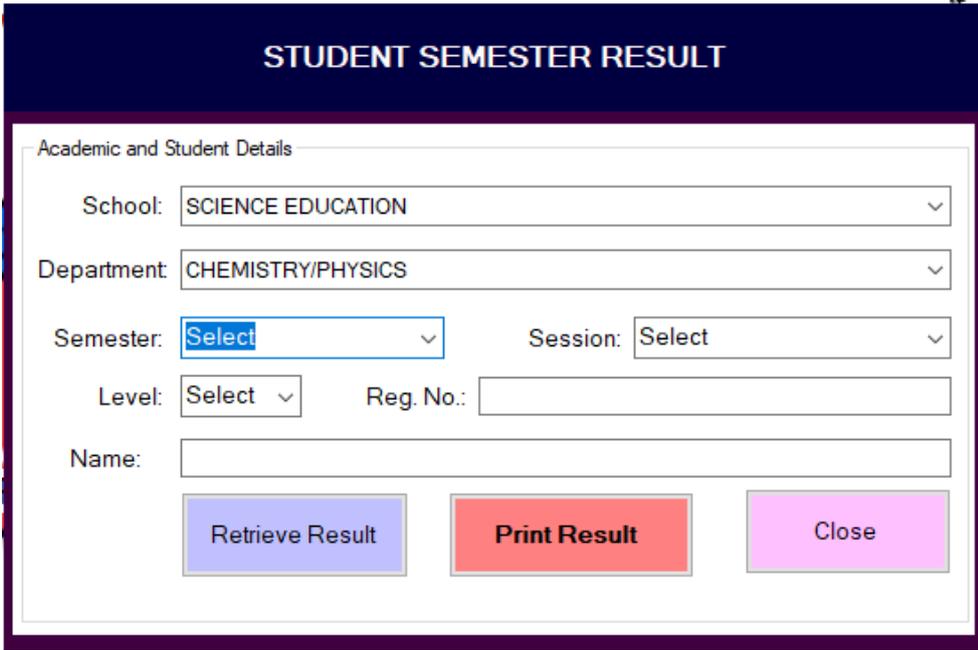
STUDENT SEMESTER RESULT

Academic and Student Details

School:	SCIENCE EDUCATION
Department:	CHEMISTRY/PHYSICS

Semester: Select   Session: Select

Level: Select   Reg. No.:

Name:

Retrieve Result   **Print Result**   Close

- For printing of activity log, click on **Report** menu and select **Activity Log** or on Standard tools bar click on **Log**, and the **Activity Log Report** form appears.
- For searching records, under **Search by** section, select different search **options** such as username, email or phone, then enter the search string in the text box and the records would be sorted.
- For printing the log, select desired month and year, then click on **Print Log** button. After report has displayed, click on **Print** button to print the report.

ID	First Name	User Name	Email	Phone	Activity	Time	Date	Month	Year
1	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRG-SCIENCE EDUCATION	6:44:55 PM	2023-01-08	Jan	2023
2	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRG-TECHNICAL EDUCATION	6:45:43 PM	2023-01-08	Jan	2023
3	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRG-BUSINESS EDUCATION	6:46:48 PM	2023-01-08	Jan	2023
4	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-ACCOUNTING	6:48:17 PM	2023-01-08	Jan	2023
5	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-OFFICE TECHNOLOGY & MGT (OTM)	8:31:28 PM	2023-01-08	Jan	2023
6	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-BUILDING TECHNOLOGY	8:35:12 PM	2023-01-08	Jan	2023
7	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-ELECTRICAL/ELECTRONICS TECHNOLOGY	8:36:18 PM	2023-01-08	Jan	2023
8	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-CHEMISTRY/PHYSICS	8:49:32 PM	2023-01-08	Jan	2023
9	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-MATHEMATICS/PHYSICS	8:50:09 PM	2023-01-08	Jan	2023
10	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRM-BUSINESS EDUCATION	8:58:37 PM	2023-01-08	Jan	2023
11	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-ACCOUNTING	8:59:22 PM	2023-01-08	Jan	2023
12	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRM-ACCOUNTING	8:59:43 PM	2023-01-08	Jan	2023
13	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRG-BUSINESS EDUCATION	9:08:00 PM	2023-01-08	Jan	2023
14	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-ACCOUNTING	9:08:17 PM	2023-01-08	Jan	2023
15	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRM-ACCOUNTING	9:08:34 PM	2023-01-08	Jan	2023
16	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRM-BUSINESS EDUCATION	9:09:55 PM	2023-01-08	Jan	2023
17	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-AUTOMOBILE TECHNOLOGY	9:03:55 PM	2023-01-15	Jan	2023
18	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-METAL WORK TECHNOLOGY	9:04:22 PM	2023-01-15	Jan	2023
19	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRM-METAL WORK TECHNOLOGY	9:04:33 PM	2023-01-15	Jan	2023
20	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-METAL WORK TECHNOLOGY	9:05:04 PM	2023-01-15	Jan	2023
21	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-WOODWORK TECHNOLOGY	9:08:42 PM	2023-01-15	Jan	2023
22	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	SRG-EDUCATION	7:05:20 PM	2023-01-31	Jan	2023
23	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	DRG-PRIMED/SOCIALSTUDIES	7:07:21 PM	2023-01-31	Jan	2023
24	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	NRS-N/14/EET/5591	9:24:06 AM	2023-02-01	Feb	2023
25	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	NRS-N/14/EET/5591	9:49:58 AM	2023-02-01	Feb	2023
26	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	NRS-N/14/EET/5591	9:59:41 AM	2023-02-01	Feb	2023
27	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	URS-N/14/EET/5591	8:03:00 PM	2023-02-01	Feb	2023
28	Uwem	LIMAVISTA	lifeysbeautiful@gmail.com	08061304097	URS-N/14/EET/5591	8:05:44 PM	2023-02-01	Feb	2023

- For getting help, click on **Help** menu and select **User Manual** and the **UserManual** form will appear.
- For getting information about the application, click on **Help** menu and select **About** and the **About** form will appear. Click on **Ok** button to close the form.
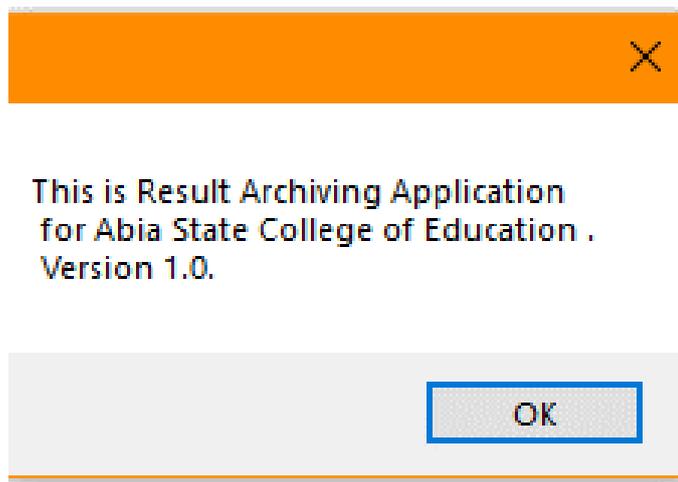
SUMMARY

The Exams and record is an important Department/Unit in every higher institution including ours. Exams and Records Unit is referred to as the engine house of our college. This is because the future of our students depends on the Unit which is responsible for keeping, deleting, addition, updating, and retrieval of students' results.

Many students have suffered untold hardship due to poor documentation of their results in Exams and records. It is not uncommon to see students coming to look for their results or during clearance after schooling and are disappointed because their results will be missing. Results missing in the Exams and Record are common these days due to manual filling. Manual filling is prompt to tears and wears, mutilation, alterations of students' results, changing the face results, improper filling of results, delayed in retrieval of result thereby resulting in wasting the student's time.

Our College (Abia state College of Education (Technical) Arochukwu has been using manual filling method for database Management System in Exams and Records since the college started in 1993.

This has resulted to scheduling and rescheduling of returning students and graduated students in getting their results. It has invariably affected those who gained admission into institution of higher learning or lost some lucrative jobs as well as the returning students who supposed to see their results as to know the number of carry-overs and how and when to remedy it.

The methodology adopted for data analysis was Chi Square (X2) while the methodology adopted in designing the software is Visual basic.Net programming language with Version 15.0. This is because of the robust nature of the language. Meanwhile, Cronbach Alpha coefficient $\alpha = K/(K-1)(1-(\sum S2i)/S2)$

Object Oriented programming Language adopted using Visual Basic.Net Programming language with Version 15. The Software is very Robust and user friendly. With the deployment the age-long problems in Exams and Record will be highly reduced if not totally annihilated

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