
Secure Intranet Result System for Processing Students' Result in Nigerian Colleges of Education

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ABSTRACT

Computation of examination result of large population of students manually can be rigorous, time-consuming, delayed and prone to errors. Students' results in an examination conveys the level of achievement of the students in a particular course and if the computation are incorrect or not released on time this may affect both the students and the decision-maker. But the computation of students' result becomes easier and more accurate when carried out with a suitable software application running on a computer system. Therefore, in this study, a secure intranet result system (SIRS) was developed for the processing of students' results in Nigerian Colleges of Education. The software was developed in Microsoft Visual Basic programming language in the form of a database, employing MySQL Relational Database Management System. The system used the semester scores entered by the computer operator to generate grade point averages (GPA) and updated cumulative grade point averages (CGPA), pass list, failure list, probation list, advice to withdraw list, overall departmental best student and transcript. The reliability of the system was validated by conducting accuracy tests and found that the system performed well and produced expected results on completion. For the effective implementation of the SIRS, staff should be well trained on how to effectively use the system and data validation should be carried out before computation of the results to ascertain the correctness of the input data. Educative and Institutions' Management should put in place adequate facilities to effectively implement the SIRS and proper maintenance routine for smooth running of the system.

Keywords: Cumulative Grade Point Average, Grade Point Average, Microsoft Visual Basic, My Structural Query Language, Secure Intranet Result System

CISDI Journal Reference Format

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1. INTRODUCTION

Generally, information about students as well as examination results for each semester are expected to be properly calculated and preserved by all educational institutions (Abel and Abu, 2014). Computation of students' results manually especially when the students are many is tedious, time consuming, and error prone. But students need to have access to their results on time to enable them know their performances in the various courses they had written on the examination. Though, in some cases, students do not see their first semester examination results even before they write the second semester examination because of various reasons which may not be tenable most times.

While in some cases, some students' result are released with errors which eventually do not reflect their exact level of performances in the examination. Thus, unless an accurate and effective method of computation is used, results computed can convey misleading information to decision makers (Eyo and Francis, 2012). At present the students grading system used by all colleges of education in Nigeria is Five-Point Grading System, established by the National Commission for Colleges of Education (NCCE). The NCCE five-point grading system is shown in Table 1 below. (See the Appendix)

The courses offered in a college programme are allocated a number of credit unit(s) which determines number of hour to be spent per course in a week (i.e. 1 credit unit require 1 hour while 2 credit units require 2hours and so on). The measure of performance of a student in any course is given by the grade-points obtained in that course. The grade-points obtained by a student in any course are determined by multiplying the value of the grade point by the credit unit of the course. The total grade-points are obtained by summing up the grade-points of all the courses offered. The Grade-Point Average (GPA) is computed by dividing total grade-points by the sum of credit units of all the courses offered in that semester/academic session.

Thus:

$$\text{GPA} = \frac{\text{Total Grade-Points of the courses offered in the semester/academic session}}{\text{Summation of the Credit Units of the courses in that semester/academic session}}$$

The Table 2 below (see Appendix) illustrates how a student's GPA studying Computer Science with Mathematics in Emmanuel Alayande College of Education, Oyo may be calculated manually. If such a student obtains the grades as shown at the end of year one academic session, the computation of GPA is as shown.

$$\begin{aligned} \text{Total Grade-Points} &= 126 \\ \text{Total Credit Units} &= 43 \\ \text{Grade Point Average (GPA)} &= 126/43 \\ &= 2.93 \end{aligned}$$

The Cumulative Grade-Point Average (CGPA) in any academic session is obtained by dividing the cumulative sum of the total grade-points over the academic sessions by the cumulative sum of the credit units over the same period.

Thus,

$$\text{CGPA} = \frac{\text{Cumulative sum of Total Grade-Points of the courses from first academic session to the last academic session}}{\text{Cumulative sum of the Credit Units of the courses from first academic session to the last academic session}}$$

The CGPA is a very important measure, as this is what determines whether a student can move on to the next level or to be placed on probation if CGPA is less than 1.00 at the end of first academic session or even advice to withdraw if CGPA still less than 1.00 at the end of second academic session. The final CGPA determines the level of the performance to be awarded to the candidate at the completion of the programme and for the first year, the CGPA is equal to the GPA.

Ekpenyong (2008) employs Microsoft Excel spreadsheet program to build an Intelligent Knowledge-Based System (IKBS), making use of various programming facilities provided by that application (Excel). The central issue here is that the programming is hard coded into the cells, and cell referencing is used to monitor and track students' performance (cumulative points, etc.). The system has been reported to be working fine. However, it appears to be rather restrictive, and calls for substantial expertise in programming. In the work by Ukem and Onoyom-Ita (2011), Adobe Dreamweaver, an Integrated Development Environment, is used to create the Graphic User Interface and to write the codes. Microsoft Access, a Relational Database Management System, is used to create the database tables and data. Personal Home Page Pre-Processor (PHP) is used to communicate with and manipulate the database. This application, though tested and found to be working as expected, has however not been put to use widely.

Eyo and Francis (2012) developed a computer software application to facilitate the automated processing of the results. The software was developed in Java programming language in the form of a database, employing Microsoft Access Relational Database Management System. The system developed compute Grade Point Average and Cumulative Grade Point Average for each student based on examination scores entered. Abel and Abu (2013) introduced "Data Analysis and Result Computation (DARC)", an algorithm that extends capabilities beyond examination result computation.

The algorithm gives analysis of student population and academic progress. However, computational stages before and after examination result were not captured. More so, the program did not have the ability to generate academic transcripts. Abel and Abu (2014) developed Student Record Analysis and Examination Result Computation Algorithm (SRAERCA) a comprehensive solution for use in tertiary institutions. The algorithm incorporates the entire computational process related to a student from admission to graduation and beyond. The algorithm is written in FORTRAN and was modified with the flexibility to accommodate future needs and eliminate delays in examination result computation, preparation of examination result summaries and generation of academic transcripts.

Okonigene, Ighalo and Ogbeifun (2008) examined the inadequacies involved in the manual method and propose a solution by developing a software system using Microsoft Visual Basic (VB) 6.0. The system was developed and tested with respect to the peculiar situations and problems associated with educational system. Youh (2010) presented a design that is based on Client Server Distributed Database for Student Results Processing. In the work, emphasizes on advantages of distributed system over centralized database system was made and based on that a distributed database approach was adopted. Nmaju, Nwachukwu and Ugwu (2013) adopted a web based approach in their design. The system expedites efficient service delivery in academic records management. It eliminates the delays associated with computing results and processing academic documents. It also provides an interface between students and the institution.

Ise (2015) proposed a novel framework for student result computation as cloud computing service that enables universities use student result computation system just like using an email service. The student result computation system is SaaS, which enables individual universities and other external entities to interact with the service over a secured internet using a web browser. The result service is hosted in the cloud. This eliminates the need to install and run service from any Personal Computer (PC) or CAN. It is available anytime, anywhere and can be accessed using PCs or mobile devices. Universities interacting with the result service are not burdened with software license, updates, security patches, backup and a host of other administrative and technical task associated with on-premises result systems.

Ezenma, Emmanuel and Choji (2014) developed a computer software application to facilitate the automated processing of the Public Secondary Schools results in Nigeria. The software was developed using PHP (Hypertext processor) programming language and MYSQL (My Structural Query Language), a relational database management system in designing the database; tested and found to have produced the expected results.

Computation of students' results manually is not desirable and suffers a number of set-backs such as delayed results, time consuming and prone to error. Even in some cases, examination results were wrongly entered for the students which lead to wrongly computed students' grade point averages and students could end up with undeserved final grade at the end of the course.

Therefore, it is imperative to find a method of processing examination results that would be sufficiently accurate and reasonably timely. The software application developed in this article will bring relieve by providing timely and accurate processing of students results. It will be novel if the secure intranet result system is incorporated and harmonized in Colleges of Education in Nigeria for solving problems encountered in the computation of students' results.

2. OBJECTIVES OF THE STUDY

The main objective of the study is to design software for processing of students results in Colleges of Education in Nigeria. The specific objectives include:

6. To design system that will save time and reduce the stress in the processing of students' Result.
7. To facilitate prompt release of error free results for NCE programme.
8. To design system that can be easily used and maintained.
9. To provide system that keeps track of students' results for future references and safeguards the system against unauthorized users.

3. METHODS AND MATERIALS

Secure Intranet Result System (SIRS)

The secure intranet result system is capable of running on any platform and has two sessions, namely "Admin at client side" and "Admin at server side". Administrator at server side has the authentication/permission to add whosoever to act as an Administrator(s) at the client side. Client systems are located at each school in the college while server is located at the Centre for Management Information System (CMIS).

At the client side, an administrator(s) can perform the following operations:

1. Change the password setup at the server side.
2. Register the student (i.e. entering of the students' personal records, courses registered per semester and their scores in the examination).
3. Views students score (i.e. updating the score and print out the raw scores).

The server side, an administrator performs the following operations:

1. Add new administrator(s) at the client side.
2. Computation of students' result.
3. Printing of result.

The details of the new developed system were depicted in Fig.1.

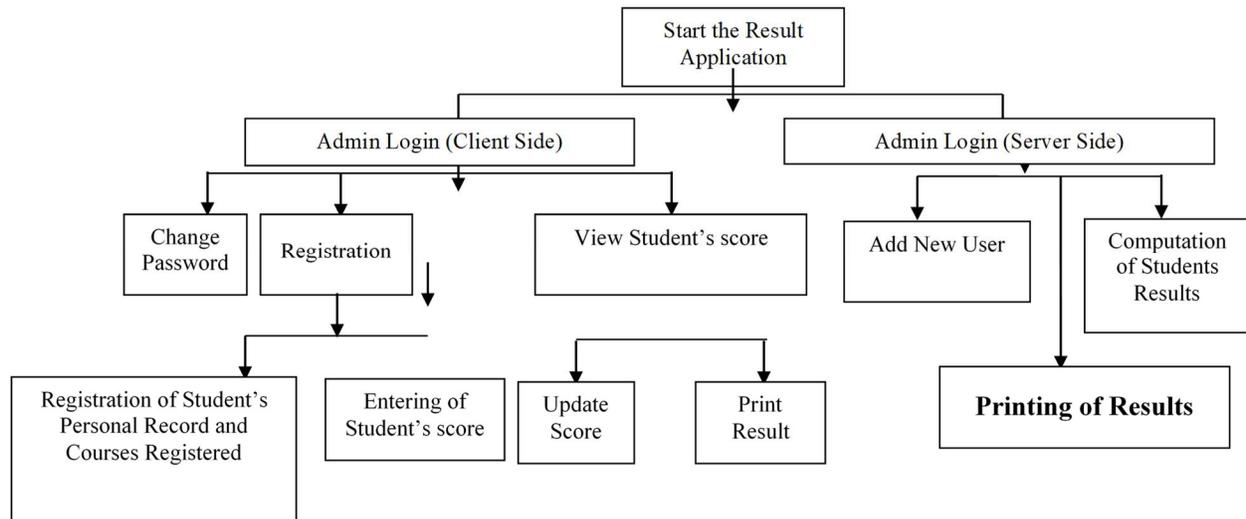


Figure 1: The Architectural Design of the Secure Intranet Result System (The Researchers)

The Secure Intranet Result System (SIRS) was developed using Microsoft Visual Basic in Visual Basic 6.0 IDE environment. The database on which the VB 2010 application runs was deployed using database programming with ADO.NET. The database system used in this work to create the database tables and data was Microsoft Access, a Relational Database Management System (RDBMS). A relational database management system is a database management system in which data is stored in the form of tables and the relationship among the data is also stored in the form of tables (Eyo and Francis, 2012). Each table has multiple columns and rows. The Relational system has been the most commonly used of all databases, and has various features that make it simple yet elegant (Brian and Stacey, 2003). The system is designed and implemented such that the following are carried out during its use:

Authentication

Before admin at the client side has access to the system, an Admin at the server side must have registered him/her at the server and he can login at the client side using the username and password setup for him at the server. This means that only the authorized admin can login at the client side but he can change his password after login.

Students Registration

Admin at the client side registered the students in the Department on the system.

Course Registration

Courses offered from first year through final year are registered on the system by the admin on the client side.

Entering of Scores

Score obtained by the students in each course offered is enter into the system by the admin on the client side.

View of Score

Scores enter can be updated if there is an error and raw scores can be printed out for validation of data.

Computation of Result

Admin at the server side performs the computation of students result to generate GPA and CGPA of the students.

Printing of Result

Admin at the server side generate various results of the students (i.e. Result slip, Graduation list, Transcript, etc.)

4. RESULTS AND DISCUSSIONS

The Sever Administrator switch on the server everyday to allow connection between server and the clients. He/she login to the system to perform the operation and the login screen is as shown in Fig. 2 & 3. Once the user is able to log in, the main menu window appears which comprises the following options (i.e. **Home, Department, Course, Combination, Student, Result, Print, Delete, Update, Lock, Logout, New User, Information, Developers and Close App**, see Fig. 4.). Administrator at the server side performs the following operations (i.e. Add new user at the client side, Computation of Results and Printing of Results)

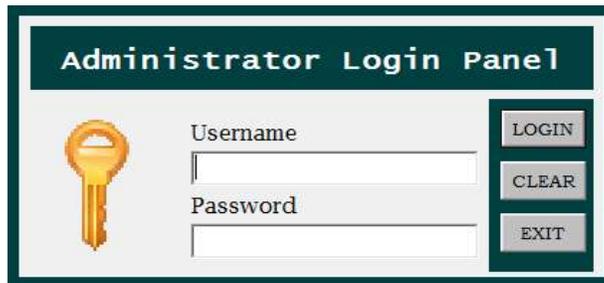


Figure 2: Login Screen for Administrator at the server side

The Client Administrator also login in to the system at client side through the username and the password setup for him/her at the server. The login screen is shown in Fig. 3.

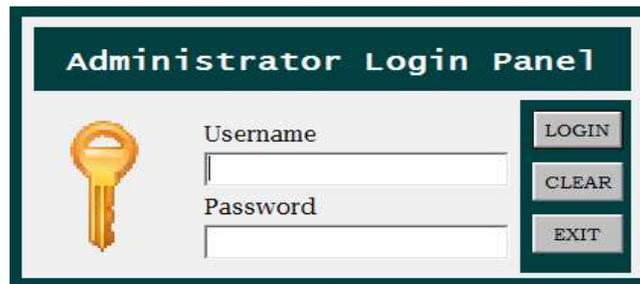


Figure 3: Login Screen for Administrator at the client side

Once the client user is able to log in, he/she can perform the following operations (i.e. Students' Registration, Course Registration, entering of students' raw scores).

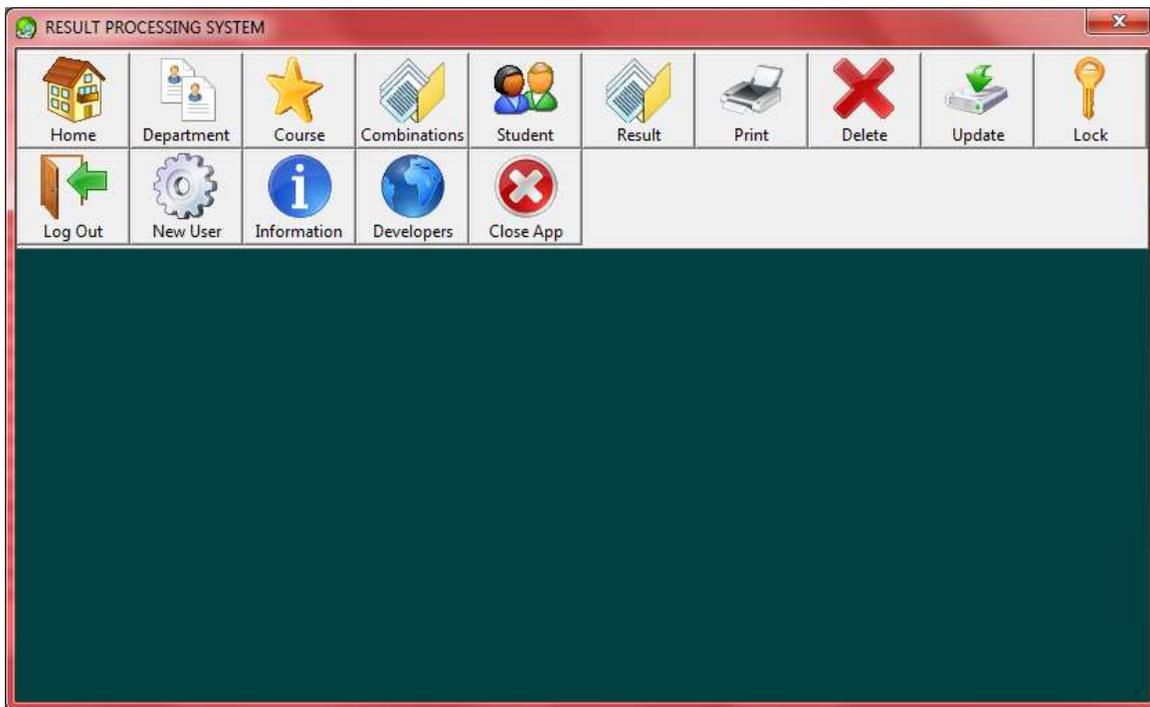


Figure 4: Main Menu Screen

Register New User

Username

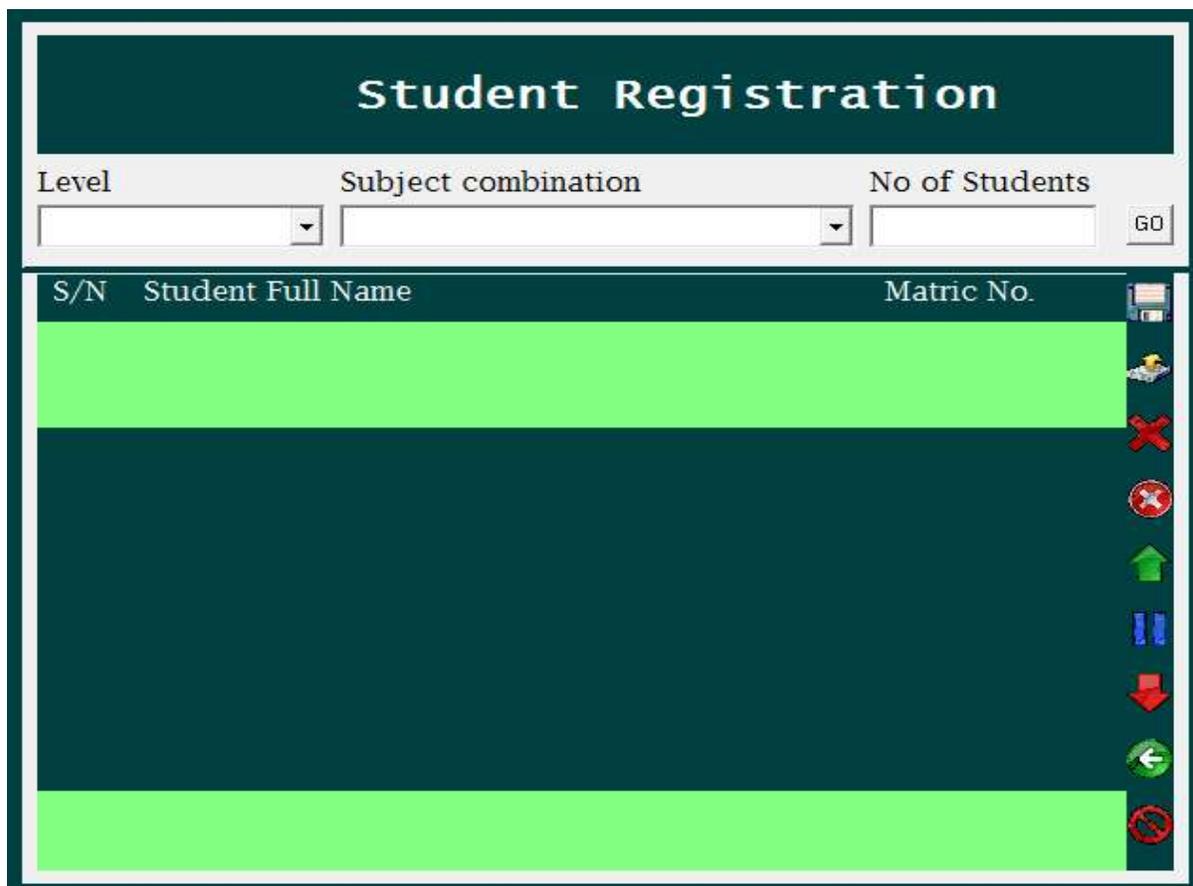
Password

Figure 5: Add New User form



The screenshot shows a 'Course Registration' panel with a dark green header. Below the header are several input fields: 'School' and 'Department' (both dropdown menus), 'Semester' and 'Level' (both dropdown menus), 'Course Title' (text input), and 'Course Code' and 'Course Unit' (both dropdown menus). A vertical toolbar on the right side contains icons for a printer, a person, a red 'X', a red 'X' with a slash, a green left arrow, and a red circle with a slash.

Figure 6: Course Registration panel



The screenshot shows a 'Student Registration' panel with a dark green header. Below the header are three input fields: 'Level' (dropdown), 'Subject combination' (text input), and 'No of Students' (text input), followed by a 'GO' button. Below these fields is a table with three columns: 'S/N', 'Student Full Name', and 'Matric No.'. The table contains two rows of data, both of which are completely redacted with a bright green color. A vertical toolbar on the right side contains icons for a printer, a person, a red 'X', a red 'X' with a slash, a green up arrow, a blue double arrow, a red down arrow, a green left arrow, and a red circle with a slash.

Figure 7: Student Registration panel

EMMANUEL ALAYANDE COLLEGE OF EDUCATION, OYO

CONTINUOUS ASSESSMENT AND EXAMINATION MARK SHEET



SESSION 2016/2017 SCHOOL Science SEMESTER Second
 COURSE TITLE Pascal Programming Language COURSE CODE CSC221 COURSE UNIT 02
 DEPARTMENT Computer Science SUB. COMBINATION CSC/ECO LEVEL 200

S/N	Student Full Name	Matric No.	Q1	Q2	Q3	Q4	Q5	Q6	EXAM.	C.A.	TOTAL	GRADE
1	Bamidele Sukurat	13/130000	10	15	12				37	23	60	B
2	Akolade Abass	13/130001	12	13	11				36	21	57	C
3	Ojo Bolade	13/130002	4	15	2				21	33	54	C
4	fdfdcfbcx sdbsfbfvdbf	19/190011	11	5	12				28	22	50	C
5	bvdsbvbcfdssd bnsacbfdsb	44488555	11	2	15				28	23	51	C
6	bvnmfghjvbnv sbdnabxbsnse	25285555	14	12	11				37	29	66	B
7	sjhxfndfsmnsd sbdfbsbnfd	58455222	10	10		10			30	10	40	E
8	vbnm bnfdbxbnf dx fbsbfdbfnbdf	45455552	10		10		10		30	14	44	E
9	gbhzdsbnxf sbnfrngesgrds svsf	54555522	10		15		10		35	14	49	D
10	bhsxbnff d avsfdsfd dbbdsxfds	44544444	10		14		15		39	14	53	C
11	vbadsvdssdbfvxbnf sfdbnbnfnbdf	11144444	15	10		14			39	12	51	C
12	bhdsdbfsdbf dbf dbf fdbfnbdfnbf fdsbnbdf	44444444	14	10	10				34	21	55	C
13	bfdgfdvbfvfvbvxv vbfvfvvx	411111112	14	15	14				43	29	72	A
14	vsvsadvsvz s fdxvcfdsvbsbv zvdsv	54454522	10		10	10			30	15	45	D
15	vdbfdsvdbv fds vfdvfvbfdbv	25552222	14		14		14		42	10	52	C
16	dbsfvdbfd fbfdbnfd fvdsvbfd	44250254		15	15	15			45	20	65	B
17	hnhdfsb shrghe sbnbnsdbhnsmbds	54425254		20	20		20		60	10	70	A
18	sdhnsdbnbf dmbnfdmfdsbmnsdew	54545522	15	15			15		45	20	65	B
19	bnsbnbfds sdbnbsnbn eweewe	44228872	10		10	10			30	14	44	E
20	annfdsbvrf dnxfbshreje jjrerej	44421212	15	10			10		35	14	49	D
21	smndnfd ewewuyreye	42422444	10	14			12		36	14	50	C
22	sjbxfbsbfhd reghjreggherereh	77855225	10	14	10				34	14	48	D
23	bcbxfvxbnx bnxbfdbnbn xbnbnbfd	77552155	10	15		15			40	20	60	B
24	dsbnbfbsnfdsb sdzbnfdsfdbbfdbfd	21125444	17	12	9				38	14	52	C
25	bbfdbfbbfd xsbdfbfdb dshhbhse	72214452	10		14		14		38	30	68	B

EXAMINER'S NAME AND SIGNATURE/DATE

HOD'S NAME AND SIGNATURE/DATE

MODERATOR'S NAME AND SIGNATURE/DATE

Figure 8a: Continuous Assessment and Examination Mark Sheet Panel

EMMANUEL ALAYANDE COLLEGE OF EDUCATION, OYO													
CONTINUOUS ASSESSMENT AND EXAMINATION MARK SHEET													
SESSION	2016/2017		SCHOOL				Science		SEMESTER				Second
COURSE TITLE	Pascal Programming Language		COURSE CODE				CSC221		COURSE UNIT				02
DEPARTMENT	Computer Science		SUB. COMBINATION				CSC/ECO		LEVEL				200
S/N	Student Full Name	Matric No.	Q1	Q2	Q3	Q4	Q5	Q6	EXAM.	C.A.	TOTAL	GRADE	
51	sdhnsdbnbfds dmbnfdmfdsbmnsdew	54545522	15	15			15		45	20	65	B	
52	bnsbnbfds sdbnbsbnbn eweewe	44228872	10		10	10			30	14	44	E	
53	annfdsbvfd dnxfbshrejjrerej	44421212	15	10			10		35	14	49	D	
54	smndnfd ewewuyreyre	42422444	10	14			12		36	14	50	C	
55	sjbxfbsbhfdf reghjregghereh	77855225	10	14	10				34	14	48	D	
56	bxbfvxbbnx bnxbfdbnbn xbnbnbfd	77552155	10	15		15			40	20	60	B	
57	dsbnbfdsbn sdbnhdbsbfdbbfdfbd	21125444	17	12	9				38	14	52	C	
58	bbfdbsbfdf xsbdfbfbdb dshhbhse	72214452	10		14		14		38	30	68	B	
59	fdnfsfd sdrhsreesnfdmndznds	14575525	13		12	11			36	32	68	B	
60	sdhbfbfds dksjnjrenfmcm	74435365	14	10		11			35	22	57	C	
61	hjsdrehnsdn yhnfdssdsn dsbnhdshds	78852213	14	11	12				37	24	61	B	
62	jhsdhnfdsnfnbds dsajhrsksrejs	74742425	10	10			10		30	21	51	C	
63	bdbdsbfdfdsbds shreshjndsjhn dshnbn	77511225	10	15	10				35	14	49	D	
64	jhsdhdshhds dhs dsjdfmfdsmnf	27774123	12		12	10			34	14	48	D	
65	nbszenczn dzbnfsbvdbv hxczb	54242445	15	15	11				41	30	71	A	
66	nexbncnmbx bxfshjdds dssdbb	54444454	14	15	15				44	10	54	C	
67													
68													
69													
70													
71													
72													
73													
74													
75													

EXAMINER'S NAME AND SIGNATURE/DATE

HOD'S NAME AND SIGNATURE/DATE

MODERATOR'S NAME AND SIGNATURE/DATE

Figure 8b: Continuous Assessment and Examination Mark Sheet panel

Zoom 100%

EMMANUEL ALAYANDE COLLEGE OF EDUCATION
P.O BOX 1010



STATEMENT OF RESULT

Session: 2015/2016 **Name:** Adegoke Taiwo **Semester:** First
Level: 100 **Combination:** CSC/ISC
Matric Number: 12/120014 **School:** Science

COURSE CODE	COURSE TITLE	SCORE	UNIT	STATUS	GRADE
CSC112	BASIC Programming Language	78	2	C	A
ISC111	Mathematics for Science I	61	3	C	B
ISC112	Science Education I	67	1	C	B
ISC114	Components of Environment I	68	2	C	B
CSC113	Computer Application	55	1	C	C
GSE111	General English	66	1	C	B
GSE113	General Mathematics	84	1	C	A
EDU111	History Of Education	62	1	C	B
CSC115	Microprocessor	45	3	C	D
CSC111	Introduction to computer	67	1	C	B

TOTAL	60
TOTAL UNIT:	16
GPA:	3.75
CGPA:	3.75

Pages: 1

Figure 9: Statement of Result Slip

5. IMPLEMENTATION

The system was implemented using VB6 and Ms-Access. The system requires the following as the basic requirements:

Hardware Requirements (Server Side)

2.40 GHZ + CPU Speed
2GB+ of RAM
10 GB+ Database Space
50 GB+ Hard-drive Space
Microsoft Access Database

Hardware Requirements (Client Side)

1 GHZ + CPU Speed
1 GB+ of RAM
20 GB+ Hard Drive Space
Internet Connectivity (500 kbps + Bandwidth)

Software Requirements (Server Side)

Windows OS
MYSQL™ 5.0 + Server
VB6
HTML 4.0+
Microsoft Office

Software Requirements (Client Side)

Windows OS
MYSQL™ 5.0 + Server
VB6
HTML 4.0+

6. CONCLUSION

Based on the study, the following conclusions were drawn. Secure intranet result system that is capable of easing the processing of students' results in Nigerian Colleges of Education was carefully developed, tested and found to meet the stated objectives and working as expected. The system is resilient, handles large students' population and proffers a comprehensive solution to examination result's computation as well as well archived students' record for future integrated systems.

It is easily retrieve any required information for prompt decision making. The Secure Intranet Result System (SIRS) was developed using Microsoft Visual Basic in Visual Basic 6.0 IDE environment. The database on which the VB 2010 application runs was deployed using database programming with ADO.NET. The new system uses graphical user interface (GUI) rather than command-line approach, hence made the system easy to use, reasonably secure, and enforces data integrity resulting from the use of a relational database management system.

7. RECOMMENDATIONS

The following suggestions are hereby recommended:

1. Management of the educational institutions should endeavour to use technology in processing students' results so as to enable prompt and release of error free results that will reflect the correct performance of the students.
2. Organize in-service training to staff to enable them to be well grounded in ICT compliance so as to effectively use the new system.
3. The computer operator(s) should make effort to validate the data entered so as to ensure correctness of data.
4. Management should put in place adequate facilities needed for the implementation of the system.
5. Proper maintenance routine should be put in place for smooth running of the system.

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APPENDIX

Table1: The NCCE Five Point Grading System

Credit Unit	Percentage Scores	Letter Grade	Grade Point	Grade Point Average	Cumulative Grade Point	Level of Performance
Vary according to contact hour assigned to each week per course per semester and according to work load carried by student	70-100	A	5	Derived by multiplying	4.50-5.00	Distinction
	60-69	B	4		3.50-4.49	Credit
	50-59	C	3	Credit Unit by Grade Point	2.40-3.49	Merit
	45-49	D	2		1.50-2.39	Pass
	40-44	E	1	Summing up and Dividing by Total Credit Unit	1.00-1.49	Low Pass
	0-39	F	0		Less than 1.00	Fail

Source: Students' Information Handbook, 2015

Table 2: Example of how grade point is determine

Course Code	Credit Unit(s)	Scores	Grade	Grade Points
EDU 111	1	45	D	1 X 2=2
EDU 112	2	54	C	3 X 2=6
EDU 113	2	65	B	4 X 2=8
EDU 121	1	34	F	0 X 1=0
EDU 122	1	56	C	3 X 1=3
EDU 123	1	68	B	4 X 1=4
EDU 124	2	55	C	3 X 2=6
GSE 111	1	44	E	1 X 1=1
GSE 112	1	58	C	3 X 1=3
GSE 113	1	62	B	4 X 1=4
GSE 121	1	76	A	5 X 1=5
GSE 122	1	45	D	2 X 1=2
GSE 123	1	56	C	3 X 1=3
GSE 124	1	67	B	4 X 1=4
CSC 111	1	48	D	2 X 1=2
CSC 112	2	58	C	3 X 2=6
CSC 113	1	32	F	0 X 1=0
CSC 114	1	46	D	2 X 1=2
CSC 115	1	57	C	3 X 1=3
CSC 121	1	67	B	4 X 1=4
CSC 122	1	78	A	5 X 1=5
CSC 123	1	45	D	2 X 1=2
CSC 124	1	68	B	4 X 1=4
MAT 111	2	45	D	2 X 2=4
MAT 112	2	67	B	4 X 2=8
MAT 113	1	78	A	5 X 1=5
MAT 114	1	72	A	5 X 1=5
MAT 115	2	34	F	0 X 2=0
MAT 121	2	56	C	3 X 2=6
MAT 122	2	67	B	4 X 2=8
MAT 123	2	56	C	3 X 2=6
MAT 124	1	54	C	3 X 1=3
MAT 125	1	48	D	2 X 1=2
	43			126