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Microsoft Excel Visual Basic for Applications Approach to Academic Results Compilations and Computations

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Abstract

In this paper, we present the Microsoft Excel Visual Basic for Applications approach to academic results compilations and computations as an alternative to existing process of entering student's score directly into Microsoft Excel formatted Worksheet. Looking for the cell that corresponds to the student's name and the course been considered on a formatted worksheet is relatively slow, inefficient and prone to errors. Our approach uses a user form to compile and compute all the details of students' academic results from the first semester to the last semester using Microsoft Excel Visual Basic for Applications. The paper encourages the automation of the process using Microsoft Excel Visual Basic for Applications becauseof the availability of Microsoft Office Excel and automation of the process overwhelmingly surpass the existing method by guiding against errors due to wrong cell value entry, increase efficiency by speeding up the entire process and secure the document against unauthorised users.

Keywords: Academic results compilation and computation, Microsoft Excel Visual Basic for Applications, Formatted Worksheet, User Form, Visual Basic Macros, Grade Point Average, Cumulative Grade Point Average.

Abbreviations: Microsoft Excel Visual Basic for Applications (**MEVBA**), Total Unit (**TU**), Total Point (**TP**), Grade Point Average (**GPA**),Cumulative Total Unit (**CTU**),Cumulative Total Point (**CTP**), Cumulative Grade Point Average (**CGPA**).

1. 0 Introduction

Automation of various stages of academic results compilations and computations using Microsoft Excel Visual Basic for Applications (MEVBA) is a powerful alternative approach to students' academic results compilations and computations procedures. The most common method of compilation and computation of academic results in use is to enter student's score directly into the cell of formatted worksheet that corresponds to the student's name and the course been considered. Thereafter, the grade of the entered score is manually determinesaccording to the school's grading criteria. Also, if the student fails the course by scoring below a particular score depending on the grading criteria, the course is manually registeredas carry over. The Grade Point Average (GPA) and the Cumulative Grade Point Average (CGPA) are then calculated using worksheet formulas and the student's standing either Pass, Third Class, Second Class Lower, Second Class Upper and First Class if the institution is a university or Pass, Lower Credit, Upper Credit and Distinction if the institution is a polytechnic is then determined.

This process is too cumbersome, inefficient and prone to errors particularly when the process has to be repeated for students running to hundreds and thousands. This is responsible for frequent mistakes in students' academic results released in various departments of our institutions. More often, students' GPA and CGPA are been miscalculated,courses already passed are been recorded as carry over, courses not registered are posted and graded and so on. Consequently, series of complaint letters are been received from students and these complaints will be attended to by going through the process of compilations and computations again which leads to inefficient and inconsistent output.

This paper looks at the critical solution to these problems by presenting a MEVBA that uses a user form [1] to accept student's score from the user and process the score by locating and entering the score in the cell that corresponds to the

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student's name and the particular course been treated. The program also grade the score, calculate the GPA, the CGPA, the student's standing and registered the course as a carryover if the student fail the course according to the grading criteria supplied by the user when setting up the posting process. Thus, the error in the process is reduced only to the correct entrance of the students' score into the user form which can be easily managed.

In section 2, we describe the materials and methods required for our approach to be implemented. This includes initial construction, documentsecurity,compiling and computing students' academic results and Program Organisation and Logic.Results which entail the presentation of the outcome of our approach form the content of section 3.Conclusions as a result of our effort are presented under the Discussion subheading of section 4.

2.0 Materials and Methods

The overall process was analysed and the program is designed to be users friendly and interactive [2]. The methodology employed ensures that the user is doing the wright things during the process of compiling and computing students' results. Note that users will have access to the programme menu through the Microsoft Excel ADD-INS menu item. Due to the confidential nature of the document, security is of great concern and it is given a deserved attention.

2.1 Initial Construction: For the purpose of generalisation and termination of search algorithms [3], we made some assumptions which we assumed reasonable enough for any academic environment. These assumptions are not limitations as they can be adjusted to specification by contacting us.

Standard Worksheet: The program uses a Microsoft Excel Worksheet named "StandardSheet" to report students' academic performance. The worksheet is protected to keep the format. The standardSheet worksheet is prepared for up to 5000 students and 50registered courses per student per semester to accommodate all combinations of carry over courses at any level. It also records up to 50 carry over courses per student. The worksheet automatically adjusts to accommodate the number of registered courses only and delete empty course column after adding the registered courses.

Score Grading: The programaccepts score grading up to 13 different grading levels. For example, an8score grading level may be represented as follows:

0 – 9 (F), 10 – 19 (E), 20 – 29 (D), 30 – 39 (CD), 40 – 49 (C), 50 – 59 (BC), 60 – 69 (B) and 70 – 100 (A). It also accepts two different symbols for two special scenerios peculiar to results computation. The user can use symbol like "ABS" for cases where students registered for a course but absent from examination and "NREG" for cases where students did not registered a particular course. In the case of "ABS", the program uses the course unit as part of the calculation of GPA and the courses is regarded as carry over while for "NREG" the program will not include the course unit in the calculation of GPA but the course is regarded as carry over course. Empty score textbox are regarded as empty and the program does nothing about it.

Student'sStanding: The programaccepts student's grading up to 8 different categories. For example, a 5 students' grading category may be presented as follows:

0 – 1.99 (Fair), 2 – 2.49 (Pass), 2.5 – 2.99 (Lower Credit), 3 – 3.49 (Upper Credit) and 3.5 – 4 (Distinction).

Number of Users: The number of users including the administrator, who should have access to all program workbooks distributed to various departments, is limited to 11. This is done to secure, prevent indiscriminate distributions and abuse of the program. We do hope that 10 users will be enough for each department because we assume that each level result will be handled by a user to uphold the security of the document.

2.2 Document Security:A number of security procedures [4]areimplemented to secure the document from unauthorised users.

Product Key: Each owner of the product is given an owner's name and product key that is needed to add an administrator to the application.

User Privilege: Two types of users' privileges [5] are identified as appropriate for the users of this program, they are:

Administrator: This is the privilege given to users who are responsible for overall administration of the program. Administrator privilege is required for setting up of the posting processes, view post log as well as when adding and removing user(s).

User: This is a user created and permitted to use the program by the administrator. He is only permitted to post results, he cannot change program setting.

User Account: Each user is created with user identification (User ID) and password by the administrator to control access to the program. Users can change their password to protect their account.

Post Log: All posted results are recorded in the post log worksheet to monitor the results posting processes. The post log worksheet record the student's name, matriculation number, course posted, student's score, academic session and the user that carried out the posting. The program keeps up to 100000 recent posted results in the post log worksheet. In case the log

grows up to 100000, it starts from the beginning of the log and there will be an empty row separating the new log from the old one.

2.3 Compiling and Computing Students' Academic Results: The administrator is required to set up the posting process by completing the following process:

Creating Worksheet: The StandardSheet worksheet (Figure I) is copied to a newly inserted and named worksheet that is to be used for the posting.

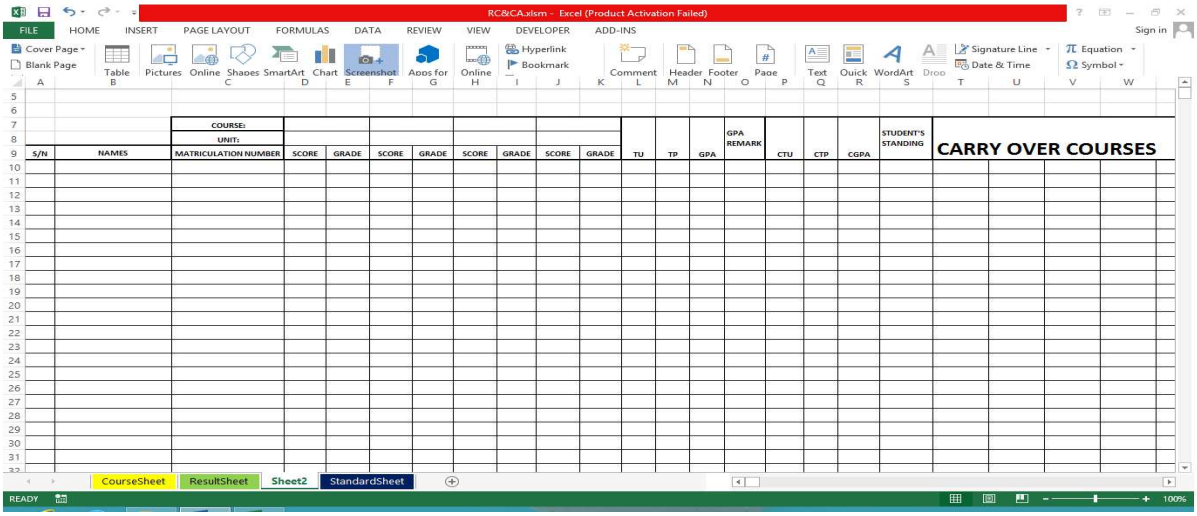

Figure I: StandardSheet Worksheet with Space forFour Registered Courses

Adding Students' Name: Students' name can be added to the worksheet by using the Add Students form in the Add-Ins menu or copy and paste from an existing document.

Setting-Up Grading Criteria: The school grading criteria is added by using the Set-Up Posting form in the Add-Ins menu. FIGURE II shows a Set-Up Posting form with grading criteria and students' standing examples presented in section 2.1 above. This will not be repeated until there is a change in the school's grading criteria.

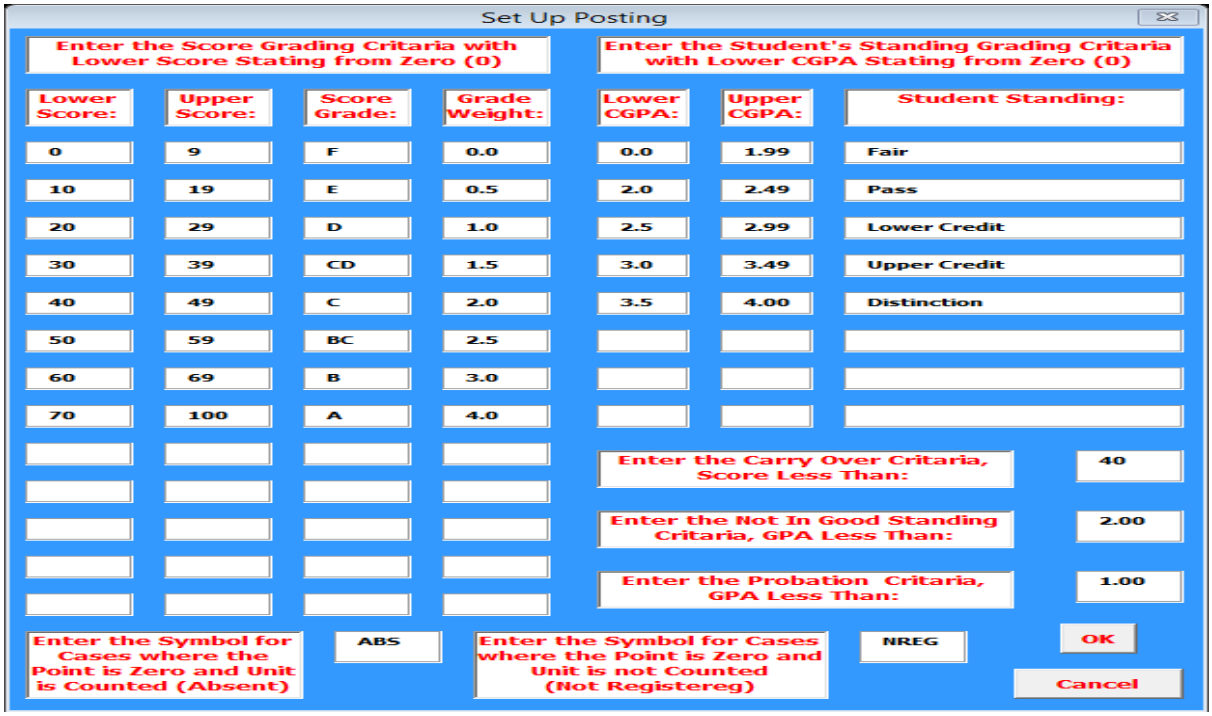

Figure II: Set-Up Posting Form

Adding Registered Courses: All registered courses are added by using the Add Registered Courses form in the Add-Ins menu. The institution name, faculty/school name, department name and the registered courses added on this form is displayed on the named worksheet prepared for the posting. Figure III shows an Add Registered Courses form with the school parameters and 8 registered courses added for OND 1 first semester 2011/2012 academic session. Last semester name and number of courses register for the last semester textboxes were left empty because this group of students are in their first semester of their first year and hence last semester is not available.

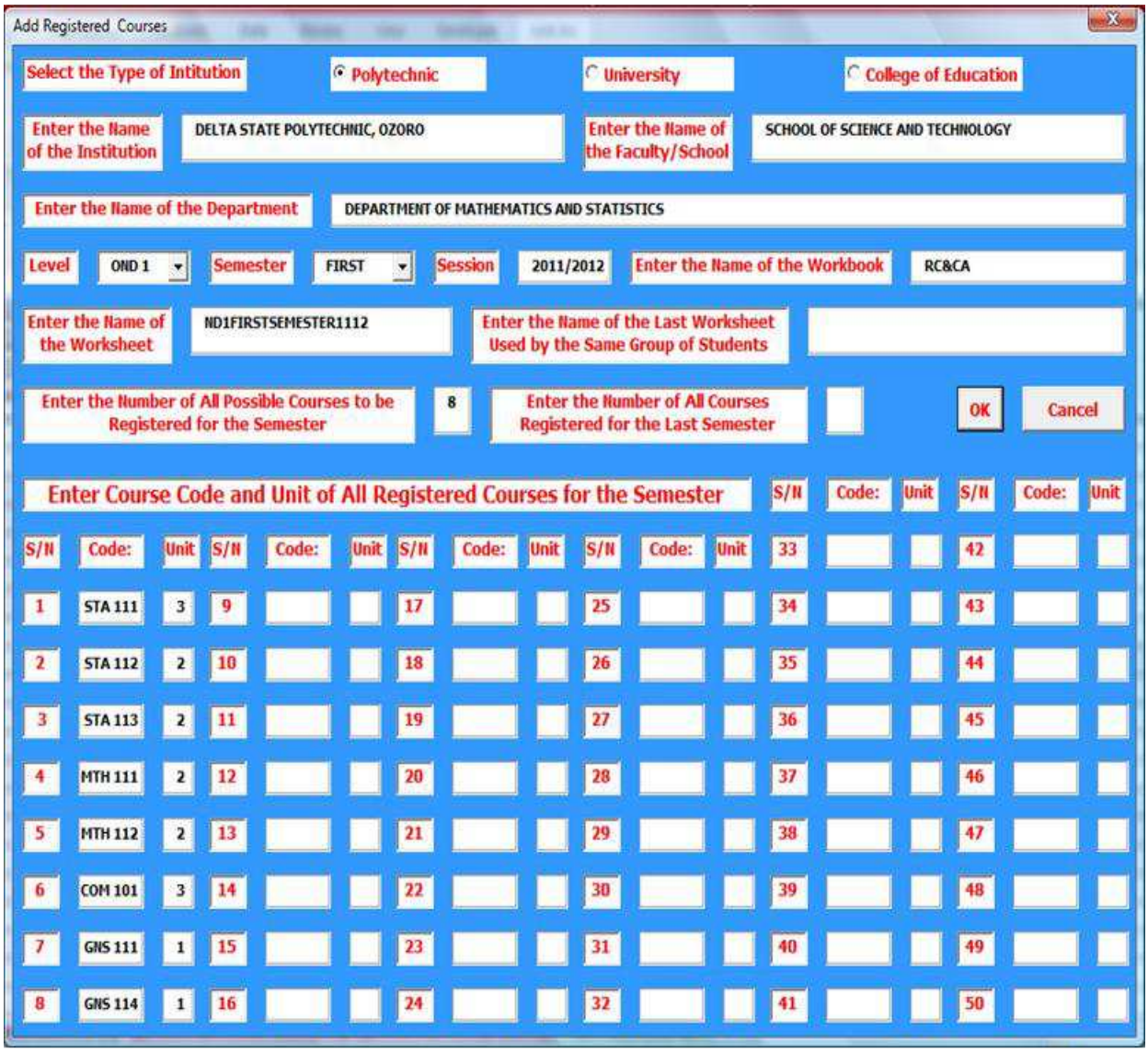

Figure III: Add Registered Courses Form

Posting Students' Scores: The user then compiles and computesstudents' scores by using the Post Results form in the Add-Ins menu.The registered courses appear as you open the Post Results form. Figure IV shows the Post Results form with matriculation Number 09/24920 for a student named Afolabi S. Maria and her scores in the 8 registered courses. The name of the student comes up automatically after typing the matriculation number to confirm that the posting is for that particular student. After clicking OK to accept the scores, the program registers the scores and performs all necessary computations. The entered scores then disappear to confirm that it had been posted. The next student matriculation number is then typed and his scores are entered to continue the posting.

Figure IV: Post Results Form with 8 Added Registered Courses

2.4 Program Organisation and Logic: After creating the worksheet to be used for the postingandsetting up the posting process by adding grading criteria and registered courses the computations and compilations procedures are organised in the program as shown in Figure V.

3.0 Results

The program reduces the process of academic results compilations and computations to a level where it can be handled by anyone who can key in the students' scores; the professionalism involved in the process is handled by the program. This makes it easy for institutions to prepare students' academic results promptly without error. The program keeps all the necessary details of students' academic results from the first semester to the last semester, speeds up the process of result compilations and computations, increase efficiencyand reduce errors to a manageable level. The administrator will set up the following semester results posting process by creating another worksheet from the StandardSheet worksheet andadd new courses by using the Add Registered Courses form. This is done on the same workbook used for the current semester to make it possible for the program to retrieve the CTLU, CTLP and carry over courses from the last semester worksheet. FIGURE VI shows 5 students results compiled and computed with the program using the grading criteria and the courses added when setting up the posting process in section 2.

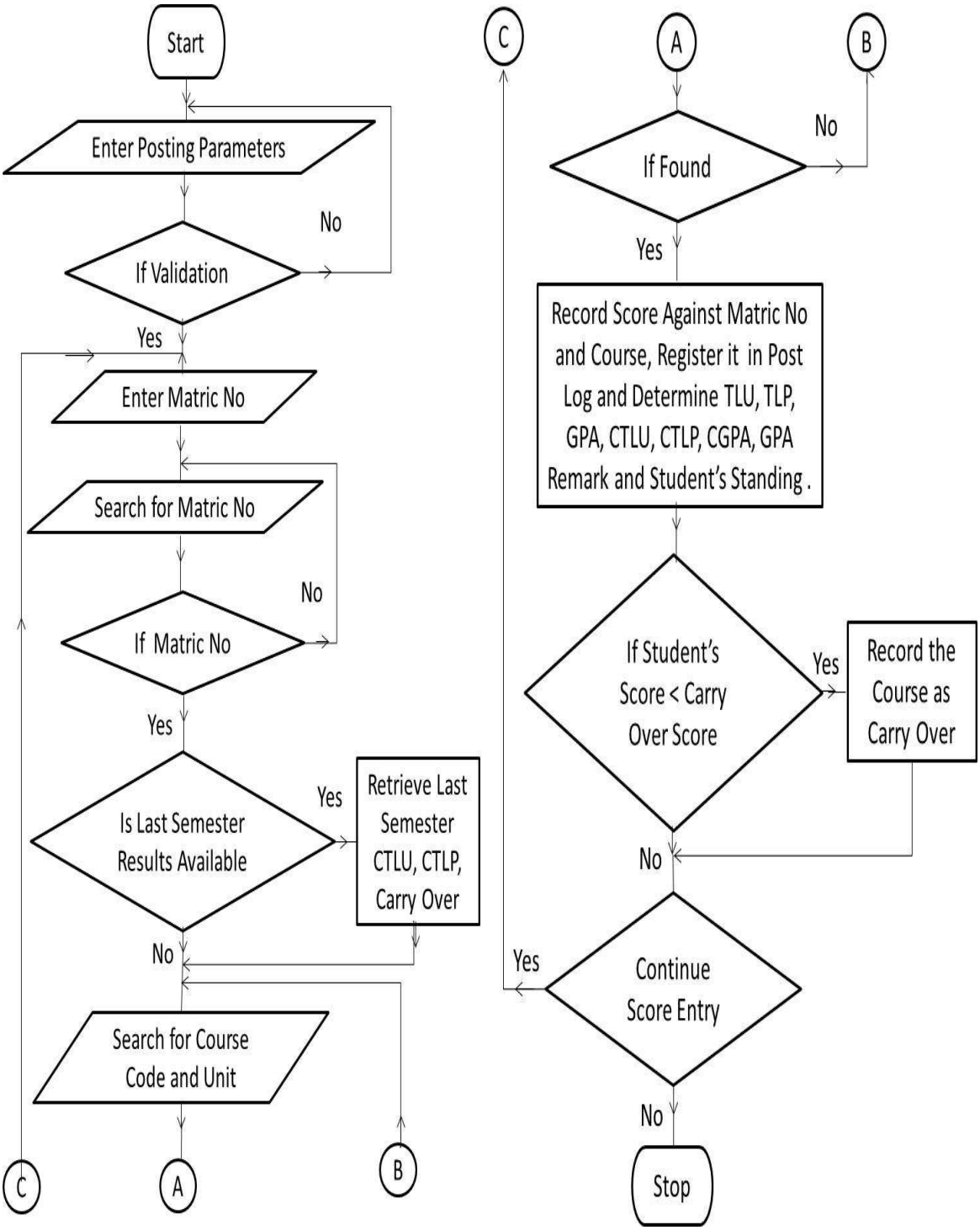

FIGURE V: Flow Chart Showing Program Organisation and Logic

DELTA STATE POLYTECHNIC, OZORO

SCHOOL OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF MATHEMATICS AND STATISTICS

OND 1 FIRST SEMESTER DETAILED RESULTS 2011/2012 ACADEMIC YEAR

		COURSE:	STA 111		STA 112		STA 113		MTH 111		MTH 112		COM 101		GNS 111		GNS 114														
		UNIT:	3		2		2		2		2		3		1		1														
S/N	NAMES	MATRIC NUMBER	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	SCORE	GRADE	TLU	TLP	GPA	REMARK	CTLU	CTLP	CGPA	STANDING	CARRY OVER COURSES				
1	AFOLABI S. MARIA	09/24920	69	B	60	B	57	BC	47	C	50	BC	34	CD	43	C	64	B	16	38.50	2.41	IGS	16	38.50	2.41	Pass	COM 101				
2	OGOGO M. JOY	09/24482	35	CD	44	C	46	C	46	C	33	CD	26	D	8	F	30	CD	16	24.00	1.50	NIGS	16	24.00	1.50	Fair	STA 111	MTH 112	COM 101	GNS 111	GNS 114
3	VICTOR JERRY	09/24815	49	C	36	CD	42	C	60	B	59	BC	60	B	46	C	21	D	16	36.00	2.25	IGS	16	36.00	2.25	Pass	STA 112	GNS 114			
4	UCHE JOSEPH	09/24587	38	CD	37	CD	44	C	50	BC	38	CD	35	CD	10	E	41	C	16	26.50	1.66	NIGS	16	26.50	1.66	Fair	STA 111	STA 112	MTH 112	COM 101	GNS 111
5	YUSUF ABIBAT	09/24682	72	A	75	A	71	A	60	B	55	BC	60	B	61	B	71	A	16	55.00	3.44	IGS	16	55.00	3.44	Upper Credit					

FIGURE VI: Completed Sample Results

Results Presentation: The programme also helps to re-arrange students' results for better presentation. Figure VII presents an Arrange Results form.

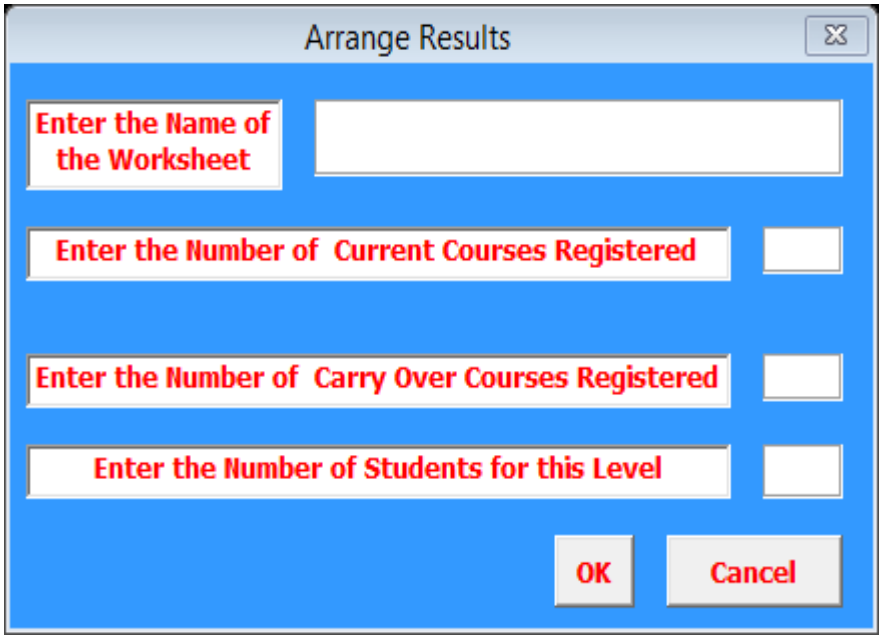

FIGURE VII: Arrange Results Form

Statement of Results: Statement of results of students can also be produced on demand by students. Figure VIII shows a Statement of Results form. To produce statement of results, the user must list all the courses in the CourseSheet worksheetand the ResultSheet worksheet provided by replacing the logo embeded by the school logo.

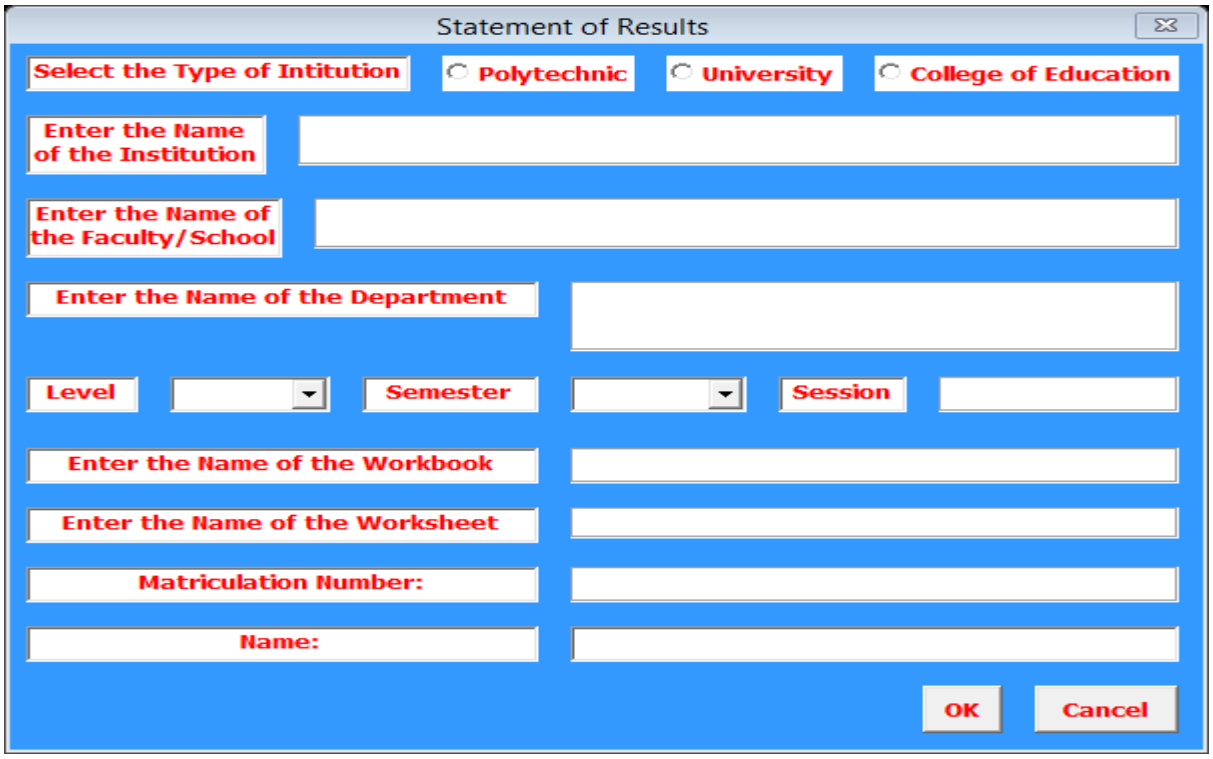

FIGURE VIII: Statement of ResultsForm

4.0 Discussion

The program had been tested, validated and adopted by the Department of Mathematics and Statistics, Delta State Polytechnic, Ozoro and we are receiving positive comments from users on the great impact the program is making in their results compilations and computations processes. Completed results are saved using a different file name and .xlsx file extension instead of the .xlsmthat the program used because of the Visual Basic Macros that is attached. The saved worksheet can then be formatted for printing.

To prevent frequent mistakes and improve efficiency of academic results compilations and computations, we recommend that academic professionals employ the use of Excel Visual Basic for Applications to automate the entire process. It is also recommended because of its availability as greater percentages of personal computers have Microsoft Excel on them which improve availability of the program designed with Excel Visual Basic for Applications. The program needs no addition hardware and software requirements as it is a Microsoft Excel Workbook file which run on any platform that supports Microsoft Excel Office package.

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