**International Academy of Science,
Engineering and Technology**
Connecting Researchers; Nurturing Innovations
IASET

DESIGN OF A LABVIEW –BASED PROGRAM TO CALCULATE
THE RUBRIC SCORE OF A GIVEN ABET OUTCOME
(THIS RESEARCH WAS SUPPORTED BY ZARQA UNIVERSITY)

Mohammad Alia, Wasif Salous & Ahmad Aljanaiedeh

Professor, Faculty of Engineering Technology, Division of Electrical Engineering, Zarqa University, Jordan

ABSTRACT

In order to carry out an assessment of a student learning outcome, ABET demands that this assessment must be measurable. Thus a need arises to find the rubric score for every question or sub-question that is related to a specific ABET student learning outcome. In this work a trial is made to design a simple, adjustable and modifiable program that calculates the rubric score depending on the number of the tested students, performance of each of them and the maximum mark allocated to the question or sub-question. The designed program was tested carefully and found to be correct and very simple to use when using only Windows operating system.

KEYWORDS: *ABET, Rubric Score, Lab View, Student Learning Outcome*

INTRODUCTION

At the time being, the ministry of Higher education in Jordan, represented by the Universities accreditation council is urging governmental and private Universities to apply for accreditation of engineering programs to ABET. The target is to develop and modernize the existing study plans to cope with ABET requirements and to guarantee a better quality of teaching.

As a result of that, some Universities responded and have got accreditation certificates and other universities are preparing their readiness or self-study reports. ABET requires a continuous and clear assessment policy to be implemented based on real simple calculations using specific assessment tools as necessary (1). Direct assessment using the examination s results is considered to be very reliable. Since the beginning of the first semester of this year at the faculty of engineering technology, Zarqa University, a lot of activities are undertaken in order to promote the teaching staff to assist the results of the first examinations. The Rubric method is recommended to be used to find the accumulative score for each student learning outcome (SLO), (2). According to rubric method student's marks are classified into a given number of groups and each group is given a specific weight. This enables to find the number of students within each group. Knowing the number of students in each group it is possible to find the accumulative score of a given (SLO). Many of the faculty members are asking for a simple program that is based on the rubric method and enables to carry out calculations using the PC s instead of doing that manually.

In this work, a trial is made to design a program to be used by faculty members in order to prepare for ABET self-study report (SSR), (3, 4).

PROGRAM SPECIFICATIONS

It is required that the Program Shall Include the Following Features

- The program must be designed to be used by any PC without installing any programming language. The program shall be run using Windows operating system only.

- The input to the program is the number of students who have set for the examination, the marks of each student and the maximum mark for each question or sub-question.

- The maximum mark could be any decimal value between zero and one hundred.

- It is preferred that the program shows the number of students falling in each group.

- The number of groups is adjustable in order to facilitate usage of four groups (V. Good-V, Good -G, Low performance- L and Unsatisfactory- U) or five groups (Excellent- E, V, G, L, U), or six groups, as required.

- The program allows data import from Excel sheet to the input array of the program.

- ABET student learning outcome score and the percentage score is the final result of the program.

PROGRAM DESCRIPTION

- In order to realize the above requirements Lab VIEW environment was used to design the program. This is because of the excellent features of Lab VIEW which allow to use the controls (inputs) and indicators (outputs) in one page which is called the front panel, and the core code is given separately in another page called the block diagram (5, 6, 7). Using LabVIEW properties it becomes possible to transforms the designed program into a standalone program which may be run using Windows operating system only, without installing LabVIEW software. One more advantage is that it is possible to interface Lab VIEW front panel with Excel sheet when it is required by using specific procedures.

The Program uses the Following Functions and Structures

- Two controls to input the number of students and the scaling range value (from zero to one), which is used to accommodate the maximum mark for the given examination.

- One dimension array control to write the marks of the students who have set for the examination.

- Two indicators to show the score and the percentage score.

- Five indicators to show number or students within a given group multiplied by group specific weight.

- In range and coerce function. This function determines whether an input (student mark) falls within a range specified by an upper limit and a lower limit inputs. This function coerces the value to fall within the range. The upper and lower limits are selectable. If input falls within the range the function outputs a Boolean True, and if the input falls outside the range a Boolean False is output.

- Boolean to (0, 1). This function converts a Boolean False or True to a 16-bit integer with a value of zero or one respectively.

- Compound Arithmetic. This function performs arithmetic on one or more numeric, array, cluster, or Boolean inputs. By selecting change mode from shortcut menu, one of the operations (add, multiply, and, or, xor) is selected. This function is used to add the product of the number of students by its specific weight for each of the five ranges.

- Wait until next ms multiple functions. This timer is used to determine the appropriate speed of iteration of the for loop structure.

- For structure. The structure is used to solve the code included within it for the given number of students. The marks of the students, which is written in the input array control are indexed through a tunnel at the border of the for a loop.

- Shift registers are used at the borders of the for loop in order to accumulate the total number of students whose marks fall within a given group.

Building on the above the Front panel is shown in figure No (1) and the Block diagram is shown in figure No (2). Important to note that the number of ranges and the value of the maximum mark are adjustable upon request. Figure No (3) shows a similar program interfaced with Excel sheet and having a five group (EVGLU) classification. Reshape array function is used to convert a two dimension array to one dimension array. Data is read from spreadsheet by using Read from spread sheet VI.
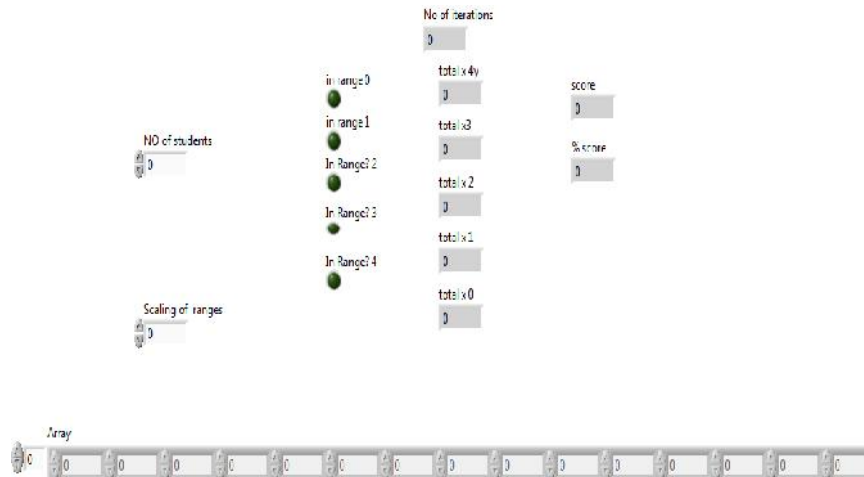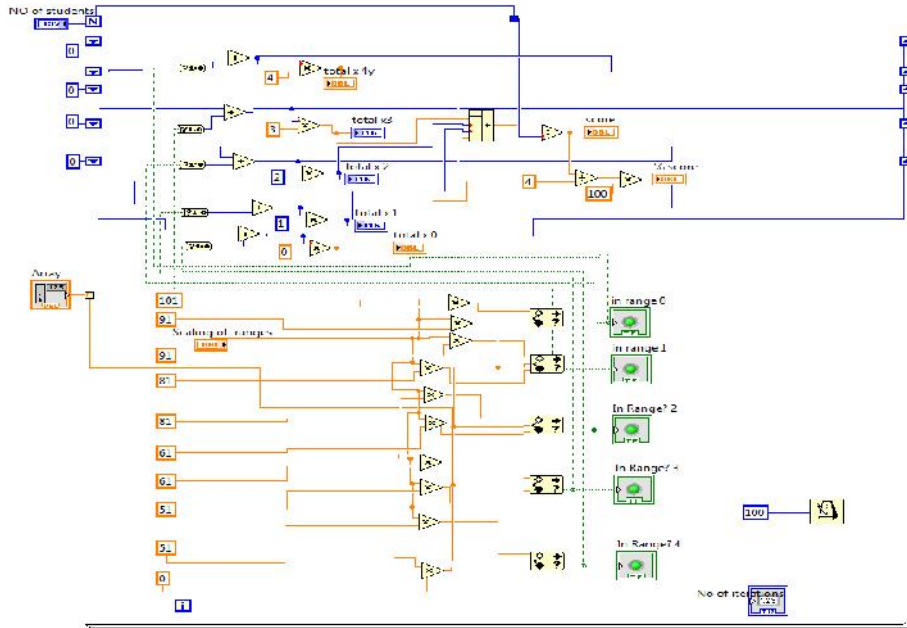

Figure 1: Front Panel of the Program

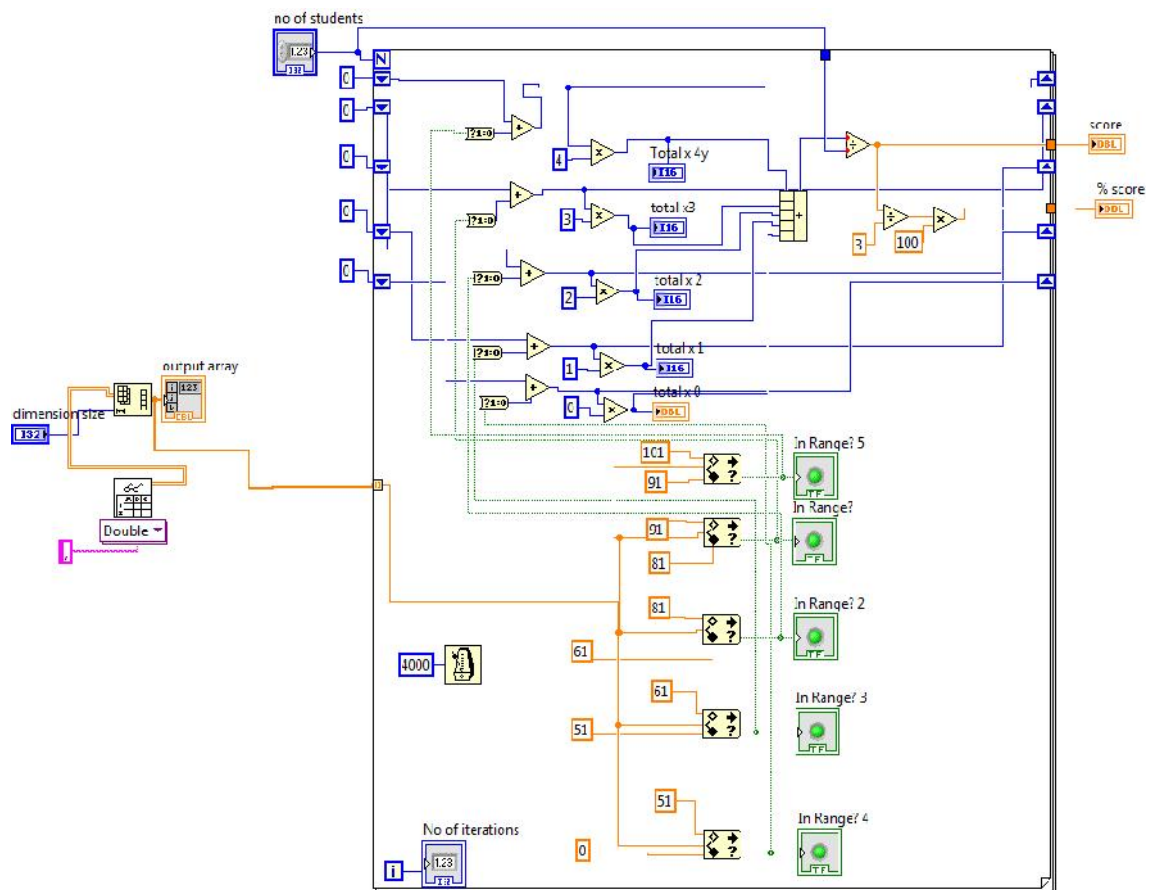**Figure 2: Block Diagram of the Program**

Figure 3: Block Diagram Interfaced with Excel Sheet

CONCLUSIONS

- A Lab VIEW – based program was designed and tested in order to find the accumulative score of a given ABET outcome.

- The program was transformed to become a standalone one, which can be used by any faculty member using Windows operating system only.

- The designed program is adjustable, flexible and permits interfacing with Excel sheet when required.

REFERENCES

1. *Student learning outcomes: An integrated continuous improvement process for course and program assessment. Hussein Rahemi, Naveen Seth*

2. *Latin America and Caribbean journal of engineering education Vol.2 (2), 2008*

3. *ABET Self-Study Report for mechanical engineering program. New York Institute of Technology June, 27 2012 U.S.A*

4. *ABET Self-Study Report for the engineering programs Upper State University Upper State, Any state July, 2015*

5. *Lab VIEW for Engineers Ronald W. Larsen. Montana State University Pearson, Prentice Hall, 2011 ISBN 10 : 0 – 13609429-5*

6. *Introduction to Lab VIEW Math script Finn Haugen, Tech Teach, Telemark University College, 12 May 2008, Denmark.*

7. *Lab VIEW For Everyone – Graphical Programming Made Even Easier. Lisa K. Wells, Jeffrey Travis Prentice Hall PTR, 1997 ISBN: 0-13-268194-3 U.S.A*