Chapter 5

Input/ Output and Forms Design

5.1 Introduction

A form is a document with spaces (also named fields or placeholders) in which to write or select, for a series of documents with similar contents. There are several types of forms. Action form, memory form and report form. An action form is that which tells the uses to do something. For example, purchase orders, application form etc. A memory form is the form to keep records. For example, inventory record, journal sheet etc. A report form guides the supervisor and administrator to do something. For example, balance sheet, operating statement etc.

Forms are the primary condition of data processing. If all necessary data are properly included in forms, future work with those data becomes easier. Forms must be well-defined so that the person for whom the forms were designed can easily and comfortably give required information. In recent times, digitized forms becomes very popular.

5.2 Form Design for Rajshahi education board

In the process of system analysis in Board of Intermediate and Secondary Education, Rajshahi, several types of forms were required. As the main focus of the analysis was to work on the examination system, forms relating the examination and its result preparation were emphasized. The examination process is a quite complex and lengthy process. From the start of question preparation to the end of result publication, a lot of processes need to be performed. Moreover after the result publication there comes the issues like re-scrutiny of result and some other processes like error correction in information etc. For these purposes, a well and effective data management system must be established.

From the experience gained form the analysis, several forms seemed to give attention for better performance of the result system processed by the board. As the analysis was highly focused on the result system, three forms for this purpose have been introduced here. One is for Head Examiner, one is for student identification and other is for result preparation. These forms were designed keeping in mind about how the forms would interact with the central database. The forms contain one or more such information such that the details of an answer script is easily extractable from the database. The details here means information about which student used the script, who was the examiner of the script, who was the Head Examiner for that script, marks of that student achieved in total and many more necessary information. The forms can be filled up online or any software can be introduced which will reduce the time and cost consumed for the transportation of answer scripts.

5.2.1 Theory marks submission form for Head Examiner

This form was designed for Head Examiner. The form contains information about teachers who examined which script as well as the script and Head Examiner. The fields of the forms are described below:

a. **Head Examiner code:** Every Head Examiner has a unique identification code. The code is stored in the central database from where the identity of the Head Examiner can be easily found.
b. **Select examination:** A Head Examiner can be assigned for more than one examination like JSC, SSC and HSC. So it is important to note which examination script is under process.
c. **Enter year:** In every year, there are some documents which need to be unique among all entities like students, examiners, answer scripts etc. But with the change of year, those information may be repeated. So, if year is added to the form as well as database, the chance of ambiguity can be eliminated.
d. **Select group:** There are three groups in SSC and HSC education system. They are: science, commerce and arts. These group information should be added to the form to make it more robust and specific. Although in JSC, no group information is required, it should be kept unmarked in case of JSC examination.
e. **Enter subject code:** Every subject has a subject code. The code is a unique identifier of each subject. As every examiner has been assigned with a particular subject, the scripts should be grouped accordingly. The Head Examiner should also distinguish each group by its group code. It would make the identification of scripts easier and faster.
f. **Tabulation sheet:** This sheet has some fields. This is the information containing script information. The fields of this sheet are described below:
    - Examiner code: Every examiner has a unique code. From the code the examiner who evaluated which form can be easily identified.
    - Script no. (in binary): Every script has a unique 32-bit binary identification number. It is a highly encrypted and very large number which identifies each sheet. As the number is very large and it is not efficient to read the data in it manually, it is recommended to scan the result and directly place it in the form.
    - Theory marks: As the examiners works only with the theory scripts, marks in each script must be noted properly.
g. **More data entry:** As it can be seen, not all data can be inserted at once. Head Examiner need to process a lot of scripts. So, here a few rows were introduced for ease. If further data entry is needed, this option is needed to be used. If this option is used, only the tabulation sheet would be refreshed. The data entered for the Head Examiner would not be erased.
h. **Submit:** When all data is properly recorded, this option will be used. Once this option is used, all inputs along with the information of Head Examiner would be stored in the database and the layout of the form will be refreshed for new entry.

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Theory marks submission form for Head Examiner

Head examiner code

123456789

Select examination

○ JSC ○ SSC ◉ HSC

Enter year

2017

Select group

◉ Science ○ Commerce ○ Arts

Enter subject code

101

Tabulation sheet

Examiner code	Script no. (in binary)	Theory marks
13579	10101010101010101010101	50

More data entry Submit

Figure 5.2.1 Theory marks submission form for Head examiner

5.2.2 Student identity checking form

The form was designed for matching students' identity and their theory answer scripts. The fields' description is given below:

a. **Select examination:** In a year several examinations like JSC, SSC and HSC are arranged by the board. So it is important to store which examination script is under process.
b. **Enter year:** The year when the examination takes place is placed here. This maintains the uniqueness of the information of the database.
c. **Select group:** There are three groups in SSC and HSC education system. They are: science, commerce and arts. These group information should be added to the form to make it more robust and specific. Although in JSC, no group information is required, it should be kept unmarked in case of JSC examination.
d. **Tabulation sheet:** This sheet contains several fields. The description is given below:
    - **Registration no.:** Every student has a unique registration no. The no. is unique in the corresponding year. This is an important identity of a student.
    - **Roll no.:** This is also a unique identity of a student. This along with the registration no. give a unique identity for every student. Because, for a student, both registration no. and roll no. can't be the same.
    - **Subject code:** Every subject has a subject code. The code is a unique identifier of each subject. Every student has to take part in examination in different subject codes for different subjects. So, it is a must to know which subject of the student is currently recorded.
    - **Theory script code (in binary):** Every script has a unique 32-bit binary identification number. It is a highly encrypted and very large number which identifies each sheet. So, no two students can take part in examination using the same answer script. Using the answer script code a script's examiner can also be found.
e. **More data entry:** As it can be seen, not all data can be inserted at once. The officials need to process a lot of scripts. So, here a few rows were introduced for ease. As the number of data processed in this stage is very large this option works as the new entry choice. If this option is used, only the tabulation sheet would be refreshed. The data entered by the officials at the beginning will not be erased.
f. **Submit:** When all data is properly recorded, this option will be used. Once this option is used, all inputs along with the information of the students would be stored in the database and the layout of the form will be refreshed for new entry.

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Student identity checking form

Enter year

2017

Select examination

○ **JSC** ○ **SSC** ◉ **HSC**

Select group

◉ **Science** ○ **Commerce** ○ **Arts**

Registration no.	Roll no.	Subject code	Theory script code (in binary)
123456	654321	101	101010101010101010

More data entry **Submit**

Figure 5.2.2 Students identity checking form

5.2.3 Result preparation form

This form is used to combine all information combining theory script, OMR script, students' identification. Processing the data evaluated form this form, final result can be prepared. The description of the fields of the form are given below:

a. **Enter roll no.:** The form is the database input of each individual student. It starts with the roll no. of a student.
b. **Enter registration no.:** Registration no. is another identity of a student. This is also stored using this form.
c. **Enter year:** The year when a student takes part in examination is used here. A student can take part in only one examination in a year.
d. **Select examination:** This is for placing the information where the type of examination is stored. Options are: JSC, SSC and HSC.
e. **Select group:** This field contains three options: science, commerce and arts. This portion is only for SSC and HSC students. For JSC students, this field needs to be kept blank.
f. **Tabulation sheet:** This is the student information form. Here goes other information about answer scripts and marks. From this field, result can be prepared finally. The fields of this sheet are described below:
    - **Subject code:** This field is to be filled with the subject code of the script which is being recorded currently.
    - **Theory script code (in binary):** This field contains information about the identity of the answer script of a student.
    - **Theory marks:** This field contains theory marks obtained by the student. This field can be filled from the database with the information stored about the script stored previously.
    - **MCQ script code (in binary):** This contains information about the MCQ script of a student.
    - **MCQ marks:** Here the marks obtained by the student from the MCQ script is placed. The information can be found from the MCQ scripts' database.
    - **Practical marks:** Some subjects has practical examination. This field can be put blank if not necessary.
    - **Grade:** There is a standard scale of grading developed by the authority based on the total marks obtained by a student.
    - **GPA:** It's a numeric expression of the grade. Combining the grades obtained from all subjects total GPA is counted.
g. **More data entry:** The amount of data can be different varying examination type. So here is the option if more data entry is required. If number of subject increases, more data is added.
h. **Submit:** When all data entry is finished, this option is used. Once the option is used, final result of a student is prepared calculating the GPA.

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Result Preparation Form

Enter roll no.

654321

Enter registration no.

123456

Enter year

2017

Select examination

○ **JSC** ○ **SSC** ◉ **HSC**

Select group

◉ **Science** ○ **Commerce** ○ **Arts**

Subject code	Theory script code (binary)	Theory marks	MCQ script code (binary)	MCQ marks	Practical marks	Grade	GPA
101	1010	50	10101010	35		A+	5.00

More data entry **Submit**

Figure 5.2.3 Result preparation form

5.3 Conclusion

The forms are essential medium for establishing an effective database system. An effective database system can ensure better performance for a system. As the board has to maintain a huge amount of data, the forms and database system must be effective and redundancy free. Every year the number of students is increasing and handling those amount of data is becoming quite complex process. Keeping those conditions under considerations, those proposed forms were designed.

But these forms need a robust and secured digital system with proper fail safe measurement. As the amount of data is increasing every year, these forms may be changed after a certain period of time. But as the forms are interacting with the central database, the modification needs to be handles properly.

The forms are designed to process digitally. So, a digital system must be designed to implement those forms in use. The implementation can be done using a website or a software. Since the form will be interacting with the central database and the result system is a very confidential process, a separate software with the ability to interact with the database is recommended. But this process needs a qualified expert team and regular maintenance. A technical support team can be appointed for this purpose.