entire process, the user has the liberty to move the cursor up, down, left, right to various locations to enter data into the form.

Enter Student Details

Name: _____

Roll no: _____

Department: _____

Subject: _____

Figure 10.2: Formatted form

In the example given in Figure 10.2, shows a sample of how student details can be added in a formatted form.

The prompt

In prompt, the data to be entered gets displayed one by one. One data enquiry will be displayed; the system will wait for the user response. Once the user responds, the next data entry gets displayed and so on. The next data entry doesn't get displayed unless user enters the data.

Enter email: xyz@gmail.com

Enter password: **********

Confirm password: **********

Exit the system(y/n): y

_____

Figure 10.3: Prompt

In the above example in Figure 10.3, the bold letters indicates messages generated from the system and the other data is entered by the user. The system generates the message "**Enter email**". Once the email is entered by the user, the system generates the next message "**Enter password**" and so on.

1. Variable data: The data items that keeps on changing for each transaction handled or if any decision is made.
2. Identification data: The data that uniquely identifies the item being processed. In each transaction record, the identifying data is known as record key.

It is very important to know what type of data is entered by user at the time of the input. This is determined by the analyst. The following types of data should not be entered as input—

1. Constant data: Data is same for every record or entry.
2. Details that system can retrieve: Here the stored data can be quickly retrieved from the system.
3. Details that the system can produce: Here system can produce results using the combination of stored data and entered data.

10.4 INPUT DATA

The design of appropriate data input methods is very important. It helps to prevent errors while entering data. The data input method to be used depends on whether the data is directly entered by users on PCs or it is entered by customers in forms manually and later entered into the system with the help of data entry operators. The goal of designing input data is to make the process of data entry logical, easy and error free. While doing data entry, operators need to consider the following:

1. The allocation space for each field.
2. The sequence of the fields must match that given in the source document.
3. The data fields format. For e.g. for entering date whether mm/dd/yy or dd/mm/yy is used.

Some of the popular data input methods are—

1. Offline data input method or batch input method.
2. Online data entry.
3. Computer readable forms.
4. Interactive data input.

Input integrity controls

Input integrity controls are very important in order to design proper input. It includes a number of methods that helps in the elimination of common input errors committed by end users. Checking the values of the individual fields is also included. Transaction logs are used to create audit trails for data entry and other system operations. Audit trails give a record of all changes made in the database. Audit trails helps to provide security and means of recovery in case of any failure.

Once input data design is completed and input data is identified, the source document should be designed. The source document captures the data and then the media can be selected to enter the data into computer.



CHECK YOUR PROGRESS

Q1. Why the volume of input data should be reduced in input design?

Q2. What type of data should not be entered as input?

Q3. Mention few popular data input methods.

10.4.1 Source Data

Source data is the form in which data are initially captured. For example, a cheque drawn for a bank account is a source document. After reaching the back, special MICR (Magnetic Ink Character Recognition) is used to encode it so that it can be processed by the information system of the bank. Therefore it can be said that source documents initiates a processing cycle as soon as they are entered into the system. Source document may be entered into a system using various methods like punch cards, from disks or even directly using keyboard. The candidate system may or may not retain the source document.

It is very important to evaluate the source document. The terms on which each source document is evaluated are—

1. Continuation of usage in candidate system.
2. Extend of modification for candidate system.

Online data entry methods uses a processor that accepts data and commands from operator through keyboard, voice input or a touch sensitive screen. The processor analyzes the input and then accepts or rejects accordingly. The three major approaches for entering data into the system or computer are:

- Menu
- Formatted forms
- Prompts

Menu

It is a selection list that helps to simplify computerized data access or entry. There is no need for the user to remember what to enter. The user can simply choose from a list of options and type the option letter associated with it. In a menu, the number of options from which an user can choose is limited. But it reduces the chances of error in data entry.

```
        Perform Operation
   A)   Addition
   B)   Subtraction
   C)   Multiplication
   D)   Division

        Enter your choice:
```

Figure 10.1: Menu

In the example given in Figure 10.1, user can select any option to perform the respective operation.

Formatted form

A formatted form is a pre-printed form or a template. It requests the user to enter data in the appropriate locations. It looks similar to a “Fill in the blanks” type of form. The form is displayed on the screen as a unit. The cursor is usually positioned at the first entry of the form. After the user starts responding by filling up the appropriate data, the cursor automatically keeps moving to the next entry and so on till the form is fully filled up. During the

4. **Mark-sensing readers:** Mark sensing readers (MSR) is also known as optical mark reader (OMR). It can recognize marks made by a pencil or pen on a specially designed form or card. These cards and forms are pre-printed for special uses. A mark in a particular position in the form or card represents certain meaning. MSR are mostly used in tests, surveys, questionnaires, etc where answers are recorded as dark pencil marks in boxes or circles.
5. **Optical Character Recognition (OCR) readers**: It recognizes all kinds of different characters. It recognizes both hand-written and printed characters and converts it into a machine-readable, digital data format. There are various applications of OCR technology. Image based PDF, TIFF, or JPG can be automatically converted into a text-based machine readable file. Digital files processed with OCR can be searched, viewed, edited and sent to other systems.
6. **Optical bar code readers**: Barcodes consists of bars and spaces that represent characters, numbers, etc. Optical recognition devices called barcode readers or barcode scanners are used to read the barcodes. Optical barcode readers detect any combination of marks that represents data. The most widely used optical bar code reader is Universal Product Code (UPC). UPC is widely used in retail stores.
7. **Cathode Ray Tube**: CRT is mostly used for online data entry. CRT screen has the ability to display 20, 40 or 80 characters simultaneously on a screen. They can display as many as 24 lines of data.

10.6 ONLINE DATA ENTRY

The most widely used technology for online data entry is Cathode Ray Tube (CRT) screens. As computers are commonly used and its price also declining, entering data directly into the computers using keyboards has become very popular. For example, Automated Teller Machine (ATM) in banking sector, Point Of Sale (POS) in retailing, etc.

A source document should be logical. It should be easy to understand. User should be clearly able to identify each area in the form. It should clearly specify the user what to write and where to write. For example, consider the field “date of birth”. It can be written in different ways. Few of the ways are—

1. 21st August 2021
2. Aug, 21st 2021
3. 21/08/2021
4. 08/21/2021

Unless it is clear how the “date of birth” field should be written, responses can be expected having the above type of combinations.

10.4.2 Design of Source Document

In order to design the source document, first the analyst must decide what data to be captured. The layout of the document can be developed by the analyst stating what items should be included and where they should be placed. The document should also include information guiding the user how to fill the form and what information to provide. Following things should be considered while designing the source document—

Layout:

The layout organizes the whole document. It places the information in such a way so that it will be noticed. It helps to establish the appropriate sequence of items. For example, most people fill up a document from top to bottom and from left to right. The document should be designed in such a manner only. The document should be designed in a logical manner. In a well-designed form, data items should be asked only once as much as possible. Forms should have enough space so that users can provide all information in the space given. The document layout exactly shows the position of each data items with all the headings and instructions to the users.

Captions:

Captions on source document tell the user the type of data that should be entered and when they should be entered. The caption should be brief and easy to understand. The captions should be the standard terms that all the users use. It is a good idea to avoid abbreviations. Simple examples should be included that tells the users how to feed the data.

A well designed source document is easily completed. It speeds up the process of recording data. If checkmarks and boxes are sufficient, they should be provided to capture the data instead of asking the users to write long responses.

10.4.3 Source Data Capture Methods

There are three different methods to capture data. Each method uses specific data preparation and input equipments. The methods are—

1. **Source data capture with key punching**: This method is very old and seldom used now a day. First data is written on the source document. If necessary, data from the source document is coded into a form that is acceptable for computer processing. Data is key punched into the cards. The punch cards are then verified by rekeying the data on a verify machine that compares previously punched data with re-punched data. The cards are then batched together and read into the computer for processing. Data is validated as they are read into the computer for processing. At last the data is processed.
2. **Source data capture with key to storage**: First data is written on the source document. If necessary, data from the source document is coded into a form that is acceptable for computer processing. The tape or disk of data is processed directly. No extra steps are needed to enter data into the computer. The data is validated as it is read into the computer for processing. The data is finally processed.

3. **Direct entry through intelligent terminal**: Intelligent terminals are very similar to cathode ray terminals. They have built in processing capabilities. The need of source document can be eliminated by the use of intelligent terminal for data capture unless a paper record of the transaction is required. The moment a transaction takes place, the operator keys the data directly through the intelligent terminals. As the data is entered, the processor validates the data. One advantage of intelligent terminal is that it can directly interact with the computer.

10.5 INPUT MEDIA AND DEVICES

Source data can be put into the system using a variety of ways. Various media and devices are used for this purpose. Few of the important media and devices are listed below—

1. **Punch cards**: The width of punch cards is either 80 or 96 columns. Data is arranged in a sequential and logical order. It is arranged in such a way so that it becomes easy to put the data into the system. Key punch is used to copy data from source documents into cards. It is very important that while designing both source document and cards should be considered simultaneously.
2. **Key to diskette**: It is modeled after the key punch process. The card is replaced by a diskette and it can store up to 3,25,000 characters. It is equivalent to data stored in 4050 punch cards. Data is stored in diskette in sequential and logical manner in batches.
3. **MICR**: Magnetic Ink Character Recognition (MICR) is a technology that translates the special fonts printed in magnetic ink on cheques into directed computer input. This technology enables a machine to read, process and record information. MICR numbers are designed in such a way so that it can be read by both user and the system. The MICR numbers cannot be faked or copied due to the use of magnetic ink and unique fonts.