Chapter III: Data Entry and Information Control

Collecting information is one of the four primary tasks that must be performed by an information system. Therefore, the collected information must be entered into the company's various media (documents, hard drives, servers, etc.) and subsequently verified to ensure its accuracy and compliance with work requirements

1. Information Entry

According to LAROUSSE [19], data entry is the recording of information for processing or storage in a computer system. It is typically performed by typing on an alphanumeric keyboard connected to a display and control screen.

From a purely IT perspective, this operation involves manually integrating (usually by specialized data entry operators) data from another source into the memory of an electronic device (typically a database) [20].

1.1. Types of Data to Enter

The data entry process involves handling different types of data, namely:

- Character or text data.
- Numerical data.
- Monetary data.
- Date and time data.
- Formulas.

1.2. Types of Data Entry

1.2.1. Manual Entry

An operation that involves entering data into a computer using the keyboard.

1.2.2. Semi-Automatic Entry

Semi-automatic data entry is a process that takes partial user input and predicts the final result. This allows for various efficiencies and faster use of different technologies.

1.2.3. Automatic Entry

Automatic data entry is a feature of certain software applications, typically with forms, which automatically fills in fields based on information the user has previously entered.

2. Information Control

Information circulating within an organization plays a role throughout its life cycle, through numerous manipulations, and must meet specific business needs and objectives. Therefore, it is essential to control the information to avoid errors and anomalies that could cause malfunctions within the organization.

Controlling information involves verifying that it is accurate, complete, valid, and complies with the organization’s requirements.

3. Main Types of Controls

3.1. Direct Controls

These are controls performed on the information itself without considering other information handled by the information system. There are several types of direct controls, such as:

3.1.1. Presence and Absence Controls:

Their purpose is to verify the existence of information if it should exist, or the absence of information if it should not exist.

Example:

- When issuing a student card, the student must already be registered in our information system (presence control).

- When enrolling a new student, that student must not already exist in our information system (absence control).

3.1.2. Syntax Controls:

These controls are typically used to detect syntax-related errors in the information, such as:

a) **Type Errors (Format Errors):**

A type error, sometimes called a format error, is a discrepancy between the data and its specified type.

Example: Weight: 12x3 → type error (the weight must be numeric, not alphanumeric).

b) **Formatting Error:**

A formatting error occurs when an entry does not match a given pattern.

Example: The date 05/31/2022 is a poorly formatted value according to our adopted format, which is DD/MM/YYYY.

c) **Irregularity Errors:**

An irregularity error occurs when data is not represented consistently, following the same pattern or logical sequence.

Example

City	Temperature
M'sila	31°C
Setif	29°C
Alger	28°C
Biskra	**93.2°F**

3.2. Indirect Controls

Their objective is to verify the compliance of a piece of information with other existing information in the system. These controls help detect errors that are generally related to the semantics of the data, such as:

3.2.1. Contradiction or Consistency Errors

Contradictions in data can be internal or external.

a) **Internal Contradiction**

This involves verifying the accuracy of one part of the information against other parts of the same information. Internal contradiction checks are typically applied in juxtaposed codes.
Example:
Consider the date 31/02/2022. The internal consistency or contradiction check detects an error because the month of February has a maximum of 29 days.

b) **External Contradiction**

This involves verifying the accuracy of a piece of information against other pieces of information.
Example:
Date of birth: 27/04/2000.
Hiring date: 12/08/2011.
The external consistency or contradiction check detects an error because the age of this employee at the time of hiring would be 11 years!!!

3.2.2. Errors Related to Integrity Constraint Violations

These are errors that do not adhere to the integrity rules of the data schema.
Example:
Verifying that the age is greater than 0.
Verifying the uniqueness of a student's ID.

3.2.3. Invalid Data Errors (Plausibility)

These are entries considered invalid but not detectable by applying constraints. The data must be plausible and make sense based on its context. Generally, these errors are domain-specific.

Example:

Name	Height
Nadir Ahmed	1.75
Mokhtar Ali	3.5

The plausibility check detects an error related to Mokhtar Ali's height because it is not conceivable for a man to have a height of 3.5 meters.

4. Some Techniques to Reduce Data Entry Errors

Errors during data entry are inevitable, and we cannot completely eliminate them. However, the best solution is to reduce them by using data entry assistance techniques. These techniques can guide the user or handle the entry task in certain cases. Here are a few techniques that can enhance data entry tasks and reduce errors.

4.1. Accept All Entry Formats (Uppercase/Lowercase)

For text fields, it is preferable to free the user from issues related to the use of uppercase and lowercase formats. In this case, all formats should be accepted, and the system should later harmonize these formats.

4.2. Avoid Entry of Deductible and Calculable Fields

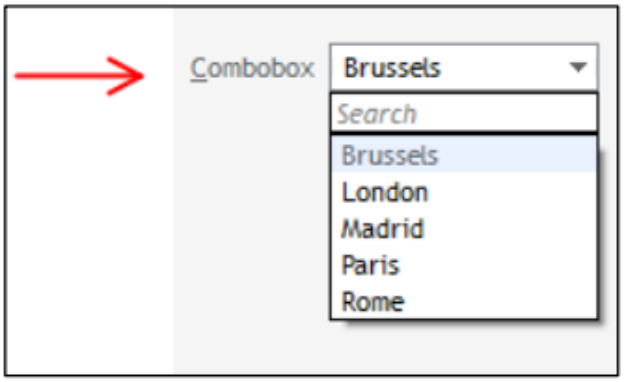
In some cases, we encounter data that can be deduced or calculated from existing data. In this case, it is preferable to exempt the user from entering these fields and allow the system to deduce or calculate them automatically.

4.3. Use Appropriate Graphical Interface Components

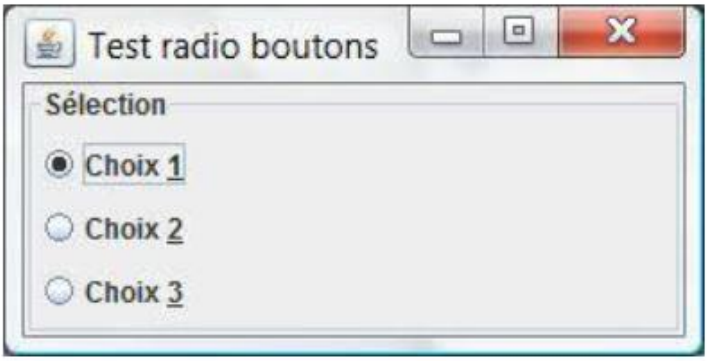
In computing, there are several graphical interface components that can help reduce data entry errors and guide the user toward best practices. Among these components, we can mention:

4.3.1. Combobox

In computing, a combobox (also known as combo-box) is a graphical user interface element that combines a text field and a dropdown list. This element is commonly used by websites and software.

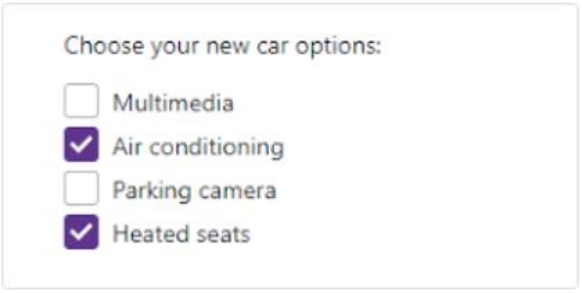


4.3.2. Radio Buttons



A radio button is a visual element of graphical interfaces, always used in a group (at least two radio buttons). The user must choose one, and only one, option among several possible ones.

4.3.3. Checkbox

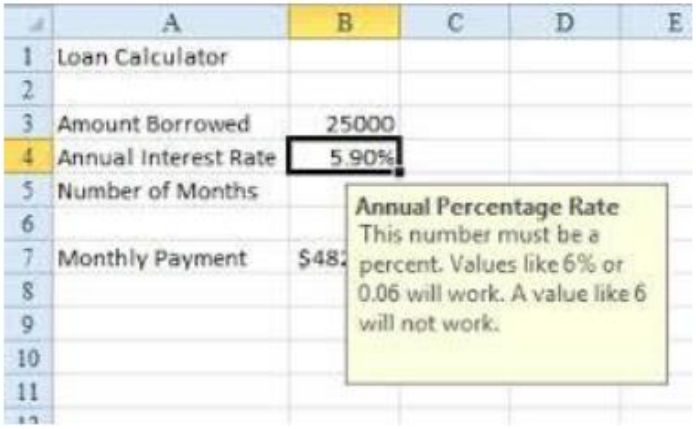


The checkbox component contains items displayed as checkboxes, which are checked when activated. They allow the selection of one or more values in a form.

4.3.4. Message Box

Displays a message window, also called a dialog box, which shows a message to the user. It is a modal window that blocks other actions in the application until the user closes it. A message box can contain text, buttons, and symbols providing information and instructions to the user.

4.3.5. Hint Text



Hint text is the recommended method to display contextual help for forms, controls, and other screen objects. Such contextual help about screen objects is also known as "What is this?" help.

4.3.6. Label

In computing, a label is a graphical interface component (widget) that displays text. The label is generally a static component, meaning it has no interactivity. It can help the user by displaying short text that guides them in their task.