Design

Now that the project manager and the client have agreed on the requirements (Requirements Specification) it is time to define how the project is going to be carried out.

The Design phase is about planning the project in detail so that that system will meet user requirements.

Diagrams can be used to demonstrate how the new system will work.

Data Flow Diagram (DFD)

A Data Flow Diagram (DFD) shows how data flows throughout a system. It is not about the order of processes, it is only about the data flows.
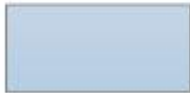
Symbols used within a DFD:

External Entity

Data Flow

Data Store
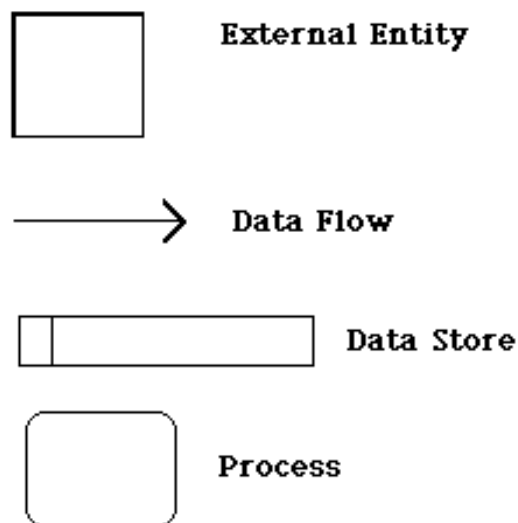
Process

System Flowchart

A system flowchart shows the processes that take place within the system and the decisions that are made. It focuses on the logic of the system, rather than the data within the system.

Symbols used within a flowchart:

Symbol	Name	Function
(oval)	Start/end	An oval represents a start or end point
(arrow)	Arrows	A line is a connector that shows relationships between the representative shapes
(parallelogram)	Input/Output	A parallelogram represents input or output
(rectangle)	Process	A rectangle represents a process
(diamond)	Decision	A diamond indicates a decision

Data Collection Forms

Data collection forms are documents that are used to collect data without the use of a computer. It is important to design the form in such a way that the required data can be collected.

When designing a data collection form, it is a good practice to follow the principles below:

- ✓ Avoid colour as the document may not be printed in colour.
- ✓ Include instructions about how to complete the form.
- ✓ Give clear instructions about where the form should be returned.
- ✓ Identify which questions must be answered and which are optional.
- ✓ Provide enough space for each answer.

- ✓ Use tick boxes for multiple choice lists.
- ✓ Make it clear how many options are allowed to be chosen from a multiple choice list.
- ✓ Ensure all fonts are consistently used.
- ✓ Avoid cluttering the form with too much information or too many questions.
- ✓ Ensure that the font style and size are legible.

Screen Layouts

A screen can be used to ask the user for data to be input or to display information to the user.

When designing a screen it is good practice to follow the principles below:

- ✓ Use colour sparingly and appropriately, different colours can be used for questions and responses or for different types of data.
- ✓ Ensure all fonts are used with consistency.
- ✓ Avoid cluttering the screen with too much information.
- ✓ Ensure that the font style and size are legible.
- ✓ Include instructions about how to fill the form.
- ✓ Identify which questions must be answered and which are optional.
- ✓ Provide enough space for each answer.
- ✓ Use tick boxes for multiple choice lists that can have more than one response.
- ✓ Use drop-down boxes (combo boxes) or option buttons (radio buttons) for multiple choice lists that can only have one response.

Validation Routines

Validation rules should be used wherever possible and be appropriate in order to reduce the number of possible input errors.

They only need to be used for input data so any calculations or output data do not require validating.

When designing a validation rule, identify the input data that is to be validated, the type of validation rule to be used, the rule that will be used and the error message that should appear if the data input is invalid.

Validation methods

Validation Method	Description
Range check	Checks the data falls between an acceptable upper and lower value, within a set range
Type check	Checks that the data entered is of an expected type, e.g. text or a number
Length check	Checks the number of characters meets expectations, e.g. an 8 character password
Presence check	Checks that the user has at least inputted something, stopping them from accidentally entering nothing
Check digit	An extra digit added to a number which is calculated from the other digits, this ensures the rest of the number has been entered properly

Data Dictionary

A data dictionary is a document or file that describes the structure of the data held within the database. It is known as meta data which means ''data about data''. It is a tool that is used by database developers and administrators.

It will include the following items:

- ✓ Data about fields
- ✓ Data about tables

Hardware and Software for a New System

The designer will need to design what hardware and software is required. If the application being designed is a small one, then it may be able to run on existing hardware and software within the organization. The designer will need to determine the minimum hardware and software requirements and then find out if the hardware and software already exists and can be used.

In some circumstances, the application will need additional software in order to run. The designer will therefore need to identify the new software that is required.

If the existing hardware within an organization is not capable of running the software required, then upgrades to the existing hardware or new hardware will need to be specified.