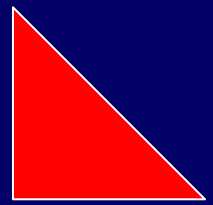
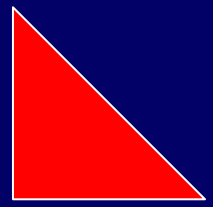


Data Dictionary

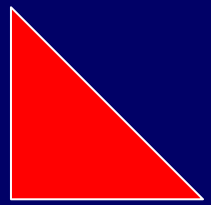
Unit 5.3

Data Dictionary



- A tool for recording and processing information (metadata) about the data that an organisation uses.
- A central catalogue for metadata.
- Can be integrated within the DBMS or be separate.
- May be referenced during system design, programming, and by actively-executing programs.
- Can be used as a repository for common code (e.g. library routines).

Benefits of a DDS

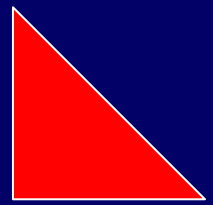


Benefits of a DDS are mainly due to the fact that it is a central store of information about the database.

Benefits include -

- improved documentation and control
- consistency in data use
- easier data analysis
- reduced data redundancy
- simpler programming
- the enforcement of standards
- better means of estimating the effect of change.

DDS Facilities

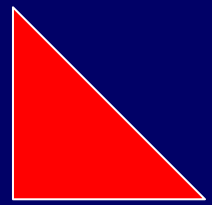


A DDS should provide two sets of facilities:

- To record and analyse data requirements independently of how they are going to be met - conceptual data models (entities, attributes, relationships).
- To record and design decisions in terms of database or file structures implemented and the programs which access them - internal schema.

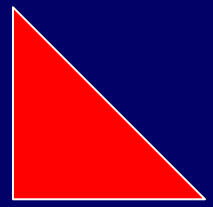
One of the main functions of a DDS is to show the relationship between the conceptual and implementation views. The mapping should be consistent - inconsistencies are an error and can be detected here.

DD Information



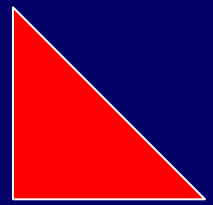
- The names associated with that element (aliases)
- A description of the data element in natural language.
- Details of ownership.
- Details of users that refer to the element.
- Details of the systems and programs which refer to or update the element.
- Details on any privacy constraints that should be associated with the item.
- Details about the data element in data processing systems, such as the length of the data item in characters, whether it is numeric alphabetic or another data type, and what logical files include the data item.
- The security level attached to the element in order to control access.
- The total storage requirement.
- The validation rules for each element (e.g. acceptable values).
- Details of the relationship of the data items to others.

DD Management



- With so much detail held on the DDS, it is essential that an indexing and cross-referencing facility is provided by the DDS.
- The DDS can produce reports for use by the data administration staff (to investigate the efficiency of use and storage of data), systems analysts, programmers, and users.
- DDS can provide a pre-printed form to aid data input into the database and DD.
- A query language is provided for ad-hoc queries. If the DD is tied to the DBMS, then the query language will be that of the DBMS itself.

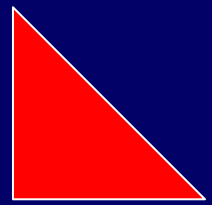
Management Objectives



From an management point of view, the DDS should

- provide facilities for documenting information collected during all stages of a computer project.
- provide details of applications usage and their data usage once a system has been implemented, so that analysis and redesign may be facilitated as the environment changes.
- make access to the DD information easier than a paper-based approach by providing cross-referencing and indexing facilities.
- make extension of the DD information easier.
- encourage systems analysts to follow structured methodologies.

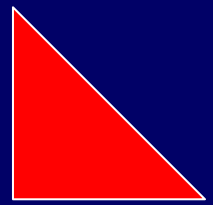
Advanced Facilities



Extra facilities which may be supported by DDS are:

- Automatic input from source code of data definitions (at compile time).
- The recognition that several versions of the same programs or data structures may exist at the same time.
  - live and test states of the programs or data.
  - programs and data structures which may be used at different sites.
  - data set up under different software or validation routine.
- The provision of an interface with a DBMS.
- Security features such as password protection, to restrict DDS access.
- Generation of update application programs and programs to produce reports and validation routines.

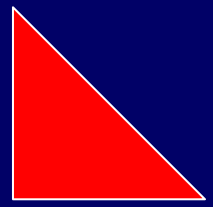
Management Advantages



A number of possible benefits may come from using a DDS:

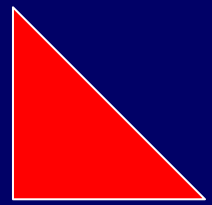
- improve control and knowledge about the data resource.
- allows accurate assessment of cost and time scale to effect any changes.
- reduces the clerical load of database administration, and gives more control
- over the design and use of the database.
- accurate data definitions can be provided securely directly to programs.
- aid the recording, processing, storage and destruction of data and associated documents.

Management Advantages cont...



- generate test files and documentation.
- enforce standards on programming, improving readable and consistency.
- aid application maintenance because changes to the data and the data structures can be made automatically to all programs using the data.
- aid the operations side of computing by holding details of storage, recovery procedures, and archiving information.
- provide security features such as passwords to assist in the protection of the data resource.

Management Disadvantages



A DDS is a useful management tool, but at a price.

- The DDS 'project' may itself take two or three years.
- It needs careful planning, defining the exact requirements designing its contents, testing, implementation and evaluation.
- The cost of a DDS includes not only the initial price of its installation and any hardware requirements, but also the cost of collecting the information entering it into the DDS, keeping it up-to-date and enforcing standards.
- The use of a DDS requires management commitment, which is not easy to achieve, particularly where the benefits are intangible and long term.