



CSE 204 - INTRO TO DATABASE SYSTEMS

DATABASE ANALYSIS

Joseph LEDET
Department of Computer Engineering
Akdeniz University
josephledet@akdeniz.edu.tr

QUOTE OF THE DAY

- The analysis of concepts is for the understanding nothing more than what the magnifying glass is for sight.
 - Moses Mendelssohn



OUTLINE

- When fact-finding techniques are used in the database application lifecycle.
- The types of facts collected in each stage of the database application lifecycle.
- The types of documentation produced in each stage of the database application lifecycle.
- The most commonly used fact-finding techniques.
- How to use each fact-finding technique and the advantages and disadvantages of each.
- About a property rental company called DreamHome.
- How to apply fact-finding techniques to the early stages of the database application lifecycle.



FACT-FINDING TECHNIQUES

- It is critical to capture the necessary facts to build the required database application.
- These facts are captured using fact-finding techniques.
- The formal process of using techniques such as interviews and questionnaires to collect facts about systems, requirements, and preferences.



WHEN ARE FACT-FINDING TECHNIQUES USED?

- Fact-finding used throughout the database application lifecycle. Crucial to the early stages including database planning, system definition, and requirements collection and analysis stages.
- Enables developer to learn about the terminology, problems, opportunities, constraints, requirements, and priorities of the organization and the users of the system.



Stage of database system development lifecycle	Examples of data captured	Examples of documentation produced
Database planning	Aims and objectives of database project	Mission statement and objectives of database system
System definition	Description of major user views (includes job roles or business application areas)	Definition of scope and boundary of database application; definition of user views to be supported
Requirements collection and analysis	Requirements for user views; systems specifications, including performance and security requirements	Users' and system requirements specifications
Database design	Users' responses to checking the logical database design; functionality provided by target DBMS	Conceptual/logical database design (includes ER model(s), data dictionary, and relational schema); physical database design
Application design	Users' responses to checking interface design	Application design (includes description of programs and user interface)
DBMS selection	Functionality provided by target DBMS	DBMS evaluation and recommendations
Prototyping	Users' responses to prototype	Modified users' requirements and systems specifications
Implementation	Functionality provided by target DBMS	
Data conversion and loading	Format of current data; data import capabilities of target DBMS	
Testing	Test results	Testing strategies used; analysis of test results
Operational maintenance	Performance testing results; new or changing user and system requirements	User manual; analysis of performance results; modified users' requirements and systems specifications

EXAMPLES OF DATA CAPTURED AND DOCUMENTATION PRODUCED DURING THE DATABASE APPLICATION LIFECYCLE



FACT-FINDING TECHNIQUES

- A database developer normally uses several fact-finding techniques during a single database project including:
 - examining documentation
 - interviewing
 - observing the organization in operation
 - research
 - questionnaires



EXAMINING DOCUMENTATION

- Can be useful
 - to gain some insight as to how the need for a database arose.
 - to identify the part of the organization associated with the problem.
 - To understand the current system.



EXAMPLES OF TYPES OF DOCUMENTATION THAT SHOULD BE EXAMINED

Purpose of documentation	Examples of useful sources
Describes problem and need for database	Internal memos, e-mails, and minutes of meetings Employee/customer complaints, and documents that describe the problem Performance reviews/reports
Describes the part of the enterprise affected by problem	Organizational chart, mission statement, and strategic plan of the enterprise Objectives for the part of the enterprise being studied Task/job descriptions Samples of completed manual forms and reports Samples of completed computerized forms and reports
Describes current system	Various types of flowcharts and diagrams Data dictionary Database system design Program documentation User/training manuals



INTERVIEWING

- Most commonly used, and normally most useful, fact-finding technique. Enables collection of information from individuals face-to-face.
- Objectives include finding out facts, verifying facts, clarifying facts, generating enthusiasm, getting the end-user involved, identifying requirements, and gathering ideas and opinions.



ADVANTAGES AND DISADVANTAGES OF INTERVIEWING

Advantages

- Allows interviewee to respond freely and openly to questions
- Allows interviewee to feel part of project
- Allows interviewer to follow up on interesting comments made by interviewee
- Allows interviewer to adapt or re-word questions during interview
- Allows interviewer to observe interviewee's body language

Disadvantages

- Very time-consuming and costly, and therefore may be impractical
- Success is dependent on communication skills of interviewer
- Success can be dependent on willingness of interviewees to participate in interviews

INTERVIEWING

- There are two types of interviews unstructured and structured.
- Open-ended questions allow the interviewee to respond in any way that seems appropriate.
- Closed-ended questions restrict answers to either specific choices or short, direct responses.



OBSERVING THE ORGANIZATION IN OPERATION

- An effective technique for understanding a system.
- Possible to either participate in, or watch, a person perform activities to learn about the system.
- Useful when validity of data collected is in question or when the complexity of certain aspects of the system prevents a clear explanation by the end-users.



ADVANTAGES AND DISADVANTAGES OF USING OBSERVATION

Advantages

Allows the validity of facts and data to be checked

Observer can see exactly what is being done

Observer can also obtain data describing the physical environment of the task

Relatively inexpensive

Observer can do work measurements

Disadvantages

People may knowingly or unknowingly perform differently when being observed

May miss observing tasks involving different levels of difficulty or volume normally experienced during that time period

Some tasks may not always be performed in the manner in which they are observed

May be impractical

RESEARCH

- Useful to research the application and problem.
- Use computer trade journals, reference books, and the Internet (including user groups and bulletin boards).
- Provide information on how others have solved similar problems, plus whether or not software packages exist to solve or even partially solve the problem.



ADVANTAGES AND DISADVANTAGES OF USING RESEARCH

Advantages

Can save time if solution already exists

Researcher can see how others have solved similar problems or met similar requirements

Keeps researcher up to date with current developments

Disadvantages

Requires access to appropriate sources of information

May ultimately not help in solving problem because problem is not documented elsewhere



QUESTIONNAIRES

- Conduct surveys through questionnaires, which are special-purpose documents that allow facts to be gathered from a large number of people while maintaining some control over their responses.
- There are two types of questions, namely free-format and fixed-format.



ADVANTAGES AND DISADVANTAGES OF USING QUESTIONNAIRES

Advantages

People can complete and return questionnaires at their convenience

Relatively inexpensive way to gather data from a large number of people

People more likely to provide the real facts as responses can be kept confidential

Responses can be tabulated and analyzed quickly

Disadvantages

Number of respondents can be low, possibly only 5% to 10%

Questionnaires may be returned incomplete

May not provide an opportunity to adapt or re-word questions that have been misinterpreted

Cannot observe and analyze the respondent's body language

USING FACT-FINDING TECHNIQUES – A WORKED EXAMPLE

DreamHome Staff Registration Form

Staff Number SG5

Full Name Susan Brand

Sex F DOB 3-Jun-70

Position Manager

Salary 24000

Branch Number B003

Branch Address
163 Main St, Glasgow

Telephone Number(s)
0141-339-2178 / 0141-339-4439

Enter details where applicable Manager Start Date 01-Jun-99

Supervisor Name _____ Manager Bonus 2350

DreamHome Staff Listing

Branch Number B003

Branch Address
163 Main St, Glasgow
G11 9QX

Telephone Number(s)
0141-339-2178 / 0141-339-4439

Staff Number	Name	Position
SG5	Susan Brand	Manager
SG14	David Ford	Supervisor
SG37	Ann Beech	Assistant
SG112	Annet Longhorn	Supervisor
SG126	Chris Lawrence	Assistant
SG132	Sofie Walters	Assistant

USING FACT-FINDING TECHNIQUES – A WORKED EXAMPLE

DreamHome Property Registration Form

Property Number PG16

Type Flat Rooms 4

Rent 450

Address
5 Novar Drive,
Glasgow, G12 9AX

Owner Number C093
(If known)

Person/Business Name
Tony Shaw

Address 12 Park Pl,
Glasgow G4 0QR

Tel No 0141-225-7025

Enter details where applicable

Type of business

Contact Name

Managed by staff
David Ford

Registered at branch
163 Main St, Glasgow

DreamHome Client Registration Form

Client Number CR74
(Enter if known)

Full Name
Mike Ritchie

Enter property requirements

Type Flat

Max Rent 750

Branch Number B003

Branch Address
163 Main St, Glasgow

Registered By
Ann Beech

Date Registered 16-Nov-11

USING FACT-FINDING TECHNIQUES – A WORKED EXAMPLE

DreamHome Property Listing for Week beginning 01/06/13

If you are interested in viewing or renting any of the properties in this list, please contact our branch office as soon as possible.

Branch Address

163 Main St, Glasgow

G11 9QX

Telephone Number(s)

0141-339-2178 / 0141-339-4439

Property No	Address	Type	Rooms	Rent
PG4	6 Lawrence St, Glasgow	Flat	3	350
PG36	2 Manor Rd, Glasgow	Flat	3	375
PG21	18 Dale Road, Glasgow	House	5	600
PG16	5 Novar Drive, Glasgow	Flat	4	450
PG77	100A Apple Lane, Glasgow	House	6	560
PG81	781 Greentree Dr, Glasgow	Flat	4	440

DreamHome Property Viewing Report

Property Number PG4

Property Address

6 Lawrence St, Glasgow

Type Flat

Rent 350

Client No	Name	Date	Comments
CR76	John Kay	20/04/13	Too remote. OK, but needs redecoration throughout.
CR56	Aline Stewart	26/05/13	
CR74	Mike Ritchie	11/11/13	
CR62	Mary Tregear	11/11/13	

USING FACT-FINDING TECHNIQUES – A WORKED EXAMPLE

<i>DreamHome Lease</i> Number 00345810	
<p>Client Number <u>CR74</u> (Enter if known)</p> <p>Full Name <u>Mike Ritchie</u> (Please print)</p> <p>Client Signature _____</p>	<p>Property Number <u>PG16</u></p> <p>Property Address <u>5 Novar Dr, Glasgow</u></p>
<p>Enter payment details</p> <p>Monthly Rent <u>450</u></p> <p>Payment Method <u>Cheque</u></p> <p>Deposit Paid (Y or N) <u>Yes</u></p>	<p>Rent Start <u>01/06/12</u></p> <p>Rent Finish <u>31/05/13</u></p> <p>Duration <u>1 year</u></p>



MISSION STATEMENT FOR *DREAMHOME* DATABASE SYSTEM

"The purpose of the *DreamHome* database system is to maintain the data that is used and generated to support the property rentals business for our clients and property owners and to facilitate the cooperation and sharing of information between branches."



MISSION OBJECTIVES FOR *DREAMHOME* DATABASE SYSTEM

To maintain (enter, update, and delete) data on branches.
To maintain (enter, update, and delete) data on staff.
To maintain (enter, update, and delete) data on properties for rent.
To maintain (enter, update, and delete) data on property owners.
To maintain (enter, update, and delete) data on clients.
To maintain (enter, update, and delete) data on property viewings.
To maintain (enter, update, and delete) data on leases.
To maintain (enter, update, and delete) data on newspaper adverts.

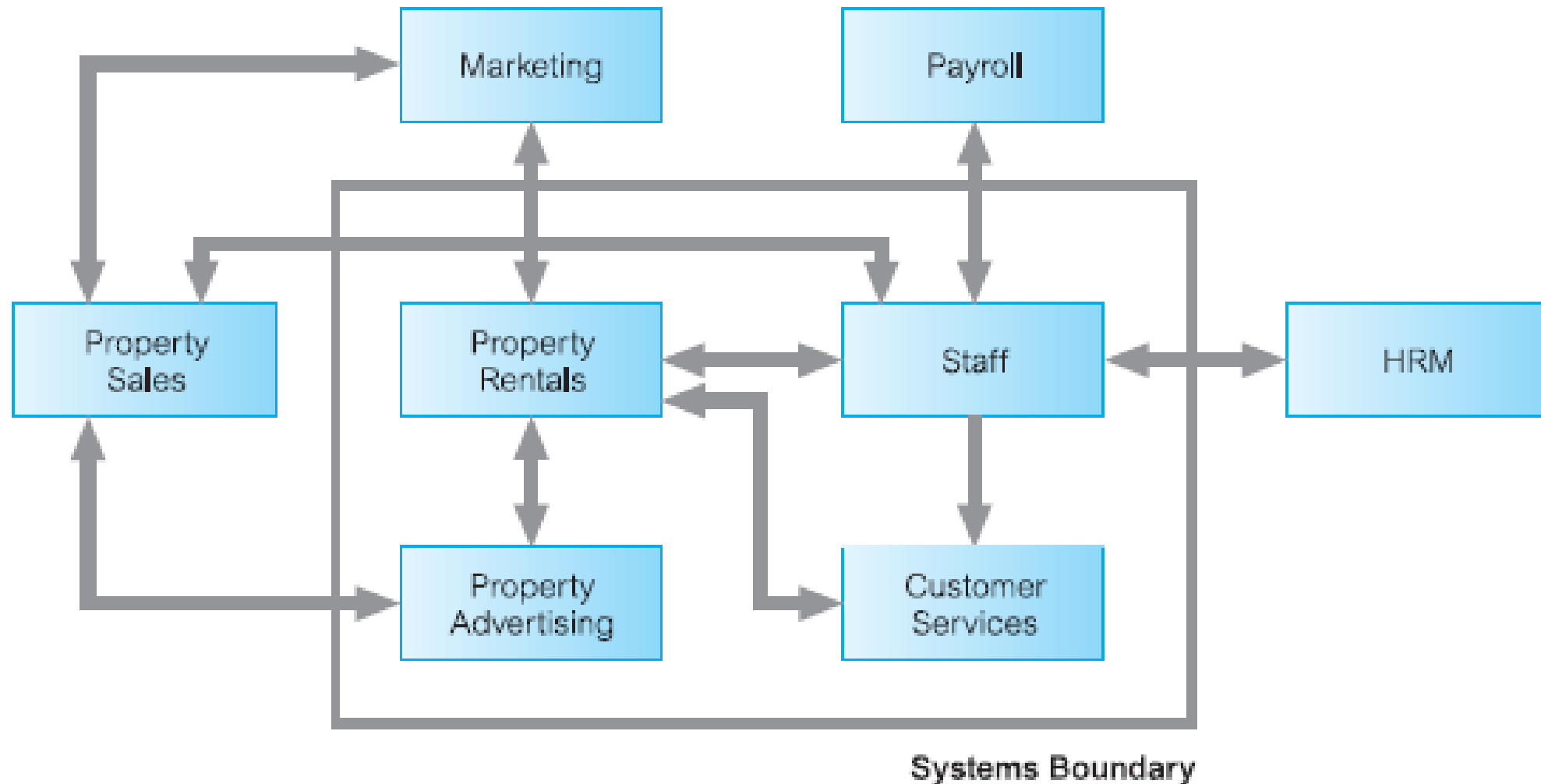
To perform searches on branches.
To perform searches on staff.
To perform searches on properties for rent.
To perform searches on property owners.
To perform searches on clients.
To perform searches on property viewings.
To perform searches on leases.
To perform searches on newspaper adverts.

To track the status of property for rent.
To track the status of clients wishing to rent.
To track the status of leases.

To report on branches.
To report on staff.
To report on properties for rent.
To report on property owners.
To report on clients.
To report on property viewings.
To report on leases.
To report on newspaper adverts.



SYSTEM BOUNDARY FOR *DREAMHOME* DATABASE SYSTEM



MAJOR USER VIEWS FOR DREAMHOME DATABASE SYSTEM

Data	Access Type	Director	Manager	Supervisor	Assistant
All Branches	Maintain				
	Query	X	X		
	Report	X	X		
Single Branch	Maintain		X		
	Query		X		
	Report		X		
All Staff	Maintain				
	Query	X	X		
	Report	X	X		
	Maintain		X		
	Query		X	X	
	Report		X	X	
All Property	Maintain				
	Query	X			
	Report	X	X		
	Maintain		X	X	
	Query		X	X	X
	Report		X	X	X
All Owners	Maintain				
	Query	X			
	Report	X	X		
	Maintain		X	X	
	Query		X	X	X
	Report		X		
All Clients	Maintain				
	Query	X			
	Report	X	X		
	Maintain		X	X	
	Query		X	X	X
	Report		X		
All Viewings	Maintain				
	Query				
	Report				
	Maintain			X	X
	Query			X	X
	Report			X	X
All Leases	Maintain				
	Query	X			
	Report	X	X		
	Maintain		X	X	
	Query		X	X	X
	Report		X	X	
All Newspapers	Maintain				
	Query	X			
	Report	X	X		
	Maintain		X		
	Query		X		
	Report		X		

CROSS-REFERENCE OF USER VIEWS WITH MAIN TYPES OF DATA USED BY EACH

	Director	Manager	Supervisor	Assistant
branch	X	X		
staff	X	X	X	
property for rent	X	X	X	X
owner	X	X	X	X
client	X	X	X	X
property viewing			X	X
lease	X	X	X	X
newspaper	X	X		