



11.4.1 The *DreamHome* Case Study—An Overview of the Current System

The first branch office of *DreamHome* was opened in 1992 in Glasgow in the UK. Since then, the Company has grown steadily and now has several offices in most of the main cities of the UK. However, the Company is now so large that more and more administrative staff are being employed to cope with the ever-increasing amount of paperwork. Furthermore, the communication and sharing of information between offices, even in the same city, is poor. The Director of the Company, Sally Mellweadows, feels that too many mistakes are being made and that the success of the Company will be short-lived if she does not do something to remedy the situation. She knows that a database could help in part to solve the problem and has requested that a database system be developed to support the running of *DreamHome*. The Director has provided the following brief description of how *DreamHome* currently operates.

DreamHome specializes in property management, taking an intermediate role between owners who wish to rent out their furnished property and clients of *DreamHome* who require to rent furnished property for a fixed period. *DreamHome* currently has about 2000 staff working in 100 branches. When a member of staff joins the Company, the *DreamHome* staff registration form is used. The staff registration form for Susan Brand is shown in Figure 11.1.

Each branch has an appropriate number and type of staff including a Manager, Supervisors, and Assistants. The Manager is responsible for the day-to-day running of a branch and each Supervisor is responsible for supervising a group of staff called Assistants. An example of the first page of a report listing the details of staff working at a branch office in Glasgow is shown in Figure 11.2.

<i>DreamHome</i> Staff Registration Form	
Staff Number <u>SG5</u>	Branch Number <u>B003</u>
Full Name <u>Susan Brand</u>	Branch Address <u>163 Main St, Glasgow</u>
Sex <u>F</u> DOB <u>3-Jun-70</u>	Telephone Number(s) <u>0141-339-2178 / 0141-339-4439</u>
Position <u>Manager</u>	
Salary <u>24000</u>	
Enter details where applicable	Manager Start Date <u>01-Jun-99</u>
Supervisor Name _____	Manager Bonus <u>2350</u>

Figure 11.1 The *DreamHome* staff registration form for Susan Brand.

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DreamHome Staff Listing																							
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<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 33%;">Staff Number</th> <th style="width: 33%;">Name</th> <th style="width: 33%;">Position</th> </tr> </thead> <tbody> <tr> <td>SG5</td> <td>Susan Brand</td> <td>Manager</td> </tr> <tr> <td>SG14</td> <td>David Ford</td> <td>Supervisor</td> </tr> <tr> <td>SG37</td> <td>Ann Beech</td> <td>Assistant</td> </tr> <tr> <td>SG112</td> <td>Annet Longhorn</td> <td>Supervisor</td> </tr> <tr> <td>SG126</td> <td>Chris Lawrence</td> <td>Assistant</td> </tr> <tr> <td>SG132</td> <td>Sofie Walters</td> <td>Assistant</td> </tr> </tbody> </table>			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
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Page 1																							

Figure 11.2 Example of the first page of a report listing the details of staff working at a DreamHome branch office in Glasgow.

Each branch office offers a range of properties for rent. To offer property through DreamHome, a property owner normally contacts the DreamHome branch office nearest to the property for rent. The owner provides the details of the property and agrees an appropriate rent for the property with the branch Manager. The registration form for a property in Glasgow is shown in Figure 11.3.

Once a property is registered, DreamHome provides services to ensure that the property is rented out for maximum return for both the property owner and, of course, DreamHome. These services include interviewing prospective renters (called clients), organizing viewings of the property by clients, advertising the property in local or national newspapers (when necessary), and negotiating the lease. Once rented, DreamHome assumes responsibility for the property including the collection of rent.

Members of the public interested in renting out property must first contact their nearest DreamHome branch office to register as clients of DreamHome. However, before registration is accepted, a prospective client is normally interviewed to record personal details and preferences of the client in terms of property requirements. The registration form for a client called Mike Ritchie is shown in Figure 11.4.

Once registration is complete, clients are provided with weekly reports that list properties currently available for rent. An example of the first page of a report listing the properties available for rent at a branch office in Glasgow is shown in Figure 11.5.

Clients may request to view one or more properties from the list and after viewing will normally provide a comment on the suitability of the property. The first page of a report describing the comments made by clients on a property in Glasgow is shown in Figure 11.6. Properties that prove difficult to rent out are normally advertised in local and national newspapers.

DreamHome Property Registration Form	
Property Number <u>PG16</u> Type <u>Flat</u> Rooms <u>4</u> Rent <u>450</u> Address <u>5 Novar Drive,</u> <u>Glasgow, G12 9AX</u> 	Owner Number <u>C093</u> (If known) Person/Business Name <u>Tony Shaw</u> Address <u>12 Park Pl,</u> <u>Glasgow G4 0QR</u> Tel No <u>0141-225-7025</u> Enter details where applicable Type of business _____ Contact Name _____
Managed by staff <u>David Ford</u>	Registered at branch <u>163 Main St, Glasgow</u>

Figure 11.3 The *DreamHome* property registration form for a property in Glasgow.

DreamHome Client Registration Form	
Client Number <u>CR74</u> (Enter if known) Full Name <u>Mike Ritchie</u>	Branch Number <u>B003</u> Branch Address <u>163 Main St, Glasgow</u> Registered By <u>Ann Beech</u> Date Registered <u>16-Nov-11</u>
Enter property requirements Type <u>Flat</u> Max Rent <u>750</u>	

Figure 11.4 The *DreamHome* client registration form for Mike Ritchie.

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DreamHome Property Listing for Week beginning 01/06/13																																							
<p>If you are interested in viewing or renting any of the properties in this list, please contact our branch office as soon as possible.</p>																																							
Branch Address <u>163 Main St, Glasgow</u> <u>G11 9QX</u>		Telephone Number(s) <u>0141-339-2178 / 0141-339-4439</u>																																					
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;">Property No</th> <th style="width: 35%;">Address</th> <th style="width: 10%;">Type</th> <th style="width: 10%;">Rooms</th> <th style="width: 10%;">Rent</th> </tr> </thead> <tbody> <tr> <td>PG4</td> <td>6 Lawrence St, Glasgow</td> <td>Flat</td> <td>3</td> <td>350</td> </tr> <tr> <td>PG36</td> <td>2 Manor Rd, Glasgow</td> <td>Flat</td> <td>3</td> <td>375</td> </tr> <tr> <td>PG21</td> <td>18 Dale Road, Glasgow</td> <td>House</td> <td>5</td> <td>600</td> </tr> <tr> <td>PG16</td> <td>5 Novar Drive, Glasgow</td> <td>Flat</td> <td>4</td> <td>450</td> </tr> <tr> <td>PG77</td> <td>100A Apple Lane, Glasgow</td> <td>House</td> <td>6</td> <td>560</td> </tr> <tr> <td>PG81</td> <td>781 Greentree Dr, Glasgow</td> <td>Flat</td> <td>4</td> <td>440</td> </tr> </tbody> </table>					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
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Figure 11.5 The first page of the *DreamHome* property for rent report listing property available at a branch in Glasgow.

DreamHome Property Viewing Report																							
Property Nummer <u>PG4</u>		Property Address <u>6 Lawrence St, Glasgow</u>																					
Type <u>Flat</u>																							
Rent <u>350</u>																							
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CR74	Mike Ritchie	11/11/13																					
CR62	Mary Tregear	11/11/13	OK, but needs redecoration throughout.																				
Page 1																							

Figure 11.6 The first page of the *DreamHome* property viewing report for a property in Glasgow.

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

Figure 11.7 The *DreamHome* lease form for a client called Mike Ritchie renting a property in Glasgow.

Once a client has identified a suitable property, a member of staff draws up a lease. The lease between a client called Mike Ritchie and a property in Glasgow is shown in Figure 11.7.

At the end of a rental period a client may request that the rental be continued; however, this requires that a new lease be drawn up. Alternatively, a client may request to view alternative properties for the purposes of renting.



11.4.2 The *DreamHome* Case Study—Database Planning

The first step in developing a database system is to clearly define the **mission statement** for the database project, which defines the major aims of the database system. Once the mission statement is defined, the next activity involves identifying the **mission objectives**, which should identify the particular tasks that the database must support (see Section 10.3).

Creating the mission statement for the *DreamHome* database system

We begin the process of creating a mission statement for the *DreamHome* database system by conducting interviews with the Director and any other appropriate staff, as indicated by the Director. Open-ended questions are normally the most useful at this stage of the process. Examples of typical questions we might ask include:

- “What is the purpose of your company?”
- “Why do you feel that you need a database?”
- “How do you know that a database will solve your problem?”

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For example, the database developer may start the interview by asking the Director of *DreamHome* the following questions:

Database Developer: *What is the purpose of your company?*

Director: We offer a wide range of high-quality properties for rent to clients registered at our branches throughout the UK. Our ability to offer quality properties, of course, depends upon the services we provide to property owners. We provide a highly professional service to property owners to ensure that properties are rented out for maximum return.

Database Developer: *Why do you feel that you need a database?*

Director: To be honest, we can't cope with our own success. Over the past few years we've opened several branches in most of the main cities of the UK, and at each branch we now offer a larger selection of properties to a growing number of clients. However, this success has been accompanied with increasing data management problems, which means that the level of service we provide is falling. Also, there's a lack of cooperation and sharing of information between branches, which is a very worrying development.

Database Developer: *How do you know that a database will solve your problem?*

Director: All I know is that we are drowning in paperwork. We need something that will speed up the way we work by automating a lot of the day-to-day tasks that seem to take forever these days. Also, I want the branches to start working together. Databases will help to achieve this, won't they?

Responses to these types of questions should help formulate the mission statement. An example mission statement for the *DreamHome* database system is shown in Figure 11.8. When we have a clear and unambiguous mission statement that the staff of *DreamHome* agree with, we move on to define the mission objectives.

Creating the mission objectives for the *DreamHome* database system

The process of creating mission objectives involves conducting interviews with appropriate members of staff. Again, open-ended questions are normally the most useful at this stage of the process. To obtain the complete range of mission

"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."

Figure 11.8 Mission statement for the *DreamHome* database system.

objectives, we interview various members of staff with different roles in *DreamHome*. Examples of typical questions that we might ask include:

- “What is your job description?”
- “What kinds of tasks do you perform in a typical day?”
- “What kinds of data do you work with?”
- “What types of reports do you use?”
- “What types of things do you need to keep track of?”
- “What service does your company provide to your customers?”

These questions (or similar) are put to the Director of *DreamHome* and members of staff in the role of Manager, Supervisor, and Assistant. It may be necessary to adapt the questions as required, depending on whom is being interviewed.

Director

Database Developer: *What role do you play for the company?*

Director: I oversee the running of the company to ensure that we continue to provide the best possible property rental service to our clients and property owners.

Database Developer: *What kinds of tasks do you perform in a typical day?*

Director: I monitor the running of each branch by our Managers. I try to ensure that the branches work well together and share important information about properties and clients. I normally try to keep a high profile with my branch Managers by calling into each branch at least once or twice a month.

Database Developer: *What kinds of data do you work with?*

Director: I need to see everything, well at least a summary of the data used or generated by *DreamHome*. That includes data about staff at all branches, all properties and their owners, all clients, and all leases. I also like to keep an eye on the extent to which branches advertise properties in newspapers.

Database Developer: *What types of reports do you use?*

Director: I need to know what's going on at all the branches and there are lots of them. I spend a lot of my working day going over long reports on all aspects of *DreamHome*. I need reports that are easy to access and that let me get a good overview of what's happening at a given branch and across all branches.

Database Developer: *What types of things do you need to keep track of?*

Director: As I said before, I need to have an overview of everything; I need to see the whole picture.

Database Developer: *What service does your company provide to your customers?*

Director: We aim to provide the best property rental service in the UK. I believe that this will be achieved with the support of the new database system, which will allow

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my staff to deal more efficiently with our customers and clients and better marketing of our properties through the development of a new *DreamHome* Web site. This site will allow our current and new renting clients to view our properties on the Web.

Manager**Database Developer:***What is your job description?***Manager:**

My job title is Manager. I oversee the day-to-day running of my branch to provide the best property rental service to our clients and property owners.

Database Developer:*What kinds of tasks do you perform in a typical day?***Manager:**

I ensure that the branch has the appropriate number and type of staff on duty at all times. I monitor the registering of new properties and new clients, and the renting activity of our currently active clients. It's my responsibility to ensure that we have the right number and type of properties available to offer our clients. I sometimes get involved in negotiating leases for our top-of-the-range properties, although due to my workload, I often have to delegate this task to Supervisors.

Database Developer:*What kinds of data do you work with?***Manager:**

I mostly work with data on the properties offered at my branch and the owners, clients, and leases. I also need to know when properties are proving difficult to rent out so that I can arrange for them to be advertised in newspapers. I need to keep an eye on this aspect of the business, because advertising can get costly. I also need access to data about staff working at my branch and staff at other local branches. This is because I sometimes need to contact other branches to arrange management meetings or to borrow staff from other branches on a temporary basis to cover staff shortages due to sickness or during holiday periods. This borrowing of staff between local branches is informal and thankfully doesn't happen very often. Besides data on staff, it would be helpful to see other types of data at the other branches such as data on property, property owners, clients, and leases, you know, to compare notes. Actually, I think the Director hopes that this database project is going to help promote cooperation and sharing of information between branches. However, some of the Managers I know are not going to be too keen on this, because they think we're in competition with each other. Part of the problem is that a percentage of a Manager's salary is made up of a bonus, which is related to the number of properties we rent out.

Database Developer: *What types of reports do you use?*

Manager: I need various reports on staff, property, owners, clients, and leases. I need to know at a glance which properties we need to lease out and what clients are looking for.

Database Developer: *What types of things do you need to keep track of?*

Manager: I need to keep track of staff salaries. I need to know how well the properties on our books are being rented out and when leases are coming up for renewal. I also need to keep eye on our expenditure on advertising in newspapers.

Database Developer: *What service does your company provide to your customers?*

Manager: Remember that we have two types of customers; that is, clients wanting to rent property and property owners. We need to make sure that our clients find the property they're looking for quickly without too much legwork and at a reasonable rent, and, of course, that our property owners see good returns from renting out their properties with minimal hassle. As you may already know from speaking to our Director, as well as from developing a new database system, we also intend to develop a new *DreamHome* Web site. This Web site will help our clients view our properties at home before coming into our branches to arrange a viewing. I need to ensure that no matter how clients contacts us—either by email through using our Web site, by phone, or in person—that they receive the same efficient service to help them find the properties that they seek.

Supervisor

Database Developer: *What is your job description?*

Supervisor: My job title is Supervisor. I spend most of my time in the office dealing directly with our customers; that is, clients wanting to rent property and property owners. I'm also responsible for a small group of staff called Assistants and making sure that they are kept busy, but that's not a problem, as there's always plenty to do—it's never-ending actually.

Database Developer: *What kinds of tasks do you perform in a typical day?*

Supervisor: I normally start the day by allocating staff to particular duties, such as dealing with clients or property owners, organizing for clients to view properties, and filing paperwork. When a client finds a suitable property, I process the drawing up of a lease, although the Manager must see the documentation before any signatures are requested. I keep client details up to date and register new clients when they want to join the Company. When a new property is registered, the

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Manager allocates responsibility for managing that property to me or one of the other Supervisors or Assistants.

Database Developer: *What kinds of data do you work with?*

Supervisor: I work with data about staff at my branch, property, property owners, clients, property viewings, and leases.

Database Developer: *What types of reports do you use?*

Supervisor: Reports on staff and properties for rent.

Database Developer: *What types of things do you need to keep track of?*

Supervisor: I need to know what properties are available for rent and when currently active leases are due to expire. I also need to know what clients are looking for. I need to keep our Manager up to date with any properties that are proving difficult to rent out. I need to ensure that clients who contact us by email requesting to view properties are given a quick response from us inviting them to call into their nearest *DreamHome* branch office. As part of the service we provide to our property owners, we need to interview all clients first before they are allowed to view our properties. There is nothing unusual about this, as we have always interviewed our clients on their first visit to a *DreamHome* branch, and it's during this time that we note their details and their property requirements.

Assistant

Database Developer: *What is your job description?*

Assistant: My job title is Assistant. I deal directly with our clients.

Database Developer: *What kinds of tasks do you perform in a typical day?*

Assistant: I answer general queries from clients about properties for rent. You know what I mean: "Do you have such and such type of property in a particular area of Glasgow?" I also register new clients and arrange for clients to view properties. When we're not too busy, I file paperwork, but I hate this part of the job—it's so boring.

Database Developer: *What kinds of data do you work with?*

Assistant: I work with data on property and property viewings by clients and sometimes leases.

Database Developer: *What types of reports do you use?*

Assistant: Lists of properties available for rent. These lists are updated every week.

Database Developer: *What types of things do you need to keep track of?*

Assistant: Whether certain properties are available for renting out and which clients are still actively looking for property.

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.

Figure 11.9 Mission objectives for the *DreamHome* database system.

Database Developer: *What service does your company provide to your customers?*

Assistant: We try to answer questions about properties available for rent such as: "Do you have a two-bedroom flat in Hyndland, Glasgow?" and "What should I expect to pay for a one-bedroom flat in the city center?"

Responses to these types of questions should help to formulate the mission objectives. An example of the mission objectives for the *DreamHome* database system is shown in Figure 11.9.



11.4.3 The *DreamHome* Case Study—System Definition

The purpose of the system definition stage is to define the scope and boundary of the database system and its major user views. In Section 10.4.1 we described how a user view represents the requirements that should be supported by a database system as defined by a particular job role (such as Director or Supervisor) or business application area (such as property rentals or property sales).



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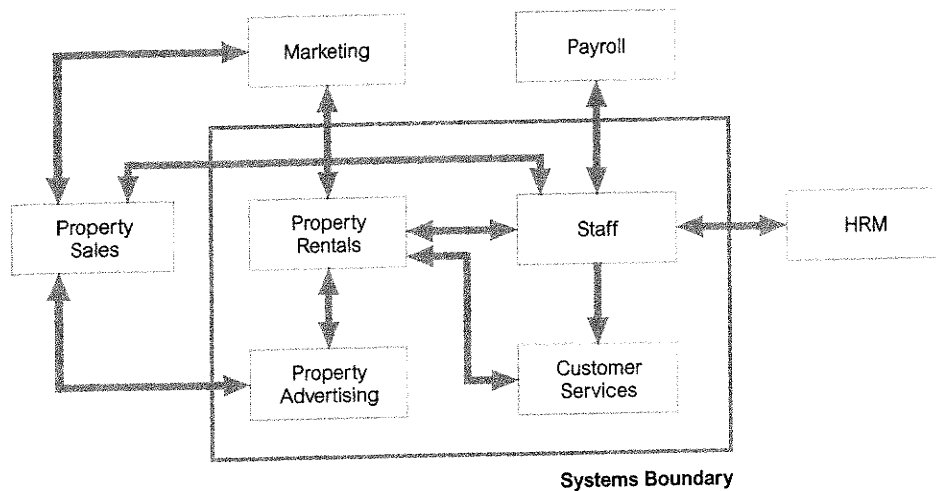


Figure 11.10 Systems boundary for the *DreamHome* database system.

Defining the systems boundary for the *DreamHome* database system

During this stage of the database system development lifecycle, further interviews with users can be used to clarify or expand on data captured in the previous stage. However, additional fact-finding techniques can also be used, including examining the sample documentation shown in Section 11.4.1. The data collected so far is analyzed to define the boundary of the database system. The systems boundary for the *DreamHome* database system is shown in Figure 11.10.

Identifying the major user views for the *DreamHome* database system

We now analyze the data collected so far to define the main user views of the database system. The majority of data about the user views was collected during interviews with the Director and members of staff in the role of Manager, Supervisor, and Assistant. The main user views for the *DreamHome* database system are shown in Figure 11.11.

11.4.4 The *DreamHome* Case Study—Requirements Collection and Analysis

During this stage, we continue to gather more details on the user views identified in the previous stage, to create a **users' requirements specification** that describes in detail the data to be held in the database and how the data is to be used. While gathering more information on the user views, we also collect any general requirements for the system. The purpose of gathering this information is to create a **systems specification**, which describes any features to be included in the new database system, such as networking and shared access requirements, performance requirements, and the levels of security required.

As we collect and analyze the requirements for the new system, we also learn about the most useful and most troublesome features of the current system. When



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

Figure 11.11 Major user views for the *DreamHome* database system.

building a new system, the old system is still in operation.

An important consideration in which there are three approaches, the first is to discuss how

Gathering database requirements

To find out what selection of data is in operation (representative of the data in the database)

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Gathering requirements of the database

While collecting information, we might find out that the database is

“What data is in the database?”
“What data is in the database?”
“What data is in the database?”

building a new database system, it is sensible to try to retain the good things about the old system while introducing the benefits that will be part of using the new system.

An important activity associated with this stage is deciding how to deal with situations in which there are more than one user view. As we discussed in Section 10.6, there are three major approaches to dealing with multiple user views: the **centralized** approach, the **view integration** approach, and a combination of both approaches. We discuss how these approaches can be used shortly.

Gathering more information on the user views of the *DreamHome* database system

To find out more about the requirements for each user view, we may again use a selection of fact-finding techniques, including interviews and observing the business in operation. Examples of the types of questions that we may ask about the data (represented as X) required by a user view include:

“What type of data do you need to hold on X?”

“What sorts of things do you do with the data on X?”

For example, we might ask a Manager the following questions:

Database Developer: *What type of data do you need to hold on staff?*

Manager: The types of data held on a member of staff is his or her full name, position, gender, date of birth, and salary.

Database Developer: *What sorts of things do you do with the data on staff?*

Manager: I need to be able to enter the details of new members of staff and delete their details when they leave. I need to keep the details of staff up to date and print reports that list the full name, position, and salary of each member of staff at my branch. I need to be able to allocate staff to Supervisors. Sometimes when I need to communicate with other branches, I need to find out the names and telephone numbers of Managers at other branches.

We need to ask similar questions about all the important data to be stored in the database. Responses to these questions will help identify the necessary details for the users' requirements specification.

Gathering information on the system requirements of the *DreamHome* database system

While conducting interviews about user views, we should also collect more general information on the system requirements. Examples of the types of questions that we might ask about the system include:

“What transactions run frequently on the database?”

“What transactions are critical to the operation of the organization?”

“When do the critical transactions run?”

"When are the low, normal, and high workload periods for the critical transactions?"

"What type of security do you want for the database system?"

"Is there any highly sensitive data that should be accessed only by certain members of staff?"

"What historical data do you want to hold?"

"What are the networking and shared access requirements for the database system?"

"What type of protection from failures or data loss do you want for the database system?"

For example, we might ask a Manager the following questions:

Database Developer: *What transactions run frequently on the database?*

Manager: We frequently get requests either by phone or by clients who call into our branch to search for a particular type of property in a particular area of the city and for a rent no higher than a particular amount. We hope that clients using the new *DreamHome* Web site will be able to view our properties at any time of the day or night. We also need up-to-date information on properties and clients so that reports can be run off that show properties currently available for rent and clients currently seeking property.

Database Developer: *What transactions are critical to the operation of the business?*

Manager: Again, critical transactions include being able to search for particular properties and to print out reports with up-to-date lists of properties available for rent. Our clients would go elsewhere if we couldn't provide this basic service.

Database Developer: *When do the critical transactions run?*

Manager: Every day.

Database Developer: *When are the low, normal, and high workload periods for the critical transactions?*

Manager: We're open six days a week. In general, we tend to be quiet in the mornings and get busier as the day progresses. However, the busiest time-slots each day for dealing with customers are between 12 and 2pm and 5 and 7pm. We hope that clients using the new *DreamHome* Web site will be able to search through our properties on their own PCs; this should cut down on the number of property queries that staff have to deal with.

We might ask the Director the following questions:

Database Developer: *What type of security do you want for the database system?*

Director: I don't suppose a database holding information for a property rental company holds very sensitive data, but I wouldn't want any of our competitors to see the data

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on properties, owners, clients, and leases. Staff should see only the data necessary to do their job in a form that suits what they're doing. For example, although it's necessary for Supervisors and Assistants to see client details, client records should be displayed only one at a time and not as a report. As far as clients using the new *DreamHome* Web site are concerned, we want them to have access to our properties and their own details—but nothing else.

Database Developer: *Is there any highly sensitive data that should be accessed only by certain members of staff?*

Director: As I said before, staff should see only the data necessary to do their jobs. For example, although Supervisors need to see data on staff, salary details should not be included.

Database Developer: *What historical data do you want to hold?*

Director: I want to keep the details of clients and owners for a couple of years after their last dealings with us, so that we can mail them our latest offers, and generally try to attract them back. I also want to be able to keep lease information for a couple of years, so that we can analyze it to find out which types of properties and areas of each city are the most popular for the property rental market, and so on.

Database Developer: *What are the networking and shared access requirements for the database system?*

Director: I want all the branches networked to our main branch office here in Glasgow so that staff can access the system from wherever and whenever they need to. At most branches, I would expect about two or three staff to be accessing the system at any one time, but remember that we have about 100 branches. Most of the time the staff should be just accessing local branch data. However, I don't really want there to be any restrictions about how often or when the system can be accessed, unless it's got real financial implications. As I said earlier, clients using the new *DreamHome* Web site should have access to our properties and their own details, but nothing else.

Database Developer: *What type of protection from failures or data loss do you want for the database system?*

Director: The best, of course. All our business is going to be conducted using the database, so if it goes down, we're sunk. To be serious for a minute, I think we probably have to back up our data every evening when the branch closes. What do you think?

We need to ask similar questions about all the important aspects of the system. Responses to these questions should help identify the necessary details for the system requirements specification.

Managing the user views of the *DreamHome* database system

How do we decide whether to use the centralized or view integration approach, or a combination of both to manage multiple user views? One way to help make a decision is to examine the overlap in the data used between the user views identified during the system definition stage. Table 11.7 cross-references the Director, Manager, Supervisor, Assistant, and Client user views with the main types of data used by each user view.

We see from Table 11.7 that there is overlap in the data used by all user views. However, the Director and Manager user views and the Supervisor and Assistant user views show more similarities in terms of data requirements. For example, only the Director and Manager user views require data on branches and newspapers, whereas only the Supervisor and Assistant user views require data on property viewings. The Client user view requires access to the least amount of data, and that is only the property and client data. Based on this analysis, we use the *centralized* approach to first merge the requirements for the Director and Manager user views (given the collective name of **Branch** user views) and the requirements for the Supervisor, Assistant, and Client user views (given the collective name of **StaffClient** user views). We then develop data models representing the Branch and StaffClient user views and then use the *view integration* approach to merge the two data models.

Of course, for a simple case study like *DreamHome*, we could easily use the centralized approach for all user views, but we will stay with our decision to create two collective user views so that we can describe and demonstrate how the view integration approach works in practice in Chapter 17.

It is difficult to give precise rules as to when it is appropriate to use the centralized or view integration approaches. The decision should be based on an assessment of the complexity of the database system and the degree of overlap between the various user views. However, whether we use the centralized or view integration approach or a mixture of both to build the underlying database, ultimately we need to re-establish

TABLE 11.7 Cross-reference of user views with the main types of data used by each.

	DIRECTOR	MANAGER	SUPERVISOR	ASSISTANT	CLIENT
branch	X	X			
staff	X	X	X		
property for rent	X	X	X	X	X
owner	X	X	X	X	
client	X	X	X	X	X
property viewing			X	X	
lease	X	X	X	X	
newspaper	X	X			

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the original user views (namely Director, Manager, Supervisor, Assistant, and Client) for the working database system. We describe and demonstrate the establishment of the user views for the database system in Chapter 18.

All of the information gathered so far on each user view of the database system is described in a document called a **users' requirements specification**. The users' requirements specification describes the data requirements for each user view and examples of how the data is used by the user view. For ease of reference, the users' requirements specifications for the Branch and StaffClient user views of the *DreamHome* database system are given in Appendix A. In the remainder of this chapter, we present the general systems requirements for the *DreamHome* database system.

The systems specification for the *DreamHome* database system

The systems specification should list all the important features for the *DreamHome* database system. The types of features that should be described in the systems specification include:

- initial database size;
- database rate of growth;
- the types and average number of record searches;
- networking and shared access requirements;
- performance;
- security;
- backup and recovery;
- legal issues.

Systems Requirements for *DreamHome* Database System

Initial database size

- (1) There are approximately 2000 members of staff working at over 100 branches. There is an average of 20 and a maximum of 40 members of staff at each branch.
- (2) There are approximately 100,000 properties available at all branches. There is an average of 1000 and a maximum of 3000 properties at each branch.
- (3) There are approximately 60,000 property owners. There is an average of 600 and a maximum of 1000 property owners at each branch.
- (4) There are approximately 100,000 clients registered across all branches. There is an average of 1000 and a maximum of 1500 clients registered at each branch.
- (5) There are approximately 4,000,000 viewings across all branches. There is an average of 40,000 and a maximum of 100,000 viewings at each branch.
- (6) There are approximately 400,000 leases across all branches. There are an average of 4000 and a maximum of 10,000 leases at each branch.
- (7) There are approximately 50,000 newspaper ads in 100 newspapers across all branches.

Database rate of growth

- (1) Approximately 500 new properties and 200 new property owners will be added to the database each month.

- (2) Once a property is no longer available for rent, the corresponding record will be deleted from the database. Approximately 100 records of properties will be deleted each month.
- (3) If a property owner does not provide properties for rent at any time within a period of two years, his or her record will be deleted. Approximately 100 property owner records will be deleted each month.
- (4) Approximately 20 members of staff join and leave the company each month. The records of staff who have left the company will be deleted after one year. Approximately 20 staff records will be deleted each month.
- (5) Approximately 1000 new clients register at branches each month. If a client does not view or rent out a property at any time within a period of two years, his or her record will be deleted. Approximately 100 client records will be deleted each month.
- (6) Approximately 5000 new viewings are recorded across all branches each day. The details of property viewings will be deleted one year after the creation of the record.
- (7) Approximately 1000 new leases will be recorded across all branches each month. The details of property leases will be deleted two years after the creation of the record.
- (8) Approximately 1000 newspaper adverts are placed each week. The details of newspaper adverts will be deleted one year after the creation of the record.

The types and average number of record searches

- (1) Searching for the details of a branch—approximately 10 per day.
- (2) Searching for the details of a member of staff at a branch—approximately 20 per day.
- (3) Searching for the details of a given property—approximately 5000 per day (Monday to Thursday), and approximately 10,000 per day (Friday and Saturday). Peak workloads are 12.00–14.00 and 17.00–19.00 daily. (The workloads for property searches should be reassessed after the *DreamHome* Web site is launched.)
- (4) Searching for the details of a property owner—approximately 100 per day.
- (5) Searching for the details of a client—approximately 1000 per day (Monday to Thursday), and approximately 2000 per day (Friday and Saturday). Peak workloads are 12.00–14.00 and 17.00–19.00 daily.
- (6) Searching for the details of a property viewing—approximately 2000 per day (Monday to Thursday), and approximately 5000 per day (Friday and Saturday). Peak workloads are 12.00–14.00 and 17.00–19.00 daily.
- (7) Searching for the details of a lease—approximately 1000 per day (Monday to Thursday), and approximately 2000 per day (Friday and Saturday). Peak workloads are 12.00–14.00 and 17.00–19.00 daily.

Networking and shared access requirements

All branches should be securely networked to a centralized database located at *DreamHome*'s main office in Glasgow. The system should allow for at least two to

three people needs to be accesses.

Performance

- (1) During response 5-seconds
- (2) During response than :
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Security

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three people concurrently accessing the system from each branch. Consideration needs to be given to the licensing requirements for this number of concurrent accesses.

Performance

- (1) During opening hours, but not during peak periods, expect less than a 1-second response for all single record searches. During peak periods, expect less than a 5-second response for each search.
- (2) During opening hours, but not during peak periods, expect less than a 5-second response for each multiple record search. During peak periods, expect less than a 10-second response for each multiple record search.
- (3) During opening hours, but not during peak periods, expect less than a 1-second response for each update/save. During peak periods, expect less than a 5-second response for each update/save.

Security

- (1) The database should be password-protected.
- (2) Each member of staff should be assigned database access privileges appropriate to a particular user view, namely Director, Manager, Supervisor, or Assistant.
- (3) A member of staff should see only the data necessary to do his or her job in a form that suits what he or she is doing.
- (4) A client should see only property data and their own personal details using the *DreamHome* Web site.

Backup and Recovery

The database should be backed up daily at 12 midnight.

Legal Issues

Each country has laws that govern the way that the computerized storage of personal data is handled. As the *DreamHome* database holds data on staff, clients, and property owners, any legal issues that must be complied with should be investigated and implemented. The professional, legal, and ethical issues associated with data management are discussed in Chapter 21.

11.4.5 The *DreamHome* Case Study—Database Design

In this chapter we demonstrated the creation of the users' requirements specification for the Branch and Staff user views and the systems specification for the *DreamHome* database system. These documents are the sources of information for the next stage of the lifecycle called **database design**. In Chapters 16 to 19 we provide a step-by-step methodology for database design and use the *DreamHome* case study and the documents created for the *DreamHome* database system in this chapter to demonstrate the methodology in practice.



APPENDIX

A

Users' Requirements Specification for *DreamHome* Case Study



Objectives

In this appendix you will learn:

- The data and transaction requirements for the Branch and Staff user views of the *DreamHome* case study described in Section 11.4.

This appendix describes the users' requirements specification for the Branch and Staff user views of the *DreamHome* database system. For each collection of user views, the "Data Requirements" section describes the data used and the "Data Transactions" section provides examples of how the data is used.

A.1 Branch User Views of *DreamHome*

A.1.1 Data Requirements

Branches

DreamHome has branch offices in cities throughout the United Kingdom. Each branch office is allocated members of staff, including a Manager, who manages the operations of the office. The data describing a branch office includes a unique branch number, address (street, city, and postcode), telephone numbers (up to a maximum of three), and the name of the member of staff who currently manages the office. Additional data is held on each Manager, which includes the date that the Manager assumed his or her position at the current branch office, and a monthly bonus payment based upon his or her performance in the property for rent market.

Staff

Members of staff with the role of Supervisor are responsible for the day-to-day activities of an allocated group of staff called Assistants (up to a maximum of 10, at any one time). Not all members of staff are assigned to a Supervisor. The data stored regarding each member of staff includes staff number, name, address, position, salary, name of Supervisor (where applicable), and the details of the branch office at which a member of staff is currently working. The staff number is unique across all branches of *DreamHome*.



Properties for rent

Each branch office offers a range of properties for rent. The data stored for each property includes property number, address (street, city, postcode), type, number of rooms, monthly rent, and the details of the property owner. The property number is unique across all branch offices. The management of a property is assigned to a member of staff whenever it is rented out or requires to be rented out. A member of staff may manage a maximum of 100 properties for rent at any one time.

When a given property is available for rent, the property details will be displayed on the *DreamHome* Web site and, when necessary, as advertisements in local and national newspapers.

Property owners

The details of property owners are also stored. There are two main types of property owner: private owners and business owners. The data stored for private owners includes owner number, name, address, telephone number, email, and password. The data stored on business owners includes name of business, type of business, address, telephone number, email, password, and contact name. The password will allow owners access to parts of the *DreamHome* database using the Web.

Clients

DreamHome refers to members of the public interested in renting property as clients. To become a client, a person must first register at a branch office of *DreamHome*. The data stored on clients includes client number, name, telephone number, email, preferred type of accommodation, and the maximum rent that the client is prepared to pay. Also stored is the name of the member of staff who processed the registration, the date the client joined, and some details on the branch office at which the client registered. The client number is unique across all *DreamHome* branches.

Leases

When a property is rented out, a lease is drawn up between the client and the property. The data listed in detail on the lease includes lease number, client number, name and address, property number and address, monthly rent, method of payment, an indication of whether the deposit has been paid deposit (calculated as twice the monthly rent), duration of lease, and the start and end dates of the lease period.

Newspapers

When required, the details of properties for rent are advertised in local and national newspapers. The data stored includes the property number, address, type, number of rooms, rent, the date advertised, the name of the newspaper, and the cost to advertise. The data stored on each newspaper includes the newspaper name, address, telephone number, and contact name.

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A.1.2 Transaction Requirements (Sample)

Data entry

Enter the details of a new branch (such as branch B003 in Glasgow).
 Enter the details of a new member of staff at a branch (such as Ann Beech at branch B003).
 Enter the details of a lease between a client and property (such as client Mike Ritchie renting out property number PG4 from the 10-May-12 to 9-May-13).
 Enter the details of a property advertised in a newspaper (such as property number PG4 advertised in the Glasgow Daily newspaper on the 06-May-12).

Data update/deletion

Update/delete the details of a branch.
 Update/delete the details of a member of staff at a branch.
 Update/delete the details of a given lease at a given branch.
 Update/delete the details of a newspaper advertisement at a given branch.

Data queries

Examples of queries required by the Branch user views:

- (a) List the details of branches in a given city.
- (b) Identify the total number of branches in each city.
- (c) List the name, position, and salary of staff at a given branch, ordered by staff name.
- (d) Identify the total number of staff and the sum of their salaries.
- (e) Identify the total number of staff in each position at branches in Glasgow.
- (f) List the name of each Manager at each branch, ordered by branch address.
- (g) List the names of staff supervised by a named Supervisor.
- (h) List the property number, address, type, and rent of all properties in Glasgow, ordered by rental amount.
- (i) List the details of properties for rent managed by a named member of staff.
- (j) Identify the total number of properties assigned to each member of staff at a given branch.
- (k) List the details of properties provided by business owners at a given branch.
- (l) Identify the total number of properties of each type at all branches.
- (m) Identify the details of private property owners that provide more than one property for rent.
- (n) Identify flats with at least three rooms and with a monthly rent no higher than £500 in Aberdeen.
- (o) List the number, name, and telephone number of clients and their property preferences at a given branch.
- (p) Identify the properties that have been advertised more than the average number of times.
- (q) List the details of leases due to expire next month at a given branch.

- (r) List the total number of leases with rental periods that are less than one year at branches in London.
- (s) List the total possible daily rental for property at each branch, ordered by branch number.


A.2 Staff User Views of DreamHome

A.2.1 Data Requirements

Staff

The data required on members of staff includes staff number, name (first and last name), position, gender, date of birth (DOB), and name of the Supervisor (where appropriate). Members of staff in the position of Supervisor supervise an allocated group of staff (up to a maximum of 10 at any one time).

Properties for rent

 The data stored on property for rent includes property number, address (street, city, and postcode), type, number of rooms, monthly rent, and the details of the property owner. The monthly rent for a property is reviewed annually. Most of the properties rented out by *DreamHome* are apartments (or flats). The management of a property is assigned to a member of staff whenever it is rented out or ready to be rented out. A member of staff may manage a maximum of 100 properties for rent at any one time.

Property owners

There are two main types of property owner: private owners and business owners. The data stored on private owners includes owner number, name (first and last name), address, telephone number, email, and password. The data stored on business owners includes owner number, name of business, business type, address, telephone number, email, password, and contact name.

Clients

When a prospective client registers with *DreamHome*, the data stored includes the client number, name (first and last name), telephone number, email, and some data on the desired property, including the preferred type of accommodation and the maximum rent that the client is prepared to pay. Also stored is the name of the member of staff who registered the new client.

Property viewings

Clients may request to view property. The data stored includes client number, name and telephone number, property number and address, date the client viewed the property, and any comments made by the client regarding the suitability of the property. A client may view the same property only once on a given date.

Leases

Once a client finds a suitable property, a lease is drawn up. The information on the lease includes lease number, client number and name, property number,

address, type and (calculated as twice the end dates of the rental period), unique across all branches, given property for

A.2.2 Transactions

Data entry

Enter the details of a new property number PG4 in G. Enter the details of a new property. Enter the details of a new property number. Enter the details of a new property. Ritchie renting out

Data update/delete

Update/delete the details of a property. Update/delete the details of a property. Update/delete the details of a property. Update/delete the details of a property. Update/delete the details of a property.

Data queries

Examples of queries:

- (a) List details of a property.
- (b) List details of a property.
- (c) List the details of a property, the branch, and the date.
- (d) List the details of a property, the branch.
- (e) List the client who registered the new client.
- (f) Identify the property.
- (g) Identify the property.
- (h) List the details of a property.
- (i) Display the details of a property but not the property number.
- (j) Display the details of a property.
- (k) Identify the property.
- (l) List the details of a property, the months.
- (m) Produce a list of properties.

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The information on
property number,

address, type and number of rooms, monthly rent, method of payment, deposit (calculated as twice the monthly rent), whether the deposit is paid, the start and end dates of the rental period, and the duration of the lease. The lease number is unique across all *DreamHome* branches. A client may hold a lease associated with a given property from a minimum of three months to a maximum of 1 year.

A.2.2 Transaction Requirements (Sample)

Data entry

Enter the details for a new property and the owner (such as details of property number PG4 in Glasgow owned by Tina Murphy).
Enter the details of a new client (such as details of Mike Ritchie).
Enter the details of a client viewing a property (such as client Mike Ritchie viewing property number PG4 in Glasgow on the 06-May-12).
Enter the details of a lease between a client and property (such as client Mike Ritchie renting out property number PG4 from the 10-May-12 to 9-May-13).

Data update/deletion

Update/delete the details of a property.
Update/delete the details of a property owner.
Update/delete the details of a client.
Update/delete the details of a property viewing by a client.
Update/delete the details of a lease.

Data queries

Examples of queries required by the Staff user views:

- (a) List details of staff supervised by a named Supervisor at the branch.
- (b) List details of all Assistants alphabetically by name at the branch.
- (c) List the details of property (including the rental deposit) available for rent at the branch, along with the owner's details.
- (d) List the details of properties managed by a named member of staff at the branch.
- (e) List the clients registering at the branch and the names of the members of staff who registered the clients.
- (f) Identify properties located in Glasgow with rents no higher than £450.
- (g) Identify the name and telephone number of an owner of a given property.
- (h) List the details of comments made by clients viewing a given property.
- (i) Display the names and phone numbers of clients who have viewed a given property but not supplied comments.
- (j) Display the details of a lease between a named client and a given property.
- (k) Identify the leases due to expire next month at the branch.
- (l) List the details of properties that have not been rented out for more than three months.
- (m) Produce a list of clients whose preferences match a particular property.