VELA: Rental Management System **July 13, 2025**
Group 7 – Section 3

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Minicase 1 - Thea

Williams Specialty Company is a small printing and engraving organization. When Pat Williams, the owner, brought computers into the business office 8 years ago, the business was very small and very simple. Pat was able to utilize an inexpensive PC-based accounting system to handle the basic information processing needs of the firm. As time has gone on, however, the business has grown and the work being performed has become significantly more complex. The simple accounting software still in use is no longer adequate to keep track of many of the company's sophisticated deals and arrangements with its customers. Pat has a staff of four people in the business office who are familiar with the intricacies of the company's record-keeping requirements. Pat recently met with her staff to discuss her plan to hire an IS consulting firm to evaluate their information system needs and recommend a strategy for upgrading their computer system. The staff are excited about the prospect of a new system, since the current system causes them much aggravation. No one on the staff has ever done anything like this before, however, and they are a little wary of the consultants who will be conducting the project.

Assume that you are a systems analyst on the consulting team assigned to the Williams Specialty Co. engagement. At your first meeting with the Williams staff, you want to be sure that they understand the work that your team will be performing and how they will participate in that work.

A. Explain, in clear, nontechnical terms, the goals of the analysis phase of the project.
B. Explain, in clear, nontechnical terms, how use cases will be used by the project team. Explain what these models are, what they represent in the system, and how they will be used by the team.

Answer:

A. Explain, in clear, nontechnical terms, the goals of the analysis phase of the project.

The analysis phase is similar to creating a detailed blueprint before building a house. The construction would not start without understanding exactly what rooms you need, how they connect, and what the family's daily routines are. In the same way, a computer system will also not be designed without first thoroughly understanding the business.

Therefore, the goals of the analysis phase of the project are:

1. Understanding Your Current Business Processes.
    - We need to know how the company operates on a day-to-day basis. This includes understanding how customer orders are handled, printing jobs are tracked, billings are managed, and the office staff and production coordination. Everyday workflows must be properly observed and documented, no matter how small it might seem.
2. Identifying Problems and Pain Points.
    - We will work with the staff to identify what exactly is frustrating about the current system. For example, “Is it hard to track complex customer arrangements?” or “Are there tasks that take too long or require too much manual work?”. These issues must be addressed completely.
3. Defining Requirements for the New System.
    - After understanding the business operations and identifying its pain points, we will now create a detailed list on what the new system must be able to do. This includes listing the functional and nonfunctional requirements of the system.
4. Establishing Project Scope and Priorities.
    - After discussing the requirements, we will work with Pat and the rest of the staff to know what core features of the new system should be prioritized first. This is to ensure that the new system gets its main functions first and we can stay within budget.

Overall, the analysis phase plays an important role in the SDLC because it prevents costly mistakes in the later parts of the project. By making sure that you thoroughly understand your needs upfront, we can design a system that can truly fit the business and make its operations more efficient.

B. Explain, in clear, nontechnical terms, how use cases will be used by the project team. Explain what these models are, what they represent in the system, and how they will be used by the team.

Use cases can be referred to as detailed stories about how people will interact with the new computer system. They are similar to scripts that describe step-by-step what happens when someone needs to accomplish a specific task. Nevertheless, it is a written description of how a user interacts with the system to complete a specific business task. Some examples would be “Process Customer Order” or “Generate Monthly Financial Report”.

Use cases represent the whole interaction between a user and the system to accomplish a meaningful business goal. They capture (1) who is using the system, (2) what they are trying to accomplish, (3) the step-by-step process they follow, (4) what information they need to provide, (5) what the system does in response, and (6) what happens when things go wrong.

In this case we will use use cases as:

1. Communication Tool

    - Use cases help us communicate clearly with everyone in the company about what the new system will do. In fact, it is more understandable because use cases are in plain language to describe certain scenarios about user-system interactions.
2. Requirements Documentation
    - Programmers refer to the use cases as a detailed requirement to build into the system.
3. Testing Guide
    - After building the new system, we will now go back and refer to the use cases that were made to check if every step explained in the use case works exactly as planned for the system that was just built.
4. Training Foundation
    - The organization will need some time to adjust to using the new system, so the use cases can be used as basis for training materials and user manuals, as they thoroughly described the proper way to use each system feature.

To make use cases, we need to work closely with your staff by asking about the daily tasks in the business and write them up. Then, we will review the cases with you to make sure we captured everything correctly.

In the case of Williams Specialty, a use case may be titled “Handle Rush Job with Special Pricing”. It would talk about how a staff member would enter a rush order, apply the special pricing rules, coordinate with production, and ensure proper billing in a step-by-step manner.

Minicase 2

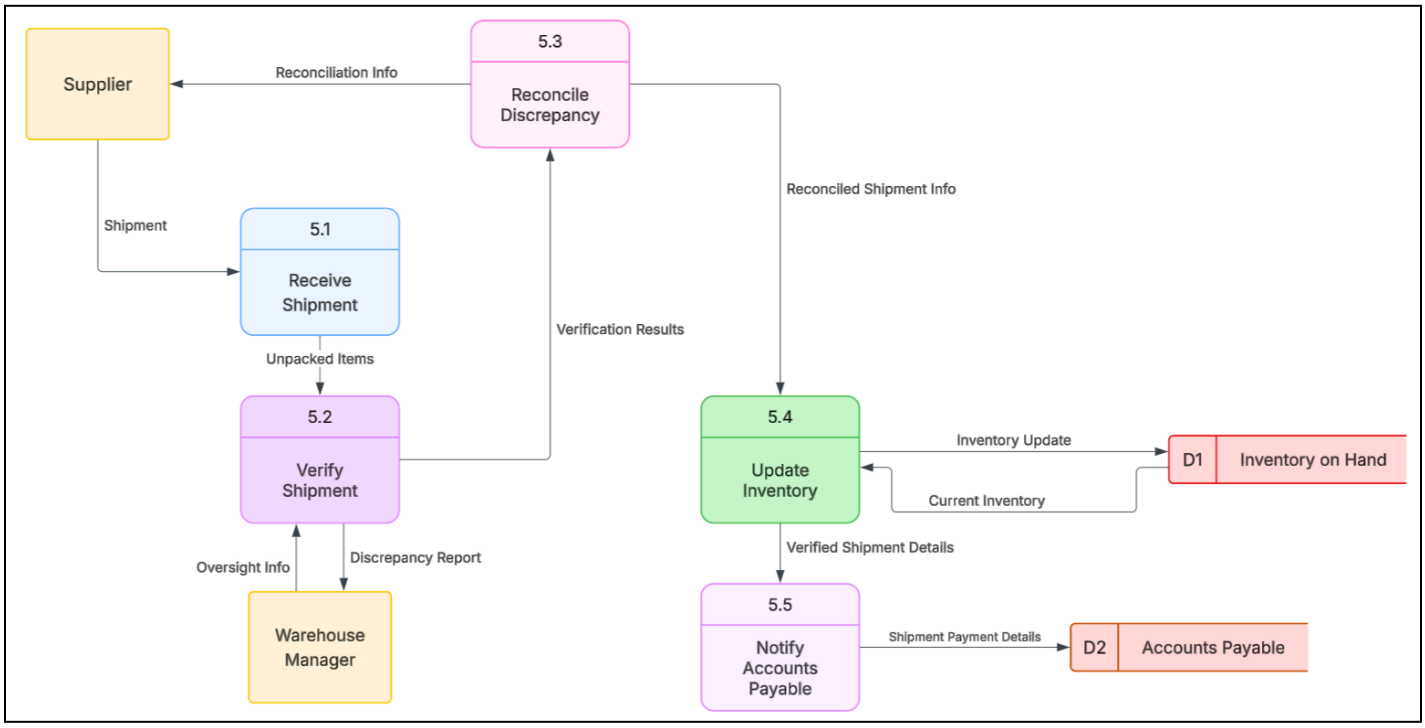
The Hatcher Company is in the process of developing a new inventory management system. One of the event handling processes in that system is Receive Supplier Shipments. The (inexperienced) systems analyst on the project has spent time in the warehouse observing this process and developed the following list of activities that are performed: getting the new order in the warehouse, unpacking the boxes, making sure that all the ordered items were actually received, putting the items on the correct shelves, dealing with the supplier to reconcile any discrepancies, adjusting the inventory quantities on hand, and passing along the shipment information to the accounts payable office. He also created the accompanying level 1 data flow diagram for this process. Unfortunately, this DFD has numerous syntax and semantic errors. Identify the errors and redraw the DFD to more correctly represent the Receive Supplier Shipments process.

Answer:

Errors:

1. Wrong Process Order – Notifying Accounts Payable happens before verification and reconciliation.
2. Inventory Updated Too Early – Inventory is changed before confirming item accuracy.
3. Missing Data Flows – Some arrows are missing or unlabeled (e.g., no feedback to supplier).
4. Warehouse Manager Not Connected – Should interact with verification and reconciliation.
5. Data Store Misuse – Inventory store isn't properly shown as being read and updated.
6. Unlabeled or Vague Arrows – Some flows lack clear names (like "info" or "data").

Corrected Data Flow Diagram:

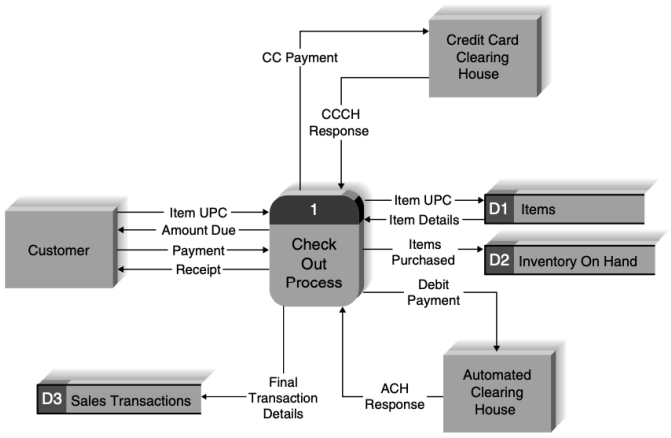


Minicase 3 - Dinnesh

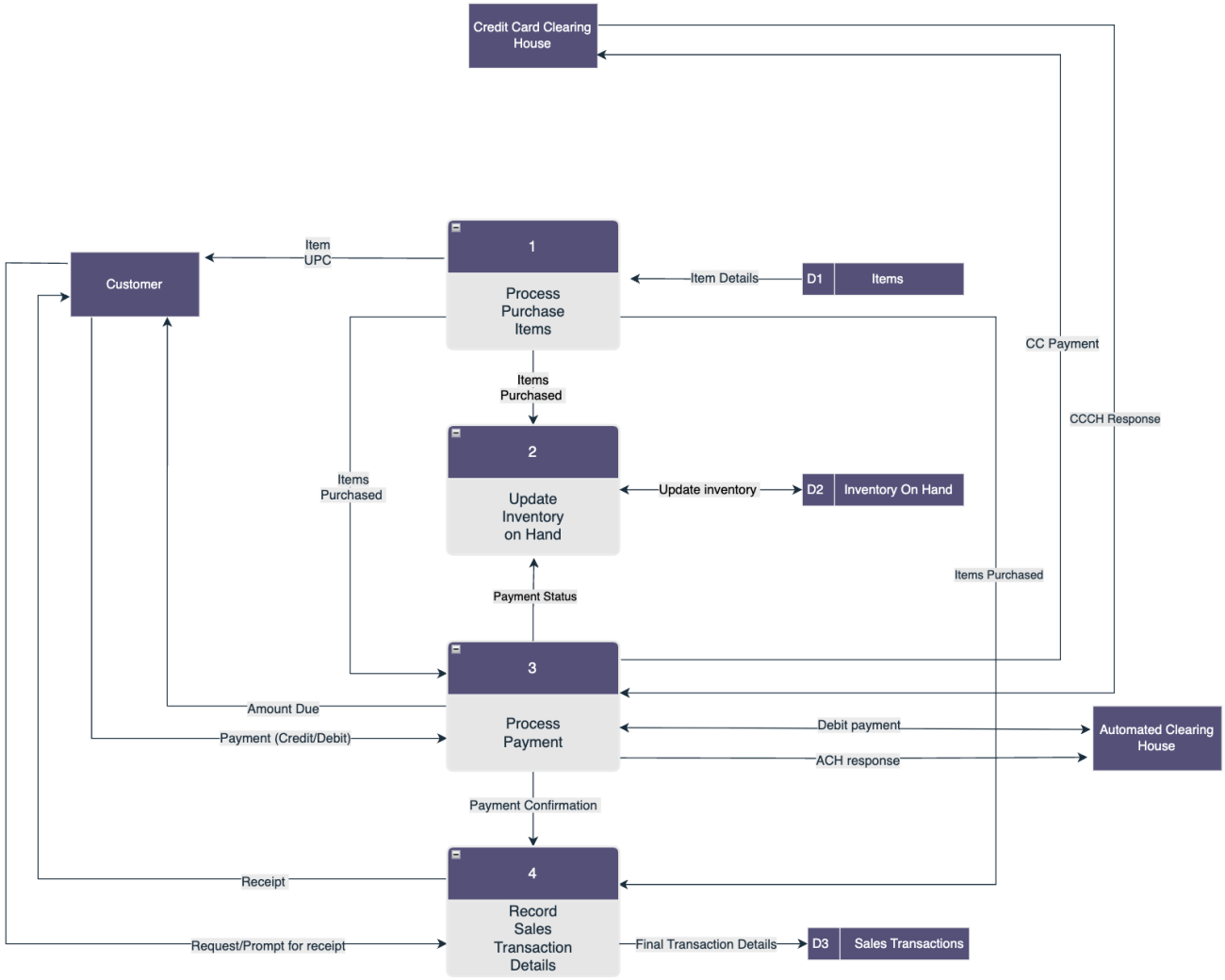
In this exercise, you will “explode” an event handling process into a level 1 DFD. The exercise focuses on the process used to complete a purchase at the “self-checkout lane” at a retail store. The basic process should be familiar to you. To simplify the scenario, we assume that only credit/debit card payments are allowed in this lane (no cash, checks, or food stamps).
We start with a DFD fragment that has been created for this situation. This fragment shows one event-handling process and the data flows it receives and sends to external entities and data stores. This fragment was extracted from the Level 0 diagram to help us focus just on this event.

The event handling process includes four subprocesses:
1.1. Process purchase items
1.2. Update inventory on hand
1.3. Process payment
1.4. Record sales transaction details

Draw the level 1 diagram for Process 1. Use the suggested subprocesses listed above as the process components of the level 1 diagram. Remember that all data flows and data stores on the parent diagram must also appear on the child diagram, but you will likely add more data flows on the child diagram.



Answer:


Credit Card Clearing House
Customer
Item UPC
1
Process Purchase Items
Item Details
D1
Items
CC Payment
CCCH Response
Items Purchased
2
Update Inventory on Hand
Update inventory
D2
Inventory On Hand
Items Purchased
Items Purchased
Payment Status
3
Process Payment
Amount Due
Payment (Credit/Debit)
Debit payment
ACH response
Automated Clearing House
Payment Confirmation
4
Record Sales Transaction Details
Receipt
Request/Prompt for receipt
Final Transaction Details
D3
Sales Transactions

Minicase 4

a. Develop a use case for each of the major processes just described.

Use Case Name: Validate Staffing Request	**ID:** UC-1	**Priority:** High
Actor: Contract Manager		
Description: The contract manager receives a staffing request from a client company and validates it against the existing contract terms and conditions to determine if the request can be processed.		
Trigger: Receipt of staffing request from client company		
Type: External		
Preconditions: 1. Contract database is accessible and up-to-date 2. Staffing request has been received with contract number 3. Contract manager has access to contract validation procedures		

Normal Course:		**Information for Steps**
1. Contract manager receives staffing request from client	←	Staffing request document
2. Contract manager enters contract number from staffing request into contract database	←	Contract number
3. System retrieves contract information from database		
4. Contract manager reviews contract terms and conditions	←	Contract validation criteria
5. Contract manager checks if contract has expired		
6. Contract manager verifies requested professional type is listed in original contract		
7. Contract manager confirms requested fee falls within negotiated fee range		
8. Contract manager determines staffing request is valid		
9. Contract manager enters staffing request into staffing request database as outstanding	→	Outstanding staffing request record
10. Contract manager sends staffing request to placement department	→	Validated staffing request

Postconditions:
1. Valid staffing request is entered in staffing request database 2. Staffing request is forwarded to placement department 3. Contract validation is documented
Exceptions: E1: Contract has expired (occurs at step 5); E2: Requested professional type not listed in contract (occurs at step 6); E3: Requested fee outside negotiated range (occurs at step 7); E4: Contract number not found in database (occurs at step 3) 1. Contract manager creates rejection letter stating the (e*xception condition)* 2. Contract manager sends rejection letter to client 3. Contract manager files copy of rejection letter; exit the use case.

Summary Inputs	**Source**	**Summary outputs**	**Destination**
Staffing request document	Client company	Outstanding staffing request record	Staffing request database
Contract number	Client company	Validated staffing request	Placement department

Use Case Name: Find and Reserve Staff	**ID:** UC-2	**Priority:** High
Actor: Placement Department Staff		
Description: The placement department searches for qualified professional staff members to fulfill a validated staffing request and reserves them if found.		
Trigger: Receipt of validated staffing request from contract manager		
Type: External		
Preconditions: 1. Staff database is accessible and current 2. Validated staffing request has been received 3. Staff availability status is up-to-date		

Normal Course:		**Information for Steps**
1. Placement department receives validated staffing request	←	Validated staffing request
2. Placement department extracts required staff type from staffing request	←	Staff type requirements
3. Placement department extracts required experience from staffing request	←	Experience requirements
4. Placement department extracts required qualifications from staffing request	←	Qualification requirements
5. Placement department searches staff database for matching individuals		
6. System returns list of qualified available staff members	→	List of qualified available staff
7. Placement department selects appropriate staff member		
8. Placement department marks selected staff member as "reserved" in staff database	→	Reserved staff member record
9. Placement department sends staffing request to arrangements department	→	Staffing request with reserved staff

Postconditions:
1. Qualified staff member is marked as "reserved"
2. Staffing request is forwarded to arrangements department
3. Staff database is updated with reservation status

Exceptions:
E1: No qualified staff found in database or not immediately available (occurs at step 6)
1. Placement department creates "unable to fill" memo
2. Placement department attaches memo to staffing request
3. Placement department sends staffing request with memo to arrangements department
4. Continue to arrangements department processing

Summary Inputs	**Source**	**Summary outputs**	**Destination**
Validated staffing request	Contract manager	Reserved staff member record	Staff database
Staff type requirements	Validated staffing request	Staffing request with reserved staff	Arrangements department
Experience requirements	Validated staffing request		
Qualification requirements	Validated staffing request		

Use Case Name: Arrange Staff Placement	**ID:** UC-3	**Priority:** Medium

Actor: Arrangements Department Staff

Description: The arrangements department contacts the reserved staff member to confirm placement details and finalizes the staffing arrangement.

Trigger: Receipt of staffing request from placement department

Type: External

Preconditions:

1. Staff member has been reserved (if available)
2. Staffing request contains all necessary placement details
3. Contact information for staff member is available

Normal Course:

	Information for Steps
1. Arrangements department receives staffing request from placement department	← Staffing request (with or without reserved staff)
2. Arrangements department contacts prospective temporary employee	← Staff member contact information
3. Arrangements department discusses placement details with staff member	→ Placement terms and conditions
4. Staff member agrees to placement terms	
5. Arrangements department works out final placement details	
6. Arrangements department marks staff member as "placed" in staff database	→ Placed staff member record
7. Arrangements department creates copy of staffing request	→ Staffing request copy
8. Arrangements department creates bill for placement fee	→ Placement fee bill
9. Arrangements department sends staffing request copy and placement fee bill to client	→ Client billing package
10. Arrangements department sends staffing request, placement fee bill, and any memos to contract manager	→ Complete placement documentation

Postconditions:

1. Staff member is marked as "placed" in database
2. Client receives placement confirmation and bill
3. Contract manager receives complete documentation
4. Placement is ready for execution

Exceptions:

E1: Staff member declines placement (occurs at step 4);

E2: Staff member unavailable when contacted (occurs at step 2)

1. Arrangements department creates "unable to fill" memo
2. Arrangements department attaches memo to staffing request
3. Arrangements department sends staffing request, memo, and any bills to contract manager
4. Continue to contract manager processing

E3: No staff member was reserved (occurs at step 1)

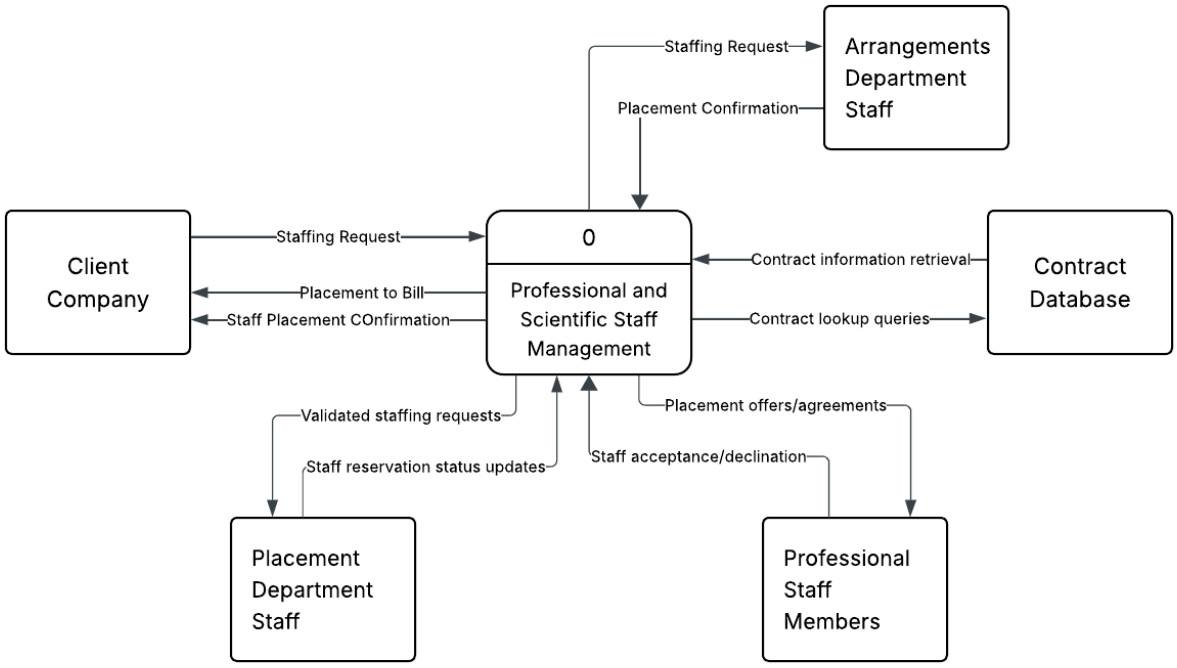
1. Arrangements department reviews "unable to fill" memo from placement department
2. Arrangements department forwards staffing request with existing memo to contract manager
3. Continue to contract manager processing

Summary Inputs	**Source**	**Summary outputs**	**Destination**
Staffing request Staff member contact information Placement terms and conditions	Placement department Staff database Staffing request and contract terms	Placed staff member record Client billing package Complete placement documentation	Staff database Client company Contract manager

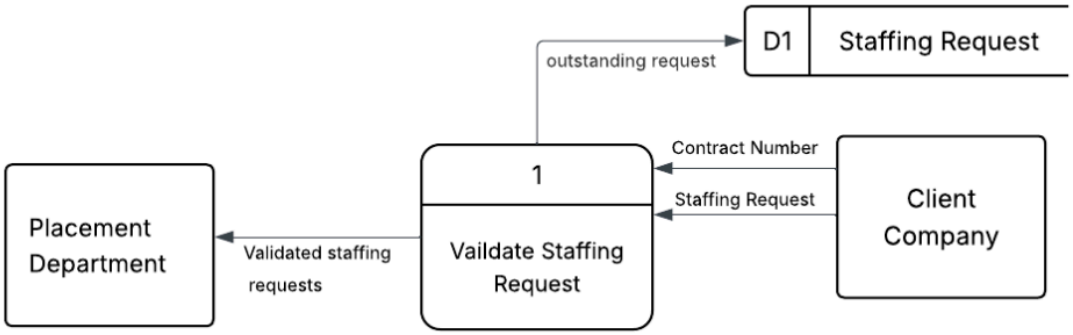
Use Case Name: Close Staffing Request	**ID:** UC- 4	**Priority:** Low
Actor: Contract Manager		
Description: The contract manager receives final documentation from arrangements department and closes the staffing request, either as filled or unfilled.		
Trigger: Receipt of placement documentation from arrangements department		
Type: External		
Preconditions: 1. Staffing request exists in database as outstanding 2. Complete documentation has been received from arrangements department 3. Contract manager has authority to close requests		
Normal Course: 1. Contract manager receives staffing request documentation from arrangements department 2. Contract manager reviews placement fee bill 3. Contract manager checks for "unable to fill" memo 4. Contract manager determines staffing request was successfully filled 5. Contract manager closes outstanding staffing request in staffing request database 6. Contract manager files documentation in contract office	**Information for Steps** ← Complete placement documentation ← Placement fee bill ← Status of filling request → Closed staffing request record → Filed documentation	
Postconditions: 1. Staffing request is closed in database 2. Documentation is properly filed 3. Process is complete		
Exceptions: E1: Staffing request could not be filled (occurs at step 4) 1. Contract manager creates client notification letter explaining inability to fill request 2. Contract manager sends notification letter to client 3. Contract manager files staffing request with "unable to fill" memo and any bills in contract office 4. Exit use case E2: Missing or incomplete documentation (occurs at step 1) 1. Contract manager identifies missing documentation 2. Contract manager contacts arrangements department requesting complete documentation 3. Contract manager waits for complete documentation 4. Return to step 1, Normal Course, when documentation is received		

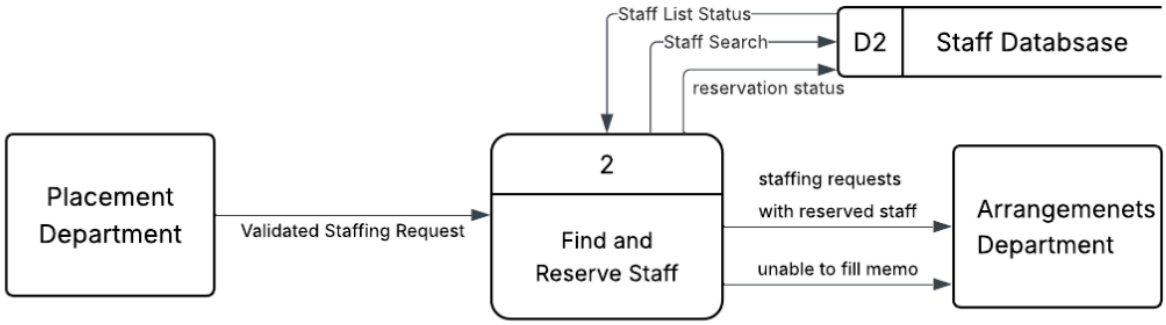
Summary Inputs	**Source**	**Summary outputs**	**Destination**
Complete placement documentation	Arrangements department	Closed staffing request record	Staffing request database
Placement fee bill	Arrangements department	Filed documentation	Contract office files
Status of filling request	Arrangements department via memos/documentation		

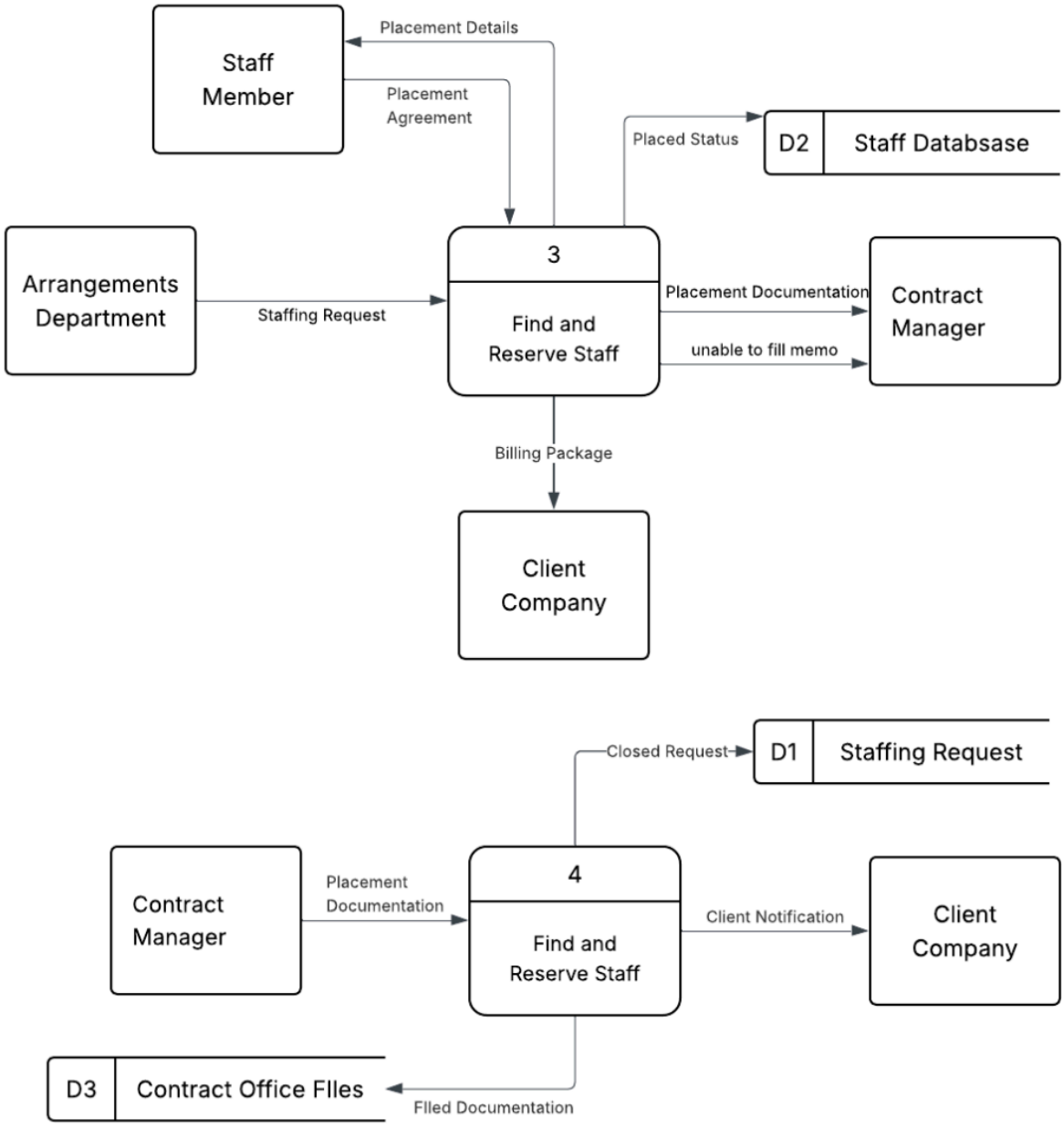
b. Create the context diagram for the system just described.

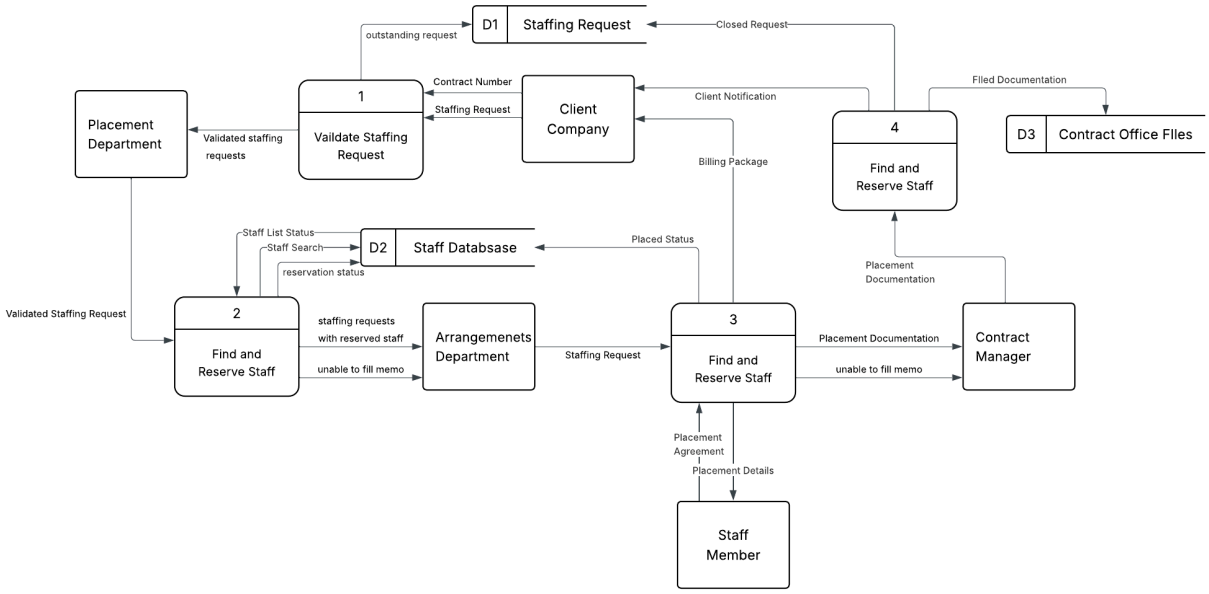


c. Create the DFD fragments for each of the four use cases outlined in part a, and then combine them into the level 0 DFD.

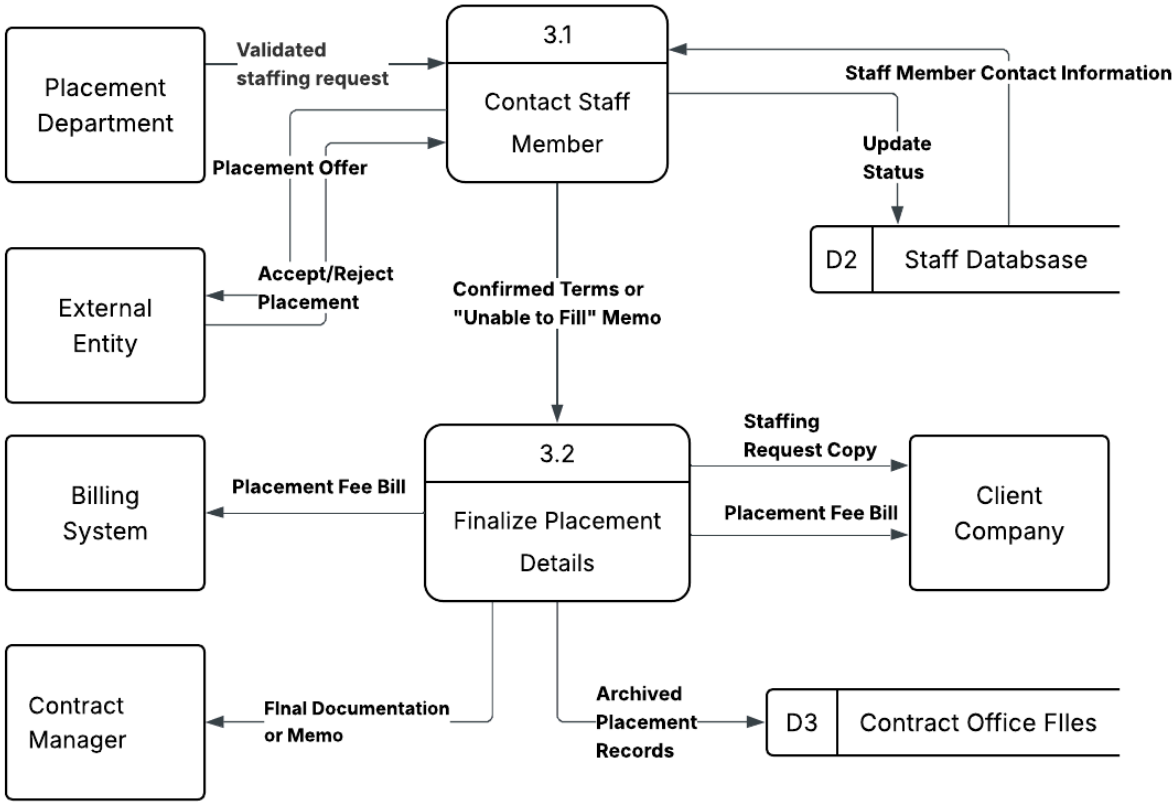

D1
Staffing Request
outstanding request
1
Vaildate Staffing Request
Contract Number
Staffing Request
Client Company
Placement Department
Validated staffing requests


Staff List Status
Staff Search
D2
Staff Databsase
reservation status
2
Find and Reserve Staff
staffing requests with reserved staff
unable to fill memo
Arrangemenets Department
Placement Department
Validated Staffing Request


Staff Member
Placement Details
Placement Agreement
Placed Status
D2
Staff Databsase
Arrangements Department
Staffing Request
3
Find and Reserve Staff
Placement Documentation
unable to fill memo
Contract Manager
Billing Package
Client Company
Closed Request
D1
Staffing Request
Contract Manager
Placement Documentation
4
Find and Reserve Staff
Client Notification
Client Company
D3
Contract Office FIles
FIled Documentation



d. Create a level 1 DFD for the most complicated use case.


Placement Department
Validated staffing request
3.1
Contact Staff Member
Staff Member Contact Information
Update Status
Placement Offer
D2
Staff Databsase
External Entity
Accept/Reject Placement
Confirmed Terms or "Unable to Fill" Memo
Billing System
Placement Fee Bill
3.2
Finalize Placement Details
Staffing Request Copy
Placement Fee Bill
Client Company
Contract Manager
FInal Documentation or Memo
Archived Placement Records
D3
Contract Office FIles