



## MILESTONE 4 - MODELING THE SYSTEM'S PROCESSES

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### Synopsis

Process modeling is a technique for organizing and documenting the structure and flow of data through a system's processes and/or the logic, policies, and procedures to be implemented by a system's processes. In this milestone we focus on using and constructing data flow diagrams (DFDs) and decomposition diagrams to perform process modeling.

Data flow diagrams are tools that depict the flow of data through a system and the work or processing performed by that system. A decomposition diagram is a DFD planning tool that shows the top-down functional decomposition and structure of a system.

During this milestone you will first construct a *context diagram* to establish project scope and boundaries. Secondly, you will draw a *functional decomposition diagram* to partition the system into logical subsystems and/or functions. Thirdly, you will complete a partially completed *event list* that identifies and confirms the business events to which the system must respond. Once that task is completed, you will refine the decomposition diagram drawn earlier to include event-handling processes. Finally you will construct a *system data flow diagram* that shows the big picture of the system, and a *primitive data flow diagram* for a single event process.

### Objectives

After completing this milestone, you should be able to:

- ⇒ Construct a context diagram to illustrate a system's interfaces with its environment.
- ⇒ Perform event partitioning and organize events in a functional decomposition diagram.
- ⇒ Identify external and temporal business events for a system.
- ⇒ Merge event diagrams into a system data flow diagram.
- ⇒ Draw primitive data flow diagrams.

### Prerequisites

Before starting this milestone the following topics should be covered:

1. Process Modeling - Chapter 6, pages 205-254  
of the SADM 4<sup>th</sup> ed. textbook.
2. Milestone 3 Solution

### Project

As a systems analyst or knowledgeable end-user, you must learn how to draw decomposition and data flow diagrams to model business process requirements. The survey and study phases of the methodology have been completed and you understand the current system's strengths, weaknesses, limitations, problems, opportunities, and constraints. You have already built the data model (**Milestone 3**) to document business data requirements for the new system. You now need to build the corresponding process models.

### Activities

1. To complete the *Context Diagram*, use Figure 6.20, page 242 of the SADM 4<sup>th</sup> ed. textbook as an example. Remember that the context diagram establishes the project scope and boundaries by depicting the system's interfaces with external parties. Refer to the narrative in Exhibit 4.1 to construct the diagram.
2. To complete the *Functional Decomposition Diagram*, use Figure 6.21, page 243 of the SADM 4<sup>th</sup> ed. textbook as an example. Assume that the system contains three subsystems with one of them being "Employee Tracking Subsystem". What would be the other two?

3. To complete the *Event – Response List*, use Figure 6.22, page 245 of the SADM 4<sup>th</sup> ed. textbook as an example. Exhibit 4.2 is a copy of a partially completed Event-Response List for the Employee Tracking Subsystem. Complete the list by providing data in the blank cells. Make assumptions where necessary. We have provided for your convenience a template of the Event-Response List on the textbook's web page [<http://www.tech.purdue.edu/textbooks/sadm/>].
4. To complete the *Event Decomposition Diagram*, use Figure 6.23, page 246 of the SADM 4<sup>th</sup> ed. textbook as an example. Refine the decomposition diagram constructed in **Activity 2** above, to include the event processes identified in **Activity 3** above. Focus only on the Employee Tracking Subsystem.
5. To complete the *System Diagram*, use Figure 6.27, pages 250 & 251 of the SADM 4<sup>th</sup> ed. textbook as an example. Exhibit 4.3 contains Event Diagrams for all the events within the Employee Tracking Subsystem. Merge these diagrams to produce the System Diagram.
6. To complete the *Primitive Diagram*, use Figure 6.28, page 252 of the SADM 4<sup>th</sup> ed. textbook as an example. Refer to the narrative in Exhibit 4.4 to construct the primitive diagram for the Employee Profile Changes Event.

Deliverable format and software to be used are according to your instructor's specifications. Deliverables should be neatly packaged in a binder, separated with a tab divider labeled "Milestone 4" and accompanied with a Milestone Evaluation Sheet (appearing first) found in Appendix A.

#### References:

##### **Context Diagram Narrative**

Exhibit 4.1

##### **Partially Completed Event-Response List**

Exhibit 4.2

##### **Event Diagrams**

Exhibit 4.3

##### **Primitive Diagram Narrative**

Exhibit 4.4

**CS 1 - MILESTONE 4: MODELING THE SYSTEM'S PROCESSES**

**Milestone 3 Solution**

Provided by your instructor

**Deliverables:**

**Context Diagram:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**Functional Decomposition Diagram:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**Event-Response List:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**Event Decomposition Diagram:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**System Diagram:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**Primitive Diagram:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**ADVANCED OPTION**

*For the advanced option, try to complete activities 3 through 6 for one of the other subsystems. In this option you will need to create the Event Diagrams before you can do the System Diagram. Make any assumptions as necessary.*

**Subsystem 2 or 3:**

**Due:** \_\_/\_\_/\_\_  
**Time:** \_\_\_\_\_

**Milestone's Point Value:**

\_\_\_\_\_

Exhibit 4.1

Use the following narrative to construct the Context Diagram for the Employee Self Service System (ESSS).

The purpose of the Employee Self Service System (ESSS) is to provide a single central repository of employee information. The Staffing Department provides new employee profile information and employee status changes. In response, the system generates staffing reports on a weekly, monthly, and yearly basis for the Staffing Department. The employees provide employee profile changes, as well as United Way and Savings Bonds contribution activity. In response, the system generates on request an Employee Participation Report for management, and Savings Bonds and United Way Contribution reports for the Employee Relations Department. The employee contribution activity records are sent to the Payroll System. Finally, an employee telephone listing can be generated for any employee who requests it.

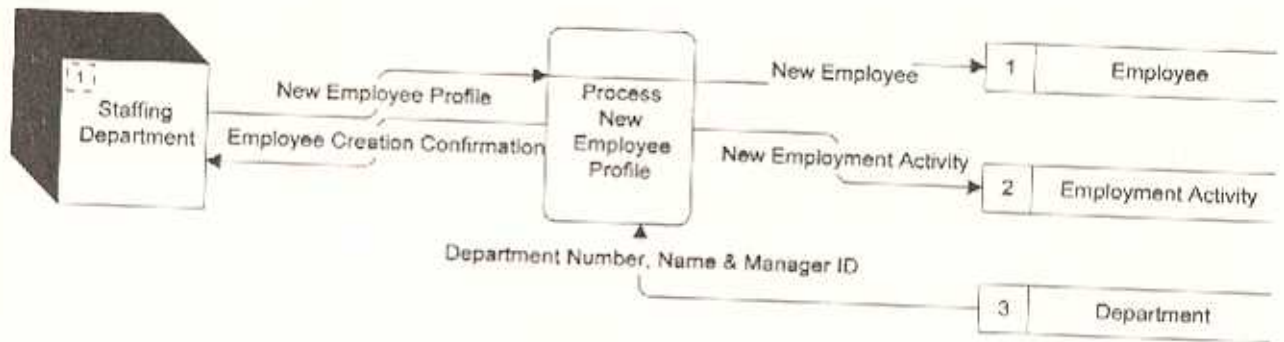
Exhibit 4.2

EVENT LIST

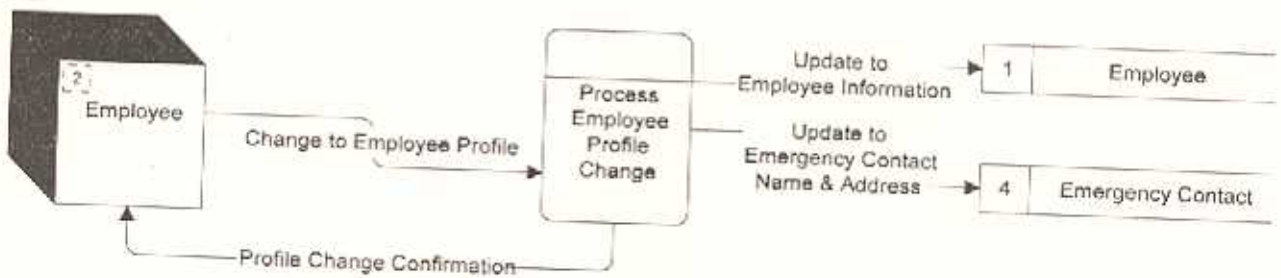
<i>Event Description</i>	Trigger (Inputs)	Responses (Outputs)
Staffing department receives acceptance letter from an individual accepting a job offer.	New Employee Profile	Create Employee Create Employment Activity
Employee provides changes to their personal information such as address or emergency contacts.		Update Employee Update Emergency Contact
Staffing department receives letter of resignation from employee.		
Request to produce listing of employee telephone numbers and locations.		
Time to analyze employee staffing.		Staffing Analysis Report

Exhibit 4.3

**Event Diagram**  
**Event: Staffing submits new employee profile**



**Event Diagram**  
**Event: Employee changes profile information**



**Event Diagram**  
**Event: Staffing submits employee status changes**

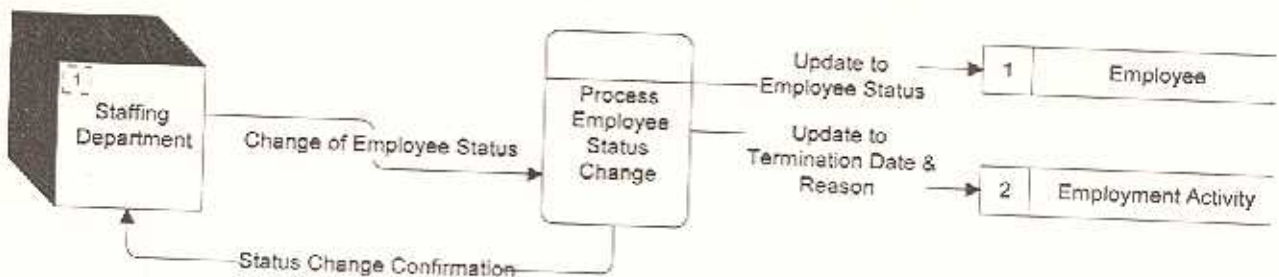


Exhibit 4.4

Use the following narrative to construct the Primitive Diagram for the Process Employee Profile Changes event.

Given an Employee ID, *validate* the employee. If the ID is not valid send a response to the employee. Verify that employee demographics are correct. If not, update them.

*Verify* employee emergency contact information. Verify that contact name and demographics are correct. If not correct them.

Given a validated employee and verified emergency contact information, *send* a confirmation to the employee that the change has been accepted.