

CPU CASE

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Picturing the Relationships

“So the project involves more than simply performing maintenance work on the current programs,” Chip says. “Are we using a formal methodology for analyzing and designing the new system?”

“Yes,” replies Anna. “We are also using Microsoft Visio to create and modify the diagrams and some simple repository information. We also have a CASE tool, Visible Analyst, to analyze and design the system.¹ We’ve recently installed the products on the computer in the office.”

With a few easy mouse clicks, Anna comes to a context-level data flow diagram (see Figure E2.1). “It’s very useful to begin thinking of the system this way,” Anna says as they look at the diagram on the screen.

Chip agrees, saying, “I can very easily see what you think is happening with the system. For instance, I see that the external entity Management supplies hardware and software inquiries and receives the corresponding responses in return. It shows the system within the larger organization.”

“I’ve also drawn a preliminary E-R diagram of the system,” Anna says as she brings up the entity-relationship diagram onscreen (see Figure E2.2). “It may need modification as we learn more about the system.”

“Yes, the many-to-many and one-to-many relationships are very clear when you look at this,” Chip says, viewing the screen.

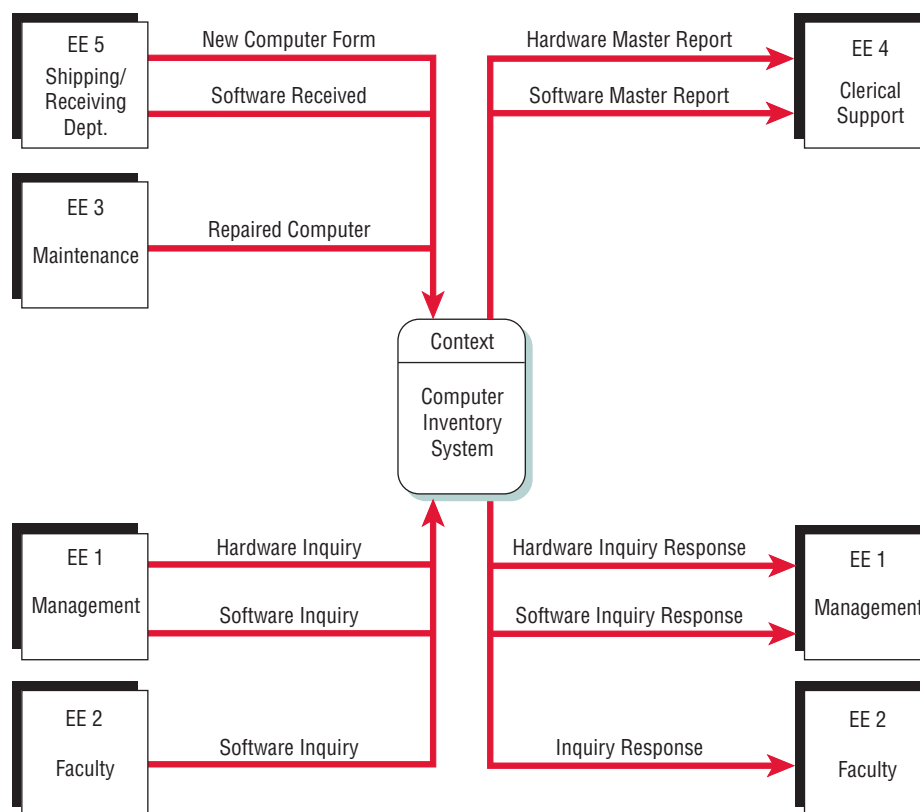


FIGURE E2.1

Context-level data flow diagram, current system.

¹For more details on how to begin using Visible Analyst, see Allen Schmidt, *Working with Visible Analyst*, 2nd ed. (Upper Saddle River, NJ: Prentice Hall, 2004).

FIGURE E2.2
Entity-relationship diagram,
current system.

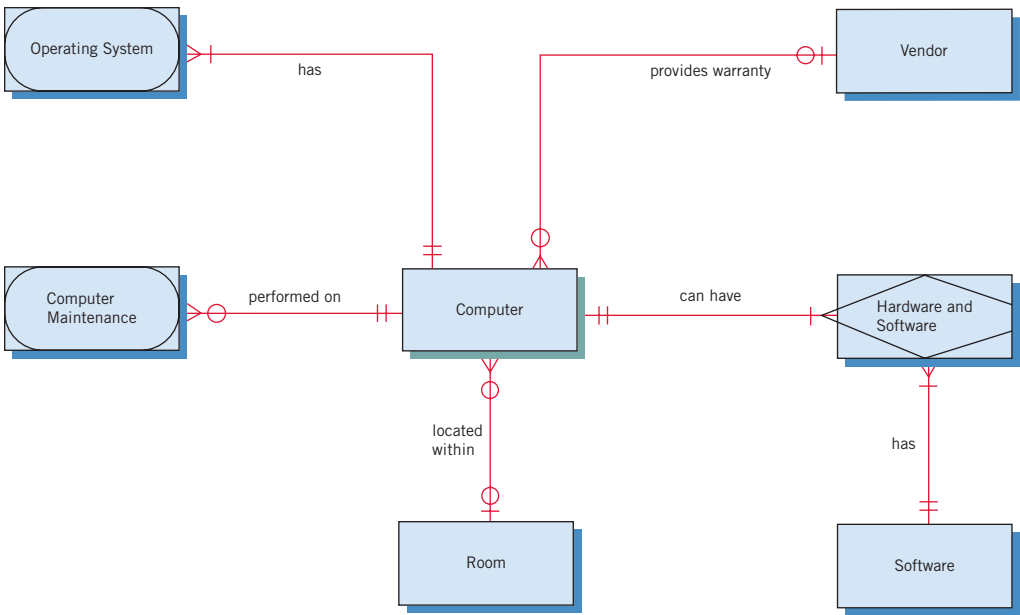


FIGURE E2.3
Use case diagram for the CPU
computer system.

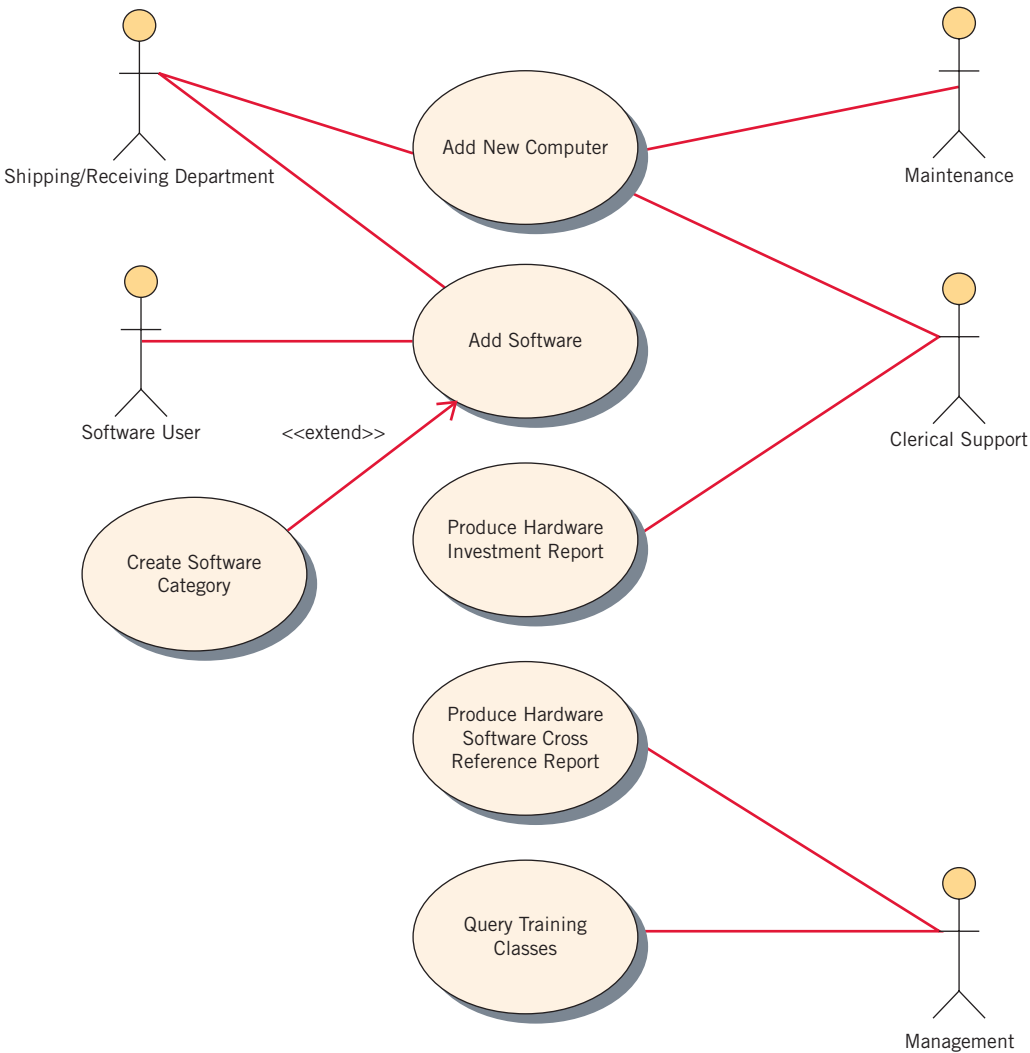


FIGURE E2.4





Use case scenario for the CPU computer system.

Use case name: Add New Computer	
Area: Computer Inventory	
Actors: Shipping/Receiving Department, Maintenance	
Stakeholder: Faculty, Student, Staff	
Level: Blue	
Description: Add a new computer and generate a list of all machines for software installation	
Trigger: Add Computer menu choice clicked	
Trigger Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal	
Steps Performed (Main Path)	Information for Steps
1. Information is entered about new computers.	Invoice and specification sheets
2. Computer is added to Computer Master.	
3. Pending orders are updated with computers that have been received.	Computer Master
4. Produce the Installation Listing report for all desktop models.	Pending Order database table
5. Produce Software Installation Listing report showing all standard software for all received computers.	Computer Master
	Computer Master
Preconditions: Computer has been received by the receiving department.	
Postconditions: A computer has been added to the database and reports have been generated.	
Assumptions: User has successfully logged on with access to Add Computer screen.	
Success Guarantee: A computer has been added to the database and required reports printed.	
Minimum Guarantee: Computer has been received and will be added later.	
Objectives Met: Add and install new computers.	
Outstanding Issues: What course of action should be taken when pending computers do not match those received.	
Priority (optional): High	
Risk (optional): Medium	

“There is one more view of the system,” continues Anna, opening the use case diagram. “This is the preliminary use case diagram for our system (see Figure E2.3). We are going to use it to obtain some valuable feedback from the users. The use cases are not all complete, but I can show you one of them.” Anna clicks on the use case symbol, displaying the use case description in the repository shown in Figure E2.4.

“You’ve got a good start here,” Chip continues as he eyes the use case description. “This helps to understand the activities that take place. Let’s get to work and see what needs to be done next.”

Exercises

-  E-1. Use Microsoft Visio or Visible Analyst to view and print the context-level data flow diagram for the computer inventory system, as Chip and Anna did.
-  E-2. Use the Repository feature or the Repository web page to view the entry for the central process.
-  E-3. Use Microsoft Visio or Visible Analyst to view and print the entity-relationship diagram for the computer inventory system.
- E-4. Explain why the external entities on the context-level diagram are not found on the entity-relationship diagram.
- E-5. Explain why the entities MANAGEMENT and FACULTY are found on both sides of the process on the context-level diagram.
-  E-6. Use Microsoft Visio or Visible Analyst to view and print the use case diagram for the computer inventory system.
- E-7. Make the following changes to the use case diagram:
 - a. Add the FACULTY actor to the lower-left side of the use case diagram.
 - b. Connect the FACULTY actor to the QUERY TRAINING CLASSES use case.

- c. Since the computers may have software installed for a specific computer lab, the clerical support staff may be responsible for installing software on the computers. Connect the CLERICAL SUPPORT actor to the ADD SOFTWARE use case.
 - d. Add two new use cases below the QUERY TRAINING CLASSES use case: QUERY SOFTWARE EXPERT and, below it, QUERY SOFTWARE INFORMATION.
 - e. Connect the FACULTY actor to the QUERY SOFTWARE EXPERT and QUERY SOFTWARE INFORMATION use cases.
 - f. Connect the MANAGEMENT actor to the QUERY SOFTWARE EXPERT use case.
- E-8. Add the INSTALL DESKTOP COMPUTER use case to the upper-right area of the diagram. This use case extends the ADD NEW COMPUTER use case.
- E-9. Add a use case description for the ADD SOFTWARE use case. It should contain the following information:
- a. Obtain the use case name and actors from the use case diagram. The stakeholder and level are the same as those in Figure E2.3.
 - b. The description should be: Add new software to the Software database table and print an installation listing.
 - c. The activity is started (triggered) when the user clicks the Add Software menu item.
 - d. The steps performed and information for steps are:

Software is keyed into the new system and validated	Software received form
Software is added to the Software Master	Software Master
The Software Installation List is produced	Software Master, Order
The software user is notified about installed software	Order
 - e. Preconditions are that software has been received. Postconditions are that the software has been added to the database and reports have been created. Assumptions are that the user has successfully logged on with access to the Add Software entry screen. A success guarantee is that the software has been added to the database and the required report printed. A minimum guarantee is that the software has been received. The objectives met are to add and install new software. The outstanding issue is how to determine which software to install on which machines. The priority is high and the risk is medium.
- E-10. Write a use case description for the PRODUCE HARDWARE SOFTWARE CROSS REFERENCE REPORT use case. Use the use case diagram to determine the heading information, making any reasonable assumptions. The steps would be to read a software record, use that information to read the hardware–software relational table, and read the hardware record. Use the hardware record to print a line, accumulating totals. Print subtotals and grand totals. This is a medium-priority, low-risk activity. Preconditions are that all the information must have been previously added to the appropriate database tables. Postconditions are that the report has been printed. Assumptions are that all the information on the database tables is correct. A success guarantee would be that the report has been successfully created. A minimum guarantee would be that the report could not be printed. The objectives met are to produce information about what software is found on which machine. Outstanding issues are: If the software is older and is not currently installed on any machines, how should the report be produced: printed, in a PDF file, or should it really be a query for one software package?
- E-11. Write the use case description for the PRODUCE HARDWARE INVESTMENT REPORT use case. Use the use case diagram to define the header information. The steps involve reading each hardware record, counting the number of machines, and totaling the amount invested in them for each computer model. When the computer brand changes, produce subtotals, with a grand total at the end of the report. All information comes from the Hardware Master database table. Make any reasonable assumptions about preconditions, postconditions, assumptions, success guarantee, minimum guarantee, objectives met, outstanding issues, priority, and risk.
- E-12. Write the use case description for the QUERY TRAINING CLASSES use case. Use the use case diagram to define the header information. The steps involve entering information on the Web form, validating the information, and storing the data on a Training Request database table. Make any reasonable assumptions about preconditions (such as if the software have to be already purchased), postconditions, assumptions, success guarantee, minimum guarantee, objectives met, outstanding issues, priority (would this be a high priority task), and risk.

The exercises preceded by a www icon indicate value-added material that is available from www.pearsonhighered.com/kendall. Students can download a sample Microsoft Visio, Visible Analyst, Microsoft Project, or a Microsoft Access file that can be used to complete the exercises. Alternatively, many of the exercises can be accomplished manually if software is unavailable.