

Business Process Analysis, A Systems Analysis Methodology

Abstract

Information system development projects often fail to meet the expectations of the stakeholders, cost much more than are budgeted for and are delivered much later than promised [1]. With the goal of improving this situation, this paper demonstrates an important step in a standardized system analysis process [2] that has proved to be effective in providing the analyst with a systematic, easy to use tool to collect and to capture business system requirements quickly and with much completeness and flexibility. When compared to other methods that the authors have used, the proposed method significantly saves time, in addition to improving analyst-client communications. This makes the analysis process more palatable to corporations where time is at a premium and where requirements change rapidly. A key feature of this methodology is the combining of a new diagramming technique in an object-oriented way with a systematic questioning system for optimum performance. In many test applications of the methodology, the effectiveness of the analyst using the system is rewarded with the comment, "You know more about the business than I do", which is a motivator for the analyst

The Extreme Analysis Method (EAM) is an extension and amalgamation of two existing methods, one called the Forms Based Analysis Method [1] and the other, the more recent Activity Diagram Method [3]. The Forms Based Analysis and Interview Method is an effective tool that allows the analyst to interact with the client through a well-structured questioning methodology and a diagramming technique that captures the information quickly and in a natural way. Additionally, the novice can quickly learn the method. However, there were no icons in the method to capture such happenings as synchronized processes, which commonly occur in a business environment, or to facilitate the capture of object-oriented concepts. The Activity Diagram Method does allow the representation of synchronized processes in an object-oriented design but does not incorporate a systemized interviewing technique nor a correspondingly easy, and quick diagrammatic method for capturing data and processes. Once the EAM is created, the analyst can identify the interfaces required and clearly name all the objects involved. The analyst can also classify all the attributes pertaining to the objects and identify the relations among them.

This methodology has been used and tested successfully by third year honours computer science students who do real-life systems analysis as part of a major course project. They learn the methodology quickly and can successfully apply it in a professional manner when conducting an analysis of a real business, such as draperies, blinds and shade

business, the diabetes association of Canada, and a major Home Health Care business. Additionally, a local commercial software house is now using the methodology.

Introduction

A good choice of diagrammatic methods during the system requirement phase will enable the analyst to readily capture the required business information and to visualize the business processes. A mental model for the analyst is that after the initial interview stage is completed, they should feel that they could run the business. It is well recognized that diagramming is a language for clear thinking and for human communication and that an enterprise needs standards for data processing diagrams. Martin [3] describes over twenty diagrammatic methods that have advantages in a variety of situations. System analysts, like carpenters, need a number of efficient tools at their workbench, and the term “Agile Analysis” has been created [2]. We believe that a well-trained analyst should be comfortable in the use of many techniques, and this view is shared by others [3].

The method proposed here, provides the analyst with an effective tool to capture information in a logical way, but at the same time is flexible enough to readily incorporate changes as the design work proceeds. The Extreme Analysis Method (EAM) extends and amalgamates the Form Based Analysis Method (FBAM) and the Activity Diagrammatic Method. The FBAM is used during the system requirement or business analysis phase. It captures the processes involved as well as the information flow through the business. It is a prior step to constructing, among other diagrams, a data flow diagram, which is regaining popularity through its use as a business process redesign methodology, and which takes much time to synthesize, making it an un-wieldy tool in the analysis phase. We summarize here, some of the highlights of the FBAM methodology. The entry point, or “Where does the business begin”, is recorded in an ellipse shaped icon and is commented with text in it. A critical event (process) is identified and captured in a circle also with a text in it; forms are represented with a rectangular box with a analyst designated number that connects it to the actual form itself; a wavy line is drawn from a critical event to a rectangular box indicates that part of this information is recorded at this point. Through the use of a sequence of well-structured questions, the analyst can interact with the user in a natural and constructive way and quickly record the information helping the interview proceed in a smooth manner. The analyst first would ask question about the general idea of the business i.e. “What is the main purpose of the business?” The analyst then would ask questions about the entry point and all the information needed for it to be recorded. From the entry point on, the analyst would ask question about the next stage and the forms (computer screens

or hand-filled forms for example) needed for this action to happen. “What will happen next?” is a common volleying question to the user, and keeps the interview flowing. To ensure effective analyst-client interaction, the analyst would go back to the entry point at reasonable intervals to review the flow with the interviewee and to pick up information that the interviewee did not think of on the first pass. The goal of this phase of the analysis is to be able to understand how to operate the business and not to redesign it, and indeed, an often-heard user comment is, “You know more about the business than I do.” Students participating in a third-year systems analysis class, where a systems analysis is undertaken with a new local business, has used the FBAM methodology and have received accolades from the business community.

Several interviews are set up with the business owners, in which the students are able to analyse the business. Previously, in the system requirement phase, the students were encouraged to use the FBAM to collect and capture the needed information for that particular portion of the analysis. As compared to other common methods that we used, we found that the student/client interaction was much more in the question mode and more time was spent in the review and refinement portion of the analysis process. Very little time is spent capturing the information at each stage, since the method facilitates an easy information capture. The FBAM methodology however, is sequential and neither facilitates the capturing of synchronized information nor does it apply as readily as it might to an object-oriented analysis.

One might argue that existing methods often fail to capture the expectations of the stakeholders. One might suggest that the tool used is lacking, however, it is our experience that clients often do not know or cannot articulate their needs at that point in time. The proposed method, which incorporates not only an easy to use diagramming methodology and a sequence of well-structured questions, leads the analyst much like an “invisible hand” through the interview and at the same time helps the clients to realize and articulate their needs. This ensures better client satisfaction, and cost within the budget and the time allotment. Also, during the time of the system development phase the requirements and technologies of the business will often change, and the collected information can become obsolete very quickly. We suggest that the analyst uses a method such as EAM that promises to embrace and capture concepts related to the change in the environment.

THE METHODOLOGY

The Extreme Analysis Method (EAM) extends and amalgamates the Form Based Analysis Method (FBAM) and the Activity Diagram Method in an innovative manner. The analyst interacts with the client through a sequence of well-structured questions in a constructive way but does not have the symbolism to represent synchronized processes. The Activity Diagram Methods is a tool that permits the representation of synchronized processes in an object-oriented design but does not incorporate a systemized interviewing and corresponding data and process capturing technique. The structured questioning and easy hand diagramming EAM method that follows, allows even the novice, to perform the analysis phase quickly and successfully. It is an important intermediate step prior to drawing the more intellectually challenging, and time-consuming phase as the drawing of a data flow diagram.

The methodology: The analyst will go through the interview asking questions in the format specified below. What makes the interview process more positive, is that the analysts often gets a response from the client that their valuable time has been well spent since the analyst can readily repeat the given information, which assures them that what they have said has been understood and been captured. The questioning process:

1. First: Determine the general idea of the business.
 - a. What is the main purpose of the business?
 - b. Who does the business serve?
 - c. How does this business begin?
2. Find the “Initial-State” of the business process.
 - a. Where does the business begin?
 - b. Is there any information present before this is done?
3. Follow the business procedure and identify the objects involved.
 - a. Now what do you do?
 - b. What happens now?
 - c. What happens first?
4. Define the forms used.
 - a. What forms do you use to report this?
5. Determine any synchronized processes pertaining to that object.
6. a. Are there synchronized processes involved?
7. Verify if there is anything else that pertains to this object.
8. Determine the next business procedure or object involved.
9. Find the “Final-State” of the business process.

Return to step 3 and continue until all the processes are captured. The analyst pauses at reasonable intervals and reviews with the client, the collected information beginning at the entry point. The analyst then asks, “Is there anything that you can think of that we didn’t discuss?” Just as with the FBAM, the analyst will ask a sequence of well-structured questions. However, with the EAM, they indicate the initial-state or the entry point with a solid dot. To indicate the flow of control the analyst then uses an arrow pointing to the first object.

The analyst differentiates among Person-Object, Entity-Object, Interface-Object and the Control-Object. The Person object is used to represent participants. The Entity-Object is used to represent things, places and events and is symbolized by a rectangle.

The Interface-Object is represented by the symbol used in Figure 1 and is used to depict user input, or user output. The Control-Object is represented by the symbol used in Figure 1 and serves as a “traffic cop” containing the application logic or business rules of the event. All objects have attributes associated with them. The analyst must identify these attributes and list them as they are attached to the object. The analyst must determine if there are any synchronized processes pertaining to that object. Once they have identified these synchronized processes, the analyst draws a solid bar to indicate the start and the end of it. All icons are easy to draw “On the Fly” and consume little time in their creation.

A wide arrow is used to indicate the information flow out of an Interface-Object. Relations among objects are represented as a rectangle with rounded corners and can easily be transferred to any Entity-Relationship Diagram. Hard copies are represented as a rectangle. To indicate a printed hard copy the analyst would draw a wavy line to the hard copy. The “Final-State” or the termination of a process is represented with a solid dot inside a circle.

Again, to ensure effective analyst-client interaction, the analyst would go back to the entry point at reasonable intervals in the interview and review the flow with the interviewee. Once the EAM is created, the analyst can identify the interfaces required and clearly name all the objects involved. They then can also classify all the attributes pertaining to the objects and can identify the relationships among them. The icons utilized in the analysis process follow in Figure 1.

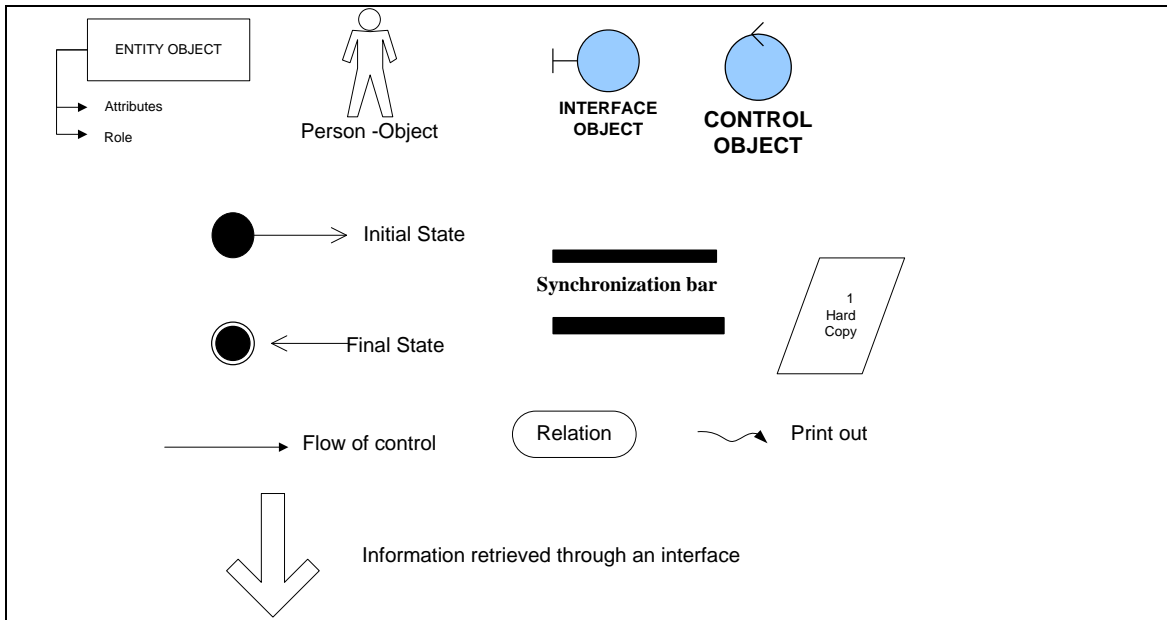


FIGURE 1: LEGEND FOR EAM

To illustrate the methodology, students in a third-year university Information Systems class analyzed a local fireplace dealership, and a team is subsequently implementing the software, which may be used by a national supplier. The dealer supplies wood burning stoves and other heating devices and installs them. Some of the information captured follows and demonstrates the quality of the information that may be captured.

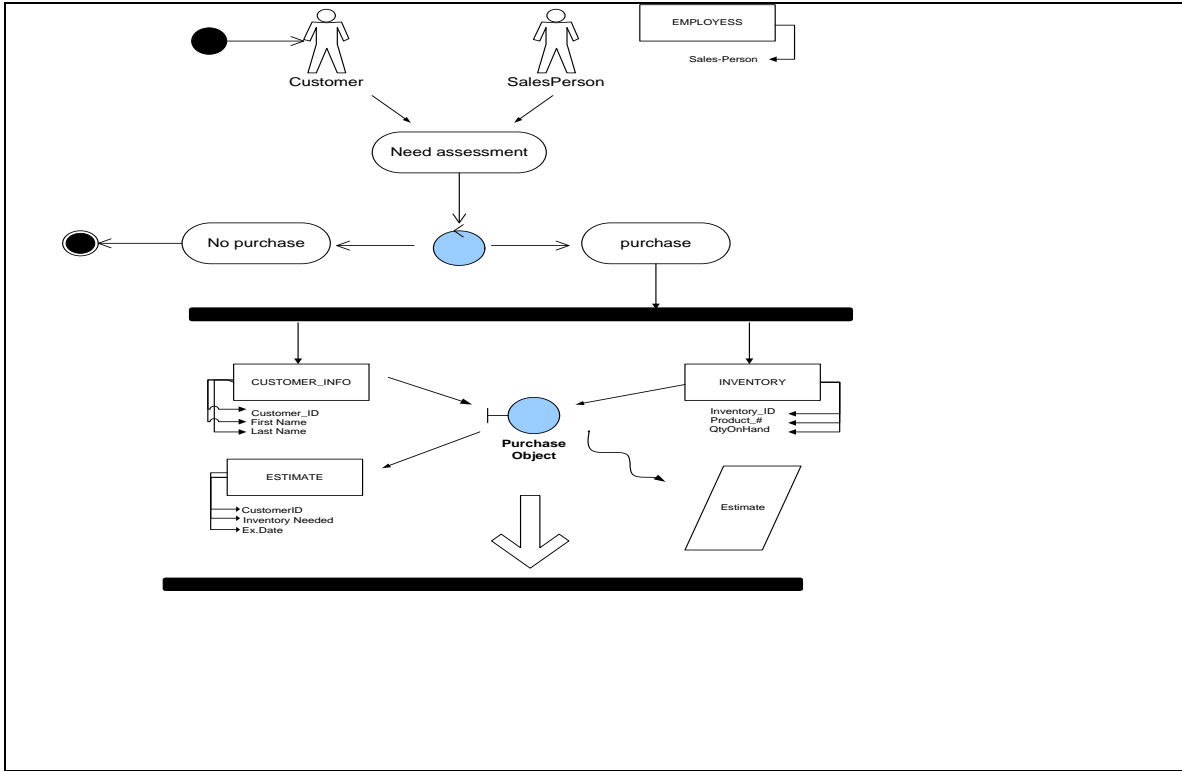


FIGURE 2: Initial Steps of the EAM Diagram for “Ray’s Fireplaces”

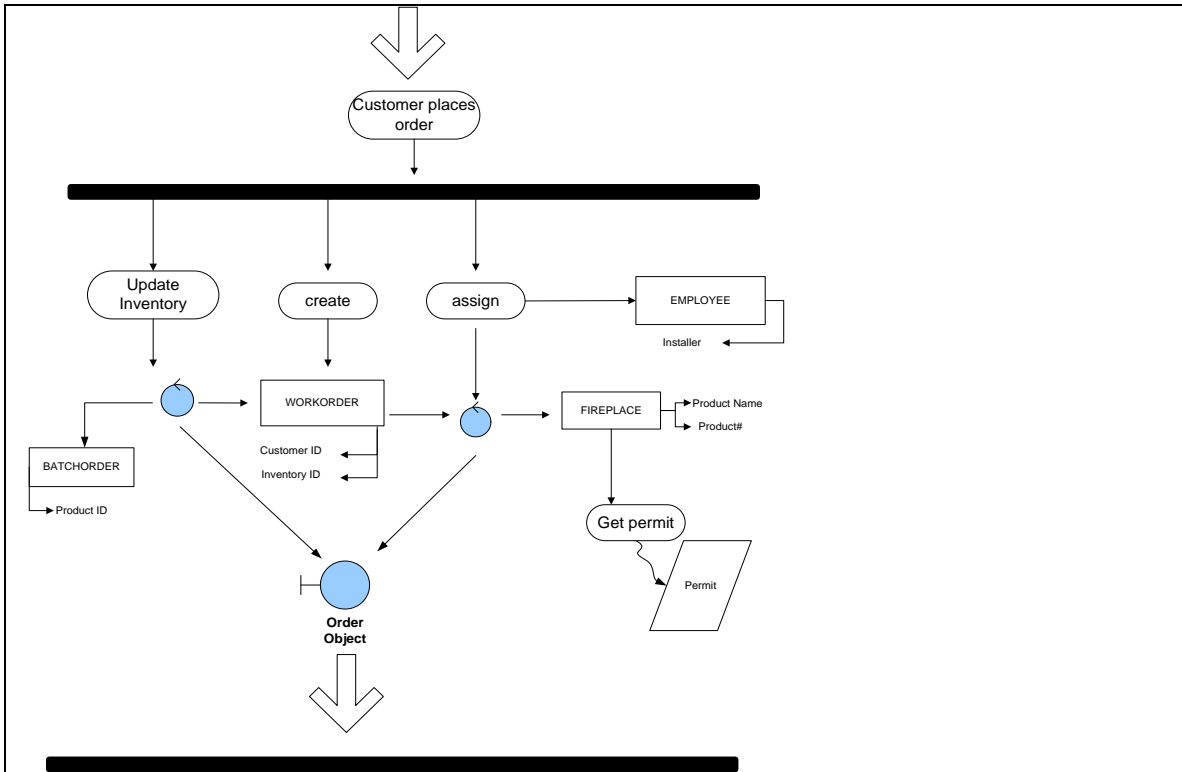


FIGURE 3: Intermediate Steps of the EAM Diagram for “Ray’s Fireplaces”

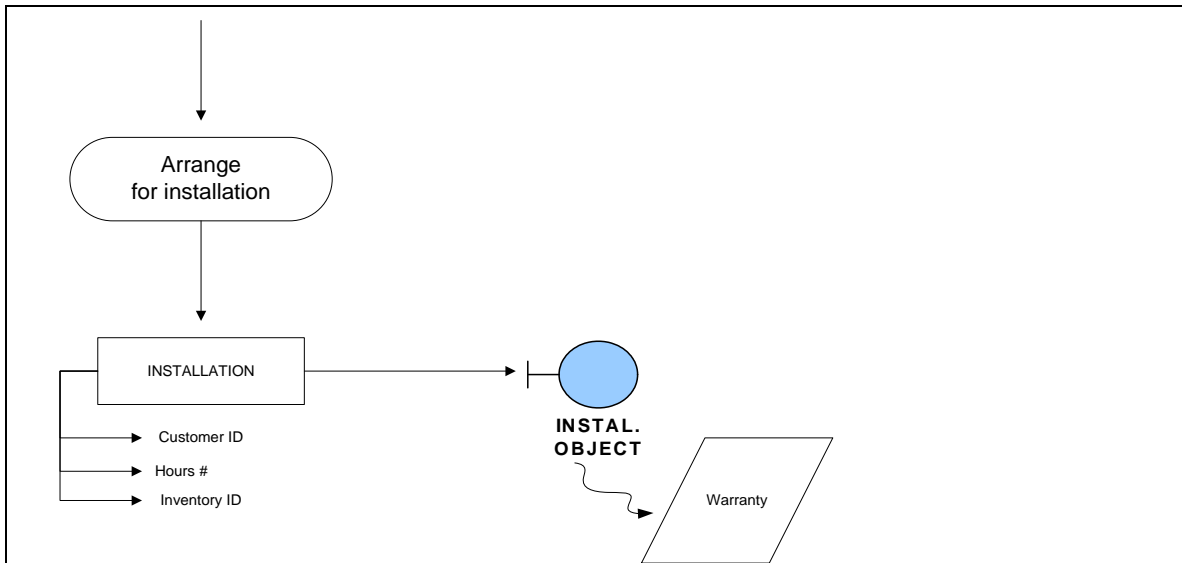


FIGURE 4: Final Steps of the EAM Diagram for “Ray’s Fireplaces”

Conclusion

The proposed method, which incorporates the use of a sequence of well-structured questions, will lead the analyst much like an “invisible hand” through the interview. The methodology can be quickly learned by the novice and applied in a professional manner. At the same time help, the method helps the client realize and articulate their needs in an easy manner, thereby ensuring better client participation and satisfaction. By quickly and thoroughly capturing the client needs, the cost is kept within the budgeted money and time allotment. The proposed method enables the analyst to include an object-oriented analysis that allows the analyst to represent synchronized as well as a sequential information flow in a complete and easy to understand way. The methodology also allows the interviewer to conduct the interview in a relaxed atmosphere in which the client is aware of each step of their business processes at all times. The systematic approach and the sequence of well-structured questions permit the analyst to control the flow of the interview, in order to ensure, that all critical questions get answered. Once the EAM is designed, the analyst can identify the interfaces required and clearly name all the objects involved. They can also classify all the attributes pertaining to the objects and identify the relations among them.

The method of quickly capturing information and then feeding it back to the user in an iterative manner, demonstrates to the user that they have been heard and also understood and that their time has been well spent. The user's confidence in the analyst is very high since the analyst easily reiterates what the user has stated. This method provides a single means of cuing the interviewer so that the process is natural and enjoyable. We believe that the proposed method will enable analyst to quickly capture data, lead the interview in a relaxed but moreover controlled way, thus helping the client to identifying their needs, resulting in higher client satisfaction, and ultimately a lower system maintenance.

- [1] **McMaster, G.E., Voorhis, D., “Forms Based Analysis and Interview Method”,** Proceedings of the Western Decision Sciences Association Conference, 1996
- [2] **Whitten, Jeffery L., Bentley, Lonnie D., and Dittman, Kevin C., “Systems Analysis Design Methods”, McGraw-Hill/Irwin, 2004.**
- [3] Gerber, Michael E., ‘The E-Myth Revisited’, Harper Business, 2001.
- [4] **http://en.wikipedia.org/wiki/Criticism_of_software_engineering**