# MILESTONE 7 – OBJECT ORIENTED ANALYSIS [1]

## 🖥 Synopsis

O bject-oriented analysis emphasizes the integration of processes and data. Like data and process modeling, object modeling is a technique for defining business requirements for a new system. But where traditional data modeling (ERDs) model just the static data and traditional process modeling (DFDs) model the processes of the system, object modeling integrates data and process concerns into constructs called objects.

The object modeling technique uses methodologies and diagramming notations that are completely different from the ones used for data and process modeling. These techniques are part of the Unified Modeling Language (UML). Object-oriented analysis techniques are best suited to projects that will implement systems using emerging object technologies. However, they can be used with any implementation technology.

In Milestone 3 we used use cases to model system requirements. In this milestone we will transform a use case narrative into an activity diagram that will graphically depict the process steps of the use case. We will also draw a system sequence diagram for the same use case. Finally we will identify objects, their data attributes, and relationships that support the required business functionality and model them in an object class diagram.

## 🖥 Objectives

After completing this milestone, you should be able to:

⇒ Construct an activity diagram to graphically depict the process steps of a use case.
⇒ Construct a system sequence diagram to depict the interaction between an actor and the system for a use case scenario.
⇒ Analyze the potential objects for the system to determine the ones that are in fact objects.
⇒ Construct a class diagram to depict the objects of the system and their relationships.

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[1]  This object modeling milestone can be done as a substitute for the data and process modeling milestones (4-6) in a pure OO project, or in addition to those milestones to compare and contrast structured and object methods.

### 🖥 **Prerequisites**

Before starting this milestone the following topics should be covered:

1. Modeling System Requirements With Use Cases – Chapter 7
2. Object-Oriented Analysis and Modeling Using the UML – Chapter 10
3. Milestone 3 Solution

### 🖥 **Assignment**

In this milestone we will transform a use case narrative into an activity diagram that will graphically depict the process steps of the use case. We will also graphically depict the interactions between the system and its users with a system sequence diagram. Finally we will identify objects, their data attributes, and relationships that support the required business functionality and model them in an object class diagram.

### 🖥 **Activities**

1. Construct an *Activity Diagram* for the Search Employee Directory use case narrative from Milestone 3. Include partitions for the actor and the system. Use your own solution for Milestone 3 or the solution provided by your instructor. Make assumptions where necessary.

2. Construct a System Sequence Diagram for one scenario of the Search Employee Directory use case narrative. The specific scenario may be designated by your instructor. Be sure to use for proper UML notation of the input messages. Attributes needed for the input messages may be in the annotated potential object list in Exhibit 7.1.

3. Analyze the annotated potential object list in Exhibit 7.1. Determine whether each potential object is an object, an attribute of a particular object, a synonym for an object or attribute, or something else. Record your findings in the Reason column. Make assumptions where necessary.

4. Construct a *Class Diagram* for the proposed system using your analysis of the annotated potential object list in Exhibit 7.1 plus the interview and exhibits in Milestone 4. Include attributes and object relationships, but not object behaviors. Make assumptions where necessary.

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 7" and accompanied with a Milestone Evaluation Sheet.

**References:**

    **Interviews and notes from all previous Milestones**

    **Milestone 3 Solution**

    **Milestone 4 Interview Transcript and Exhibits**

    **Annotated Potential Object List**
        Exhibit 7.1


**Deliverables:**

    **Activity Diagram:**                                              **Due:** __/__/__
                                                          **Time:** _____

    **System Sequence Diagram:**                            **Due:** __/__/__
                                                                  **Time:** _____

    **Potential Object List Analysis:**                    **Due:** __/__/__
                                                             **Time:** _____

    **Class Diagram:**                                                **Due:** __/__/__
                                                           **Time:** _____

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## ADVANCED OPTION

*For the advanced option, prepare additional Activity Diagrams and/or System Sequence Diagrams for additional use cases as directed by your instructor.*

    **Activity Diagrams:**                                    **Due:** __/__/__
                                                        **Time:** _____

    **System Sequence Diagrams:**                        **Due:** __/__/__
                                                             **Time:** _____

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**Milestone's Point Value:**                                                _____

          

**Exhibit 7.1**

Kira Webster has prepared the following list of potential objects by noting nouns found in use cases and interview notes. She then analyzed the list and asked questions of system users to better understand each potential object. She recorded her notes in the notes column.
1. Analyze the notes to determine whether or not each potential object is or is not a system object and to determine the attributes and relationships of the objects. Remember than an object is something about which the system should store data and/or perform activity on. You may want to review the interview transcripts from previous milestones, especially Milestone 4.
2. In the Obj column place a check mark if the potential object is, in fact, an object. Place an X if the potential object is not an object.
3. For potential objects that are not objects, note in the Reason column, note it is not an object. Common reasons include:
   - Attribute of an object
   - An instance of an object
   - Synonym for an existing object
   - State of an object (example: backordered)

| Potential Object | Notes | Obj | Reason |
|---|---|---|---|
| Annual Salary | The yearly salary of a salaried employee. | | |
| Building | A building where employees work in various rooms. | | |
| Calendar Year | The year for which a United Way contribution applies. | | |
| Contact Address | The street address, city, state, and zip of an emergency contact. | | |
| Contact Home Phone | The home phone number of an emergency contact. | | |
| Contact Name. | The first name, middle name, and last name of an emergency contact. | | |
| Contact Work Phone | The work phone number of an emergency contact. | | |
| Contract Employee | A temporary employee. | | |
| Department | An organizational grouping of employees that fulfills a business function. | | |
| Dept ID | An abbreviated identifier for a department.. | | |
| Dept Name | The full name of a department. | | |
| DOB | An employee's date of birth. | | |
| Emergency Contact | A person who should be contacted concerning a particular employee in case of | | |

| | | | |
|---|---|---|---|
| | emergency | | |
| Emp ID | A unique, sequentially-assigned identifier for an employee. | | |
| Employee | A person who works for the organization. | | |
| Employee Address | The street address, city, state, and zip of an employee. | | |
| Employee Home Phone | The home phone number of an employee. | | |
| Employee Name | The first name, middle name, last name, and nickname of an employee. | | |
| Employee Office Phone | The office phone number of an employee. | | |
| Hire Date | The date an employee was hired. | | |
| Hourly Employee | An employee who is paid a hourly wage. | | |
| Hourly Wage | The hourly wage of an hourly employee or a contract employee. | | |
| Job Title | An employee's job title. | | |
| Life Insurance | A miscellaneous deduction. | | |
| Location | Where an employee can be found. | | |
| Mail Stop | A room or an area of an office where employees can go and retrieve their mail. | | |
| Marital Status | The marital status (married, single) of an employee. | | |
| Maximum Weekly Hours | The maximum hours per week that is scheduled for each hourly employee. | | |
| Misc Deduction | A Miscellaneous Deduction elected by an employee. | | |
| Permanent Employer | The permanent employer of a contract employee. | | |
| Request Date | The date of a Miscellaneous Deduction request. | | |
| Room | A room where employees may work. | | |
| Salary Employee | An employee who is paid a salary. | | |
| Site | A company location consisting of one or more buildings. | | |
| SSN | An employee's Social Security Number. | | |
| Supervisor | An employee's supervisor | | |
| United Way Contribution | A contribution pledged to the United Way by an employee. | | |