

OCD II

CS577a

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System Analysis

4. Proposed System (Analysis of)

- System Analysis involves several steps
 - Components - models, attributes, relationships, constraints, roles, and states
 - Behavior models
 - Engineering - Abstraction, enterprise class engineering
- This section is an overview of Analysis for OCD 4.0

System Analysis

- The creation of precise, consistent description of a conceptual system in terms of its high-level components
- Description is within the organization domain, independent of implementation
- Analysis goes beyond simple checklists and pictures
- Analysis ties the domain description to the system design and implementation

Analysis Defined

- A separation of a whole into its component parts
- An examination of a complex system, its elements, and their relations
- A statement of such an analysis
- A method in philosophy of resolving complex expressions into simpler or more basic ones

Analysis Goals

- Detail *what* we want to represent, not *how* it is done
- Formalize and refine the specific parts of the organizations capabilities, entities, activities, and interactions described in the domain description that are to be automated
- Capture the high level architectural information that will represent (I.e. model) the conceptual system

Analysis Audience

- The Domain Description is for all constituents of the project
- Analysis is for Domain Experts - the high level leaders who understand the domain, know what they want, and have the authority to make decisions
- Not for implementers, who prefer design and implementation details (“hows”)

Example

Vacation Sick Leave OCD

- **OCD 2.2 Stakeholders:** customer(HR manager), users (employees, supervisors, and HR), maintainers (ISD people), project manager, and developers. manager. Users include HR staff and 350 employees who are employed under ISD.
- **OCD 3.4 Current System:** utilized in the Human Resources(HR), is based on a current software system and a lot of paper work. It is used by staff to store and monitor vacation/sick leave of 350 employees. It is part of a University software system for payroll, personnel and benefits. Current system's user interface is menu driven textual mode system. It is accessible only by HR people. It does not provide systematic vacation leave processing. Modifications of vacation data (inserts, updates and deletes) require a lot of work that is redundant.
- **OCD 4.3 Capabilities**
 - *The system will provide a web based service for employees and supervisors; Submissions will be done via web page, they will be able to post a query and receive results via web, and communicate and negotiate via email
 - *The system should provide the search capability for administrators
 - *The system should provide the users with help

4.3 System Capabilities

- Broad, high-level system behaviors.
- ***What*** the user should expect from the system
- Should be in line with Organization Goals (OCD 3.2) and Activities (OCD 3.3)
- Outline the desired modifications to the current systems entities and activities (OCD 3.3, 3.5)
- “**Just Do It**” approach. Work with what you know and flush out SR’s later.

4.3 System Capabilities

- High level overview of broad categories of system behaviors
- Not an operational breakdown (provided by System Requirements)
- System capabilities realize high-level activities in the Organization Activity Model (Reference as appropriate)

4.3 System Capabilities (cont.)

- Describe a few system capabilities and work with domain experts to clarify them.
 - Think about “What in our domain description do we want represented with technology?”
 - Look at organization wide goals and consider what is required to carry them out.
- Each system responsibility may require several iterations: Consistency and redundancy are not issues at this point

4.3 System Capabilities(cont.)

- “Just do it” approach eliminates the pressure to get it all right on the first pass
 - “Go with what you know” and plan to iterate back through it.
 - Multiple iterations of SC’s reduce complexity through balanced partitions, promote focus, remove redundancies and contradictions
- As more capabilities are documented, architects get a better idea of how the domain experts are viewing the proposed system
- Allow tangents to continue, even if they cross perceived system boundaries.

Example:
System Capabilities

4.3 System Capabilities

The system capabilities are the high-level system behaviors described according to broad categories of system behaviors.

Responsibility: SC-01

Name: Find/Search Material

Description: Once the archive is accessed the user needs to find the materials desired or if there are materials of interest.

Priority: Very High

Rationale: Once at the site the user must be able to search for an item in the archive. This is deemed a basic requirement.

Relates to: IA [OCD 2.5]

WinWin reference: eballew-WINC-4, eballew-WINC-9, eballew-WINC-3

Responsibility: SC-02

Name: View Material

Description: Materials in the archive can be viewed using the system.

Priority: Very High

Rationale: This is basic required functionality for the customer and user.

Relates to: II.C.3 [OCD 2.5]

WinWin reference: eballew-WINC-6, eballew-WINC-7, eballew-WINC-16, eballew-WINC-2, eballew-WINC-13

Finding System Capabilities

- Ask Constructive Questions
- Avoid counter productive questions
- Don't obsess over issues that are addressed as part of the process (e.g. consistency, redundancy, completeness, soundness)

Constructive Questions

- Some constructive, informal questions that may be useful in gaining clarity (organized brainstorming)
 - “What does this mean?”
 - “Can you give me an example of this?”
 - “What do you need to do this?”
 - “What is involved with this?”

Construction Question 1

“What does this mean?”

Useful to define words and phrases

(document in CDL)

Construction Question 2

“Can you give me an example of this?”

Useful to draw out scenarios of desired system operations

Construction Question 3

“What do you need to do this?”

To find out information required to carry out a responsibility

Construction Question 4

- ***“What is involved with this?”***
- To discover sub-capabilities and the steps required to fulfill them
- This question is important as it is used to continue the process.

Counterproductive Questions

- Avoid Counterproductive Questions:
 - ***“Didn't we already cover this?”***
 - ***“How can we possibly implement that?”***
 - ***“Do we really need this?”***
- Begin by discovering what is actually wanted
- The modeling process answers these “save it for later” questions

Counterproductive Question 1

“Didn't we already cover this?”

👉 Don't worry about overlapping capabilities: these will be cleared up as we build the model

Counterproductive Question 2

“How can we possibly implement that?”

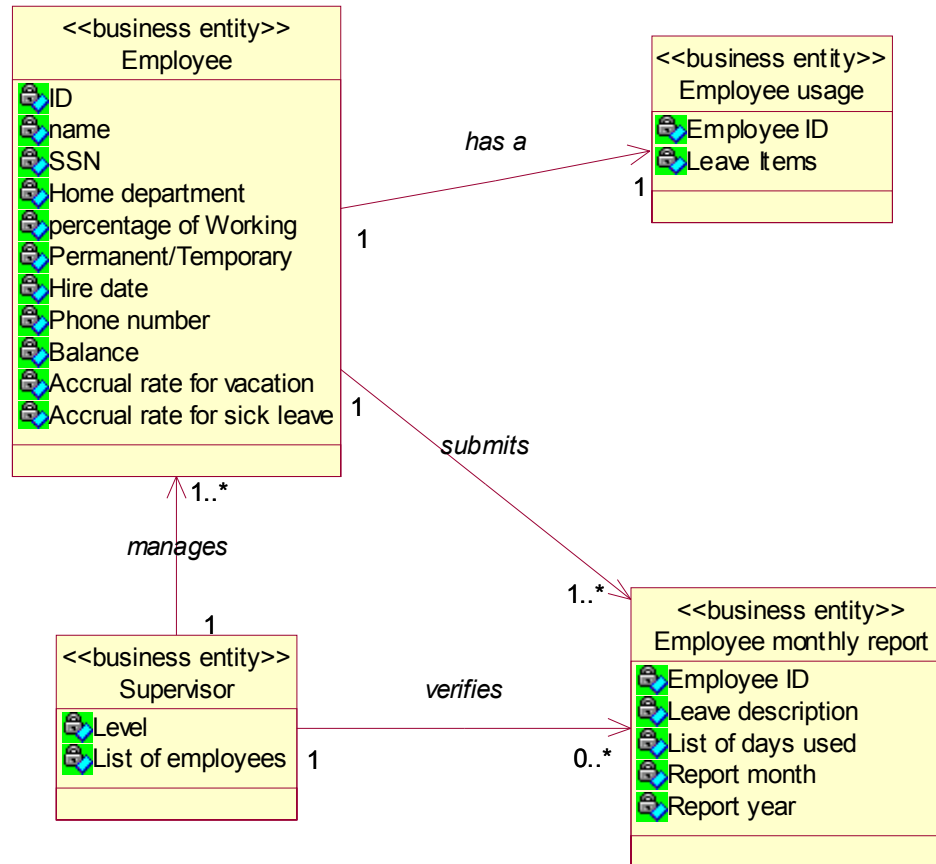
- ☞ Stay focused: this is not relevant to domain experts, only to implementers

Counterproductive Question 3

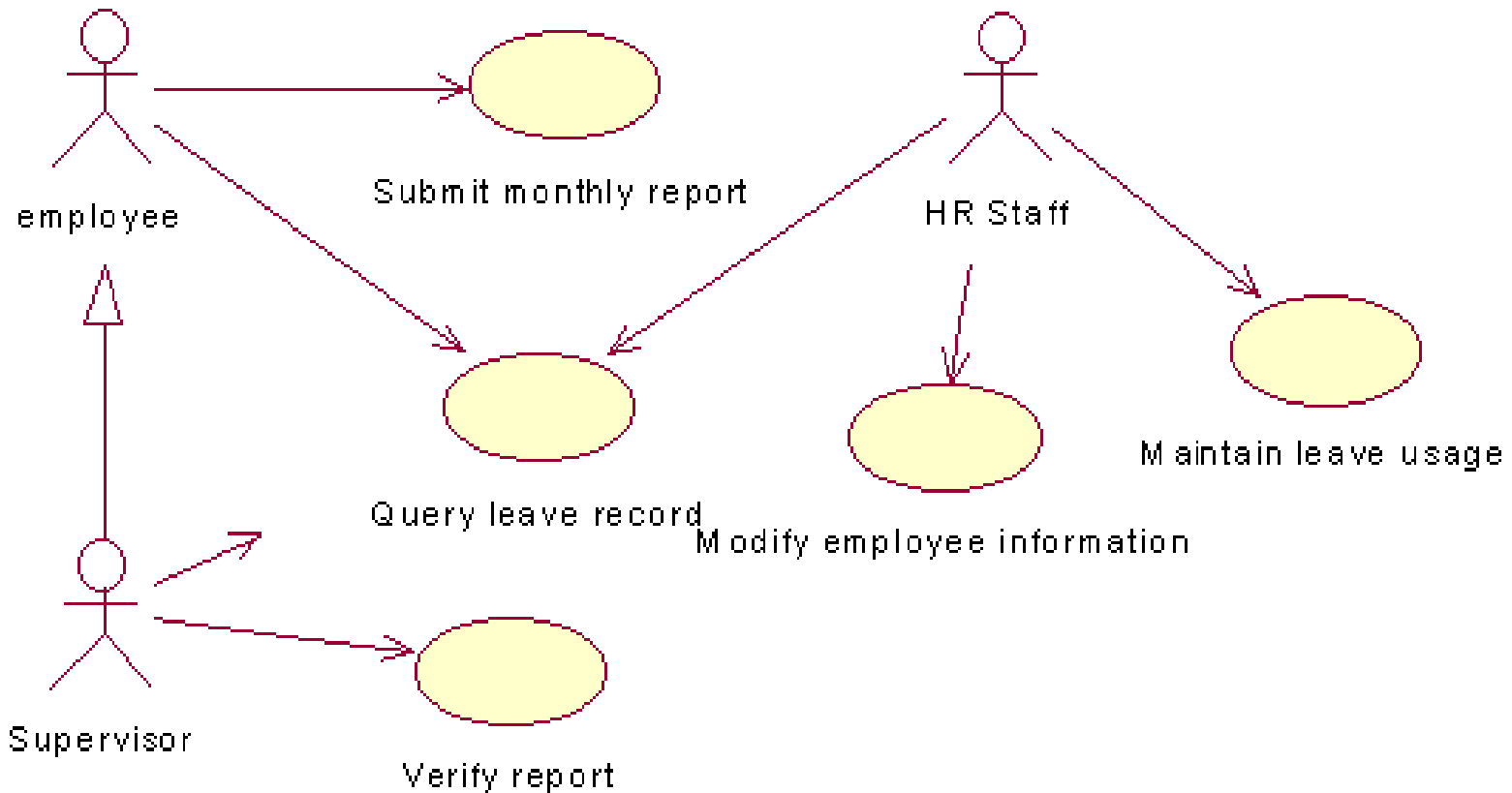
“Do we really need this?”

☞ Don't challenge feasibility or relevance:
relevance is determined by domain
experts (you can send them the bill later!)

OCD 4.5.2 Proposed Entity Model



OCD 4.5.1 Proposed Activities



4.4 L.O.S. Goals

- Project Goals have global effects on the System capabilities
- L.O.S. Goals should be consistent with Win conditions and agreements
- M.R.S. (Measurable, Relevant, Specific): Initially, one may specify desirable and acceptable levels of capability
- Use a simple enumerated list

4.4 L.O.S. Goals (continued)

- Describe desired qualities of the System (i.e., "how well" the system should perform a given responsibility)
- Do not overburden the system's analysis with L.O.S. Goals that are not expressly requested by the customer.

4.4 L.O.S. Goals (continued)

Level of Service:	<<give a reference number and name>> such as “LS-1: Response time”
Description:	<<describe the level of service>>, such as “1 second desired; 2 seconds acceptable”
Measurable:	<<indicate how this goal can be measured with respect the specific elements it addresses – include as appropriate baseline measurements, minimum values, maximum values, average or typical or expected values, etc. >>, such as “time between hitting Enter and getting useful information on the screen”
Relevant:	<<describe which system capabilities (OCD 4.3) and perhaps project goals (OCD 4.2) this level of service is relevant to>>, such as “larger delays in order processing (see capability 3 in OCD 4.3) cause user frustration”
Specific:	<<describe what in particular within the system capabilities (OCD 4.3) and perhaps project goals (4.2) this level of service addresses>>, such as “credit card validation (in capability 3 OCD 4.3) may cause significant delay when attempting to connect to the verification service”

Example: L.O.S. Goals

Example OCD 4.4 L.O.S. Goals

1. Simple and easy to use system

The system should be simple and attractive for the users who are searching and accessing the digital archive so that there is ease of access and usability for novice to expert computer users. For example, with regards to navigation there should only be a few steps for the user to get to the search. The main page will have only a brief description, a text entry only search, and a few links to keep the interface simple. The more advanced search will still be limited to 8 search or browse areas. The search results page will be a list of a maximum of 10 items for simplicity and ease of use. Also, 2 to 3 sample users will test the interface to ensure usability. [Organization Goal 2, 7, 8] [bhansali-WINC-6, bhansali-WINC-7, bhansali-WINC-14, bhansali-WINC-15, eballew-WINC-1, eballew-WINC-5]

2. Good Performance

The user desires quick access to the pages and speedy searches. A user only has so much patience, and the system should be usable or it will not be utilized, thereby limiting access. The wait for pages to load should be no longer than 15 seconds, and the search should take no longer than 10 seconds during peak usage times. The number of large graphics will be minimized, and slower modem connections will be used in testing. [Organization Goal 1, 2, 8] [nrm-WINC-7, eballew-WINC-8]

3. Ensure scalability

The archive should allow for increase in the volume of the resources, such as books, manuscripts, pamphlets, videos, etc. There are approximately 50,000 items to be archived. The system should scale from an archive size of 5,000 items to 50,000 items without any visible performance deterioration. The system should also scale from 5 to 100 concurrent users with the same performance. A significant increase in items may require a more powerful DBMS with faster searching and indexing capabilities. [Organization Goal 8] [bhansali-WINC-3, nrm-WINC-5, nrm-WINC-4]

Example: OCD 4.6 Redressal of Current System Shortfalls

Current System Shortfalls	Redressal of Current System Shortfalls
<ul style="list-style-type: none"> • Not Easy to Update 	<ul style="list-style-type: none"> • The info base will require very low maintenance by the client. The client will be allowed to modify the info base by canceling courses, adding courses, changing the times that courses are offered, or changing someone's registration.
<ul style="list-style-type: none"> • Not Easy to Search 	<ul style="list-style-type: none"> • The client will be able to generate various reports from the info base.
<ul style="list-style-type: none"> • Inefficient registration 	<ul style="list-style-type: none"> • The registration process will be automatic, eliminating the need for client intervention and improving upon the sophistication of the current system. Email notification will be sent to the user confirming registration and notification will be sent to the instructor if a course is full or not enough users have registered.
<ul style="list-style-type: none"> • No Authentication 	<ul style="list-style-type: none"> • The proposed system will have authentication both for the interface and for the info base.
<ul style="list-style-type: none"> • No Filtering System 	<ul style="list-style-type: none"> • The system will offer a different set of courses to members of the faculty and to members of the staff and to members of the administration
<ul style="list-style-type: none"> • Interface Appearance 	<ul style="list-style-type: none"> • The interface of the proposed system will follow user friendly guidelines and will have more color and graphics than the current system.
<ul style="list-style-type: none"> • Linkage to a database 	<ul style="list-style-type: none"> • The proposed system will automatically transfer information from the web interface to the info base.
<ul style="list-style-type: none"> • Canceling Registration 	<ul style="list-style-type: none"> • The user will be allowed to cancel registration for a class.

OCD 4.7.1 Stakeholder Operational Impacts

Stakeholder:	The customer - the instructor of the courses at Barnard
Activities Performed:	Her role is to clearly communicate her ideas as to what would make her current or a new system satisfactory to her needs. She must explain why the current system does not work, yet accept a balance between the ideal system and the practical system.
Usage Characteristics:	Our customer will frequently use the system, constantly generating reports and modifying, updating, and maintaining the info base. They are expected to have expertise in the use of the info base.

Stakeholder:	The users - Barnard faculty and staff
Activities Performed:	They will use the interface to register for computer training classes. They must declare what conditions will make the system most useful and more productive than the system currently in use.
Usage Characteristics:	The Barnard Community will frequently use the system to register for courses. They are expected to have no expertise, and their interface should be user-friendly.

Prototyping and the OCD

About the next slides

- Guidelines to describe models of prototypes within your project
 - Purpose of prototypes
 - Scope of prototypes
 - Who will participate
 - Use of tools
 - History and use
 - Results of use

OCD 5.1 Objectives

- Describe the critical issues and risks that the prototype is attempting to resolve and the uncertainties that the prototype is trying to address
- **Common Pitfall:** One common pitfall when prototyping is to fail to describe the prototype from the perspective of the client. In particular, the prototype should be user-oriented, and should avoid abstracting elements. It helps to use realistic sample data in the various prototype screens. E.g., use ‘Scrabble’, ‘Monopoly’, ‘Clue’, as opposed to ‘Item 1’, ‘Item 2’, ‘Item 3’.

OCD 5.2 Approach

- Describe the type of prototypes , the stakeholders who will participate in prototyping efforts, and the development tools used.
- **5.2.1 Scope and Extent**
 - Describe the type of prototypes (mock-up, functional, etc.) built and how they address the objectives stated in OCD 5.1
 - Explain the degree of faithfulness to the proposed system each prototype is expected to have.
 - Describe the extent that each prototype is expected to contribute to the implementation of the proposed system.
- **5.2.2 Participants**
 - Describe any participation on the part of the clients in the prototyping effort: e.g., changes requested after initial evaluation
 - Describe how effective was the prototype in overcoming initial IKIWISI (I'll Know It When I See It) client expectations

OCD 5.2 Approach (Cont.)

- **5.2.3 Tools**

- Describe briefly the tool used to develop the prototype and the reasons for choosing that tool.
- Describe how adequate the tool turned out to be to your needs, or whether you are contemplating using a different tool
Example: "We started by creating a Web based prototype. But we decide to move to Microsoft Access since the system does not require public access and will be used only at the reference librarian desk".

- **5.2.4 Revision History**

- Mention whether this is the first prototype, or a revised one, including changes suggested by client, etc...
- Keep a simple Version Control history for the prototype, independent of the one for the overall OCD

5.3 Initial Results

- For each aspect of the system that you prototyped, describe the:
 - **Current way of performing activity**
Example: "Currently, orders are entered via phone, email, or fax without interactive confirmation of price and availability."
 - **Proposed way of performing activity**
 - Include screen shot of relevant prototype screen
 - Brief explanations on how system will be used as illustrated by prototype screen (You may annotate explanations directly on screen shots)
 - You may propose multiple screens, and indicate which one your client preferred (or maybe hasn't decided yet which one to use).
- **Example:**
 - *Home page*: Client is provided company and new-specials information, and is asked for name, account number, and indication of user type: consumer, corporate, or dealer (see screen image).
 - *Search Page*: Client is offered the option of a single keyword search of all fields, or a more complex search (see screen image).

5.4 Conclusions

- List by order of priority the items that you will be looking into next, during the next round of prototyping
- List the most critical risks that you hope to resolve by doing further prototyping
- **Example:** "Current prototype suffers from navigability problems: we will be looking into improving the usability and the navigability using frames, site maps, etc."