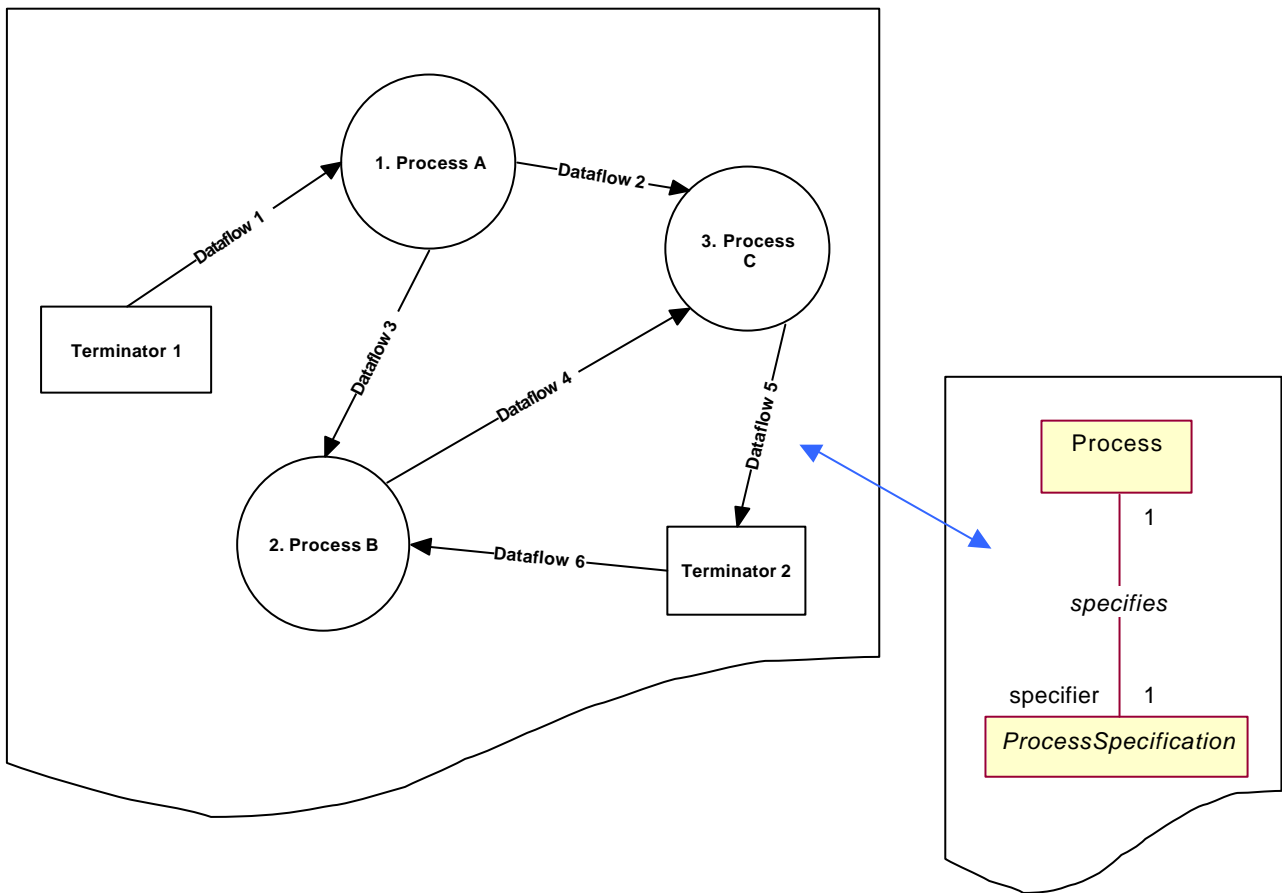


Monash University
School of Computer Science and Software Engineering
CSE3308 Software Engineering: Analysis and Design
Group Analysis and Design Project
Semester 1 2004



**Object-Oriented Analysis and Design of a Structured Analysis
Computer-Aided Software Engineering Tool**

Introduction

The Group Analysis and Design project requires that you form yourselves into groups of four or five students and create a set of Object-Oriented Analysis and Design (OO A&D) documents in UML. You must use the methodologies presented to you in the lectures to prepare the OO A&D documents.

Structured Analysis (SA) emerged during the 1970s and 1980s, and developed into a number of forms. It was the dominant analysis paradigm for software development during the eighties and into the nineties. In 1989, Ed Yourdon published “Modern Structured Analysis”, which introduced a standardised notation for SA. This facilitated the development of Computer-Aided Software Engineering (CASE) tools supporting SA.

Structured Analysis has recently been superseded in popularity by Object-Oriented A&D. Nevertheless, large amounts of existing software, that must still be maintained and/or re-engineered, was developed using SA. Consequently, software engineers today need an understanding of SA.

Assignment Task

Your task is to produce a preliminary Object-Oriented Analysis and Design for a CASE tool to do Structured Analysis, using Yourdon notation. Your reference for the specification of Yourdon notation is to be “Just Enough Structured Analysis” by Ed Yourdon. You should access this by using the link on the Resources page of the unit web site:

<http://www.csse.monash.edu.au/courseware/cse3308/html/resources.html>

For this preliminary OO A&D, only a subset of all possible SA diagrams and documents need be supported. Users of the CASE tool will employ it to analyse systems. For a given system, the CASE tool must allow the user to create:

- A Context Diagram (CD)
- A set of levelled Data Flow Diagrams (DFDs)
- Process Specifications (PSPECs) for the lowest level processes in the DFDs. Your model must support the existence of several kinds of PSPEC (Structured English, Pre- and Post-Conditions and Decision Tables), and be extensible to support other kinds in future.
- An Entity Relationship Diagram (ERD) for the datastores in the model
- A Data Dictionary (DD) for all the dataflows and datastores in the model

A CASE tool is more than a drawing tool. It does not simply allow a user to create diagrams using certain symbols—it understands the rules for using those symbols: which symbols may appear in which diagrams, and what kinds of relationships that they should have. The CASE tool can and should assist users to maintain the completeness, correctness and consistency of their SA diagrams and documents, e.g.:

- Processes in DFDs must have both incoming and outgoing dataflows. If the user’s model contains a process that does not obey this rule, this should be indicated to the user.

- Every dataflow in the DFDs must have a corresponding entry in the DD. When the user creates a dataflow, the tool should assist them to select from the existing DD entries, or to create a new DD entry.
- Levelled DFDs must be balanced—the lower-level DFD corresponding to a process at the level above must have the same incoming and outgoing dataflows as that process.

These are just a few examples. There are many such rules about the necessary relationships between the elements of SA diagrams and documents, and between the diagrams and documents themselves. They are described in the lecture notes, and also in “Just Enough Structured Analysis”. An important part of the assignment work will be reading and understanding these sources so that you understand the necessary relationships between the SA diagrams and documents well enough to model them in your OO A&D.

You will also need to think about the various ways in which a user could interact with the CASE tool to produce and edit their analysis. This will help you to develop your use cases. Experimenting with other tools, such as Rational Rose, may help you to get a feel for this.

If you are unsure about a requirement, and cannot resolve your question through reference to the lecture notes or “Just Enough Structured Analysis”, you should post a question about it on the Feedback Forum on the unit web site.

Timeline

Week 5 – Groups formed and attached Group Information Sheet submitted to the lecturer by the end of the Thursday lecture.

Week 8 (28/4/04) - A progress report detailing what the group has done to this point, the allocation of work or roles (e.g. group leader, quality manager, technical leader, configuration manager, etc.) to group members and any major decisions made by the group. This is a hurdle requirement. Failure to submit this document by the due date will result in a 10% penalty to your mark for the assignment. The submission must include minutes of group meetings and minutes of technical reviews of all work products completed to that date. It is expected that you have (at least) versions of your Use Cases and Class Diagram by this stage, and that they have been through a formal technical review.

Each student must also submit a Peer Assessment Sheet at this stage. This is for feedback only, and will not affect marks (unlike the final one).

Week 12 (24/5/04) - Submission of the completed analysis and design documents through the Third Year assignment box outside the CSSE Office, with completed Group Assignment Cover Sheet (see <http://www.csse.monash.edu.au/subjects/2004/clay1.html>).

Week 12 (24/5/04) - Each student must submit individually a Peer Assessment Sheet through the Third Year assignment boxes outside the CSSE Office.

Allocation of Marks

This assignment is worth 45% of the marks for the subject. All group members will receive the same mark for their assignment, modified by the average evaluation they receive from the other group members. All members of the group will rate the contribution of all other members of the group, and these ratings will modify the mark that each individual receives, but not by more than 20% of the group mark.

If a group is having trouble with an individual member and efforts to resolve the issue have been fruitless, then the group must approach the lecturer to assist in resolving the problem as soon as it arises. A claim that a student did not contribute his or her fair share will not be considered if it is made just prior to the submission of the assignment, or after submission.

The assignment will be marked using the following criteria:

Presentation (3): A professional level of presentation is expected for all documentation. The following are the minimum requirements:

- All documentation should be typed
- All documentation should be adequately bound
- All pages should be numbered
- A Table of Contents should be provided
- All documents must clearly indicate their creator(s)
- Diagrams may be hand-drawn, but is not recommended

Suitability of the Analysis and Design (15): This is measured by how well the analysis and design matches the requirements of the system. Not only must all requirements be covered, but the analysis must model the requirements correctly. Requirements must be consistently supported across all the design documents.

Extensibility of the Analysis and Design (9): This is measured by how easily the analysis and design could be extended to handle relevant new requirements of the system in the future.

Correctness of the Use of the Modeling Technique (15): This is measured by how well your analysis and design follows the standards of the techniques applied (e.g. OO A&D using UML). It is vital that the various components of the OO A&D model correspond to each other, and that all relationships between the model components are correctly and consistently maintained.

Minutes of Formal Technical Reviews (3): You must submit the minutes of the technical reviews you carried out for each of the work products. These will be assessed for completeness and adherence to standards.

Group Work

It is quite common for groups to have significant difficulties working together, in both industry and at university. It is therefore necessary for students to behave in a professional manner while doing this assignment. If your group is having difficulty working together, here is the appropriate method for dealing with it:

1. Approach the person with whom you are having a problem and attempt to solve the problem on a one-to-one basis.
2. Attempt to solve the problem as a group.
3. If there is still a problem, then the group should approach the lecturer and ask him or her to arbitrate. You **must** do this as soon as it becomes apparent that the problem can not be solved by the group. Do **not** leave it until there is a submission deadline to raise the problem with the lecturer.

Extensions

There will be no extensions for this assignment. As there will be a minimum of four students working on the assignment and the assignment is over a period of 2 months, the illness of one student does not justify any extensions.

Submission Requirements:

The following documents must be submitted:

- Expanded Use Cases and Use Case Diagrams
- Class Diagram(s)
- Package Diagram (if necessary due to large number of classes)
- Operation Specifications: a specification should be provided for each non-trivial operation of each class. You may use pseudo-code, or pre- and post-conditions as appropriate. “get” and “set” operations are trivial.
- Interaction Diagrams (either Collaboration or Sequence Diagrams. You choose.)
- State Diagrams for objects with interesting life cycles. An object that is simply created, has a single state, and is then destroyed does not have an interesting life cycles.
- Minutes of Group Meetings and Technical Reviews

Additional Notes on Submission requirements

It is not necessary to implement the system in any fashion.

Design of the user interface is not required. You do not need to provide screen layouts. Nor do you need to design operations or classes to handle user interface details. You may assume that an all-encompassing user interface class exists that is able to send output to the user and obtain input from the user. You are only concerned with the contents of this input and output, not its presentation. Classes corresponding to diagram elements should have an operation such as “drawSelf()”, which is called whenever an object of that class needs to be rendered on the screen. No specification is required for these operations.

Attached Documentation

You will find the following attachments:

- **Group Information Sheet.** This provides a list of the members in your group. This must be completed and handed in by the end of the Thursday lecture of week 3.
- **Peer Assessment Sheet.** Each student must complete this sheet and hand it in independently of the other members of the group. It is used to assess the contribution that each member made to the team.

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Group Information Sheet

Group Name:

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Group Members:

	Name	Student ID	Email	Signature
1				
2				
3				
4				
5				

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Peer Assessment Sheet

Name:

Student ID:

Group Name:

Assessment of group:

For each member of the group, you have five (5) marks to allocate. For example if there were three (3) other students in your group, you would have to allocate 15 (3 x 5) marks between the three of them; if there were four (4) other students in the group, you have 20 (4 x 5) marks to allocate between them.

A mark of 5 indicates that you think that your fellow group member has made a fair and reasonable contribution to the project. Marks greater than 5 indicate the person did more than a fair share of the project, less than 5 indicate that you thought the person did less than their share of the work.

A person's mark will change by *at most* 20% as a result of the average of their peer assessment.

	Name	Marks Allocated
1		
2		
3		
4		

I believe this to be a fair and reasonable assessment of the members of my group.

Signature: _____