

BNCC Information System

System Requirements Specification



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Sasmito Adibowo
Wiratna Sari Wiguna
Yusri

Arcle Technologies
<http://www.arcle.com>

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1 About This Document

This document provides the requirements specification for the initial implementation of your new computerized information system, code-named **Buncis**. It includes the various requirements that you requested, our analysis on the requirements, and the proposed requirements of the new system. Finally, this document outlines the requirements on the personnel required to initiate the implementation, maintain, and continue the redevelopment for the subsequent releases of the system. If you find any discrepancies or misconceptions, please immediately bring them to our attention.

1.1 Project History

BNCC is a Student Activity Unit that operates under the consent of Bina Nusantara University. It is organized as a club that focuses on computer-related interest groups. It maintains an approximately constant sum of 300 – 400 members yearly, which most of the new members among them are first-year undergraduates. Its activities include tutoring, member meetings, annual publications, visitations, contests, seminars, expositions, and research. Its major revenues come from the yearly members' fees and sponsors.

At the core of BNCC lies a committee that organizes all of its activities. The committee is divided categorically into several major divisions, and each led by a Division Chair. Each chair is organized horizontally and answers directly to the General Chair.

The need for an information system was expressed in a meeting conducted by Faran Gunawan, – the former coordinator of Fave Club, now the general chair. Fave Club recognizes that the increasing number activities of BNCC and likewise the number of members involved in it poses a growing load to its core committee. To provide better service for its members, BNCC requires a strong information system to back its daily activities.

The current information system employed by BNCC is primarily a manual system. The uses of computers are limited in the creation and storage of free-form documents and tables. Those documents and tables are created as files by standard office applications – such as word processing, spreadsheet, and file-based database software. There are no provisions to impose structure to those data, which creates difficulties in assessing information from them. This ad-hoc system – although it has been used for a significant amount of time – has impeded the performance of BNCC in servicing and maintaining its members.

Since its first conception, Buncis has received positive attitudes from the organization. Additionally, it has expresses its commitment through the

mandates assigned to both Fave Club and the Organization Development Team divisions in favor of Buncis' development.

The project has now reaches its requirement specifications phase. At this phase, preparation of the personnel needed for its implementation should be initiated. Following this phase is the system design phase, which upon completion of that phase, it is expected that the programmers who will implement the system to be ready.

1.2 Project Scope

The following is a definition on the scope of the project:

- The focus of the project is on core member and activity management functions.
- The final specification and design should result in a system that can be minimally implemented and run, and then incrementally expanded as the need arises.
- Several complex functions such as financial and asset managements that typically present in most ERP systems will be deliberately omitted from the project. The design and implementation of such systems will require an additional problem domain expert and will demand a significant increase of the expertise of the system analyst.

2 Business Requirements

This section describes the general business requirements requested on the Buncis system. These requirements are primarily obtained from an interview at Bina Nusantara Library, Anggrek campus at Saturday, April 20, 2002. The BNCC representatives who attended the meeting were Faran Gunawan and Juliana Anderson.

The business requirements elicitation was done by using the **PIECES** analytical framework (developed by James Wetherbe and refined by Whitten/Bentley). Each letter in the word represents one aspect of the analysis, and those aspects are Performance, Information, Economics, Control, Efficiency, and Service.

2.1 Performance Requirements

The administrative processes will be executed faster because of the presence of various templates that will help the writings of the various documents. The templates requested are primarily for the generation of:

- accountability reports
- financial reports
- proposals
- certificates
- contract documents

2.2 Information and Data Requirements

The system will simplify the creation, input, and reporting of questionnaire data.

The forms for each questionnaire may be printed to be manually distributed. When they have been answered, activists will collect those forms and input the data into the system.

For several types of questionnaires, members may input the data on their own, by using an on-line system. This system will most likely to reside in the secretariate local area network.

The system will provide reporting functions to summarize the questionnaire data. It will be advantageous if the system is also able to summarize free-form text data, using some kinds of linguistic processing approaches. The reporting functions must also be able to provide graphical reports such as bar charts, pie charts, hi-lo charts, etc.

Questionnaire forms must be flexible. The fields and layout may be modified anytime required.

The system will provide functionalities to enable performance tracking for both activists and members. Members' performances are primarily judged from the individual's presence in various activities. While activists' performances are judged through the various assistance that he or she provides to the staff.

The performance reporting functionalities must be able to elicit each individual's *activeness level*, through the calculation of a user-defined formula. The formulas are calculated from the various data available for the individual.

2.3 Economics Requirements

The system will provide tracking of financial data. This data consists of the expenses and income from each division. The data also includes the member's payments. It is desirable for the system to provide forecasting functionalities for the various expenses based on history data about past expenses.

Inventory-controls functionalities are also required. The functionalities are to be used to control the items in stock and stationary. Included in the inventory is the stock of the magazine, so that magazines that are still in stock and the members who received the magazines may be controlled.

2.4 Control Requirements

The system should enforce security by providing enforced access to data. Users with higher access levels are able to access more data than the users at the lower levels.

2.4.1 Level 0: System Administrator

Users in this level are given complete unrestricted access to all data.

2.4.2 Level 1: Division heads

Users in this level may create documentation templates (reports, letters, questionnaires, proposals, accountability reports, etc.). Additionally, these users may read the complete financial reports.

2.4.3 Level 2: Executive Committee

Users in this level may create events, such as seminars, workshops, etc. They also may create documentations (including reports, questionnaires, etc), input judgments for activists (including view all of the judgements), input the members' data, and input/modify the list of companies and organizations.

2.4.4 Level 3: Activists

The users in this level may view various data about members, events, seminars, reports, proposals, etc. Basically, all data may be viewed except the financial reports.

2.4.5 Level 4: Regular members and the outside world

Users on this level may only view summaries of the various reports.

2.5 Efficiency Requirements

The input and processing of attendance data will be more efficient. The system will also provide off-line (batch disconnected) data entry and access functionalities.

The automatization of the various business processes will reduce the need of data re-entries, and information may be communicated more accurately.

There will be no member that doubly receives a magazine.

2.6 Service Requirements

The information system will enable the organization to be more transparent about its various operations. Additionally, the system will enhance the organization's image.

Data recoverability will be ranked to the following order: members, financials, attendance, documentations, and inventory.

3 Proposed Data Models

This section describes our proposal of the models of data will be incorporated in the system. The focus of the models is on essential data items, which most of their attributes are not yet defined. This will allow to visualize the essence of the models, without prematurely defining their attributes.

3.1 People Types

The following is a model of the data about people that the system will manage. The notion of people is explicitly separated from *system users*. This is because in the future, the system is expected to accommodate users that are *not* people. Examples of such users are information systems from other organizations connected through electronic data exchange (EDI) mechanisms.

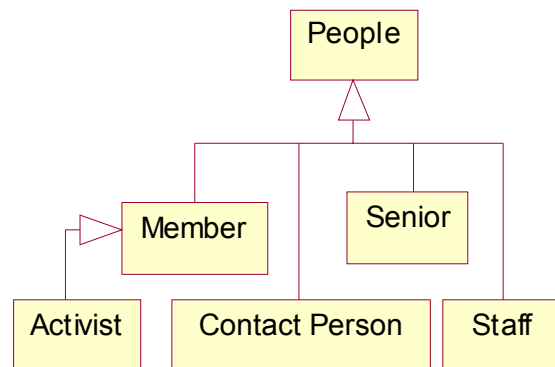


Figure 1 People Types data model

The system will record data about people that are either a member, a senior, staff, or a contact-person from other organizations. An activist is a special case of a member.

3.2 Document Types

This section describes a data model of the documents that the system will manage.

From the system's point of view, there are two general types of documents: structured and unstructured. For structured documents, the system will provide functions to input, manage and assess information about them. Whereas for unstructured documents, the system will simply store them as binary data.

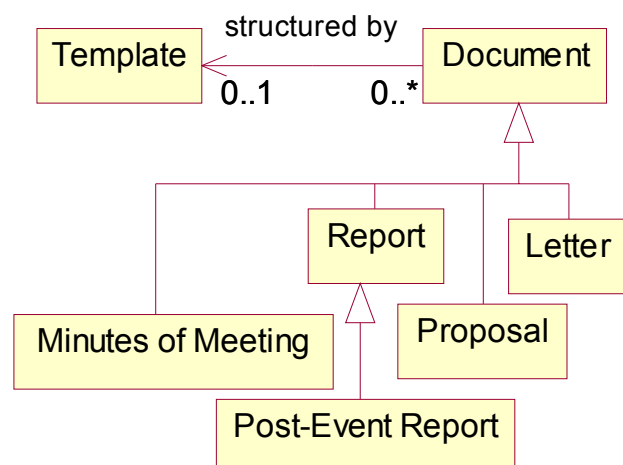


Figure 2 Document Types data model

Each structured document is associated with one template. The template defines the

document's structure. This implies that templates which still “own” documents may not be altered or deleted while there are still documents that rely on them.

Each document – structured or unstructured – is categorized into several disjoint types. Those types are:

- Minutes of Meeting – documents the execution of a meeting.
- Report – all types of formal reports.
- Post-event reports – reports written to document an event after it occurred.
- Proposals – documents that express requests or suggestions, especially to other organizations.
- Letters – general correspondence to other organizations.

3.3 Inventory Types

This section describes the types of inventory that the system will manage. Inventory management will be limited to the core data storage/retrieval functions. More advanced functions on inventory data such as value estimation and depreciation will be omitted from the initial development of the system.

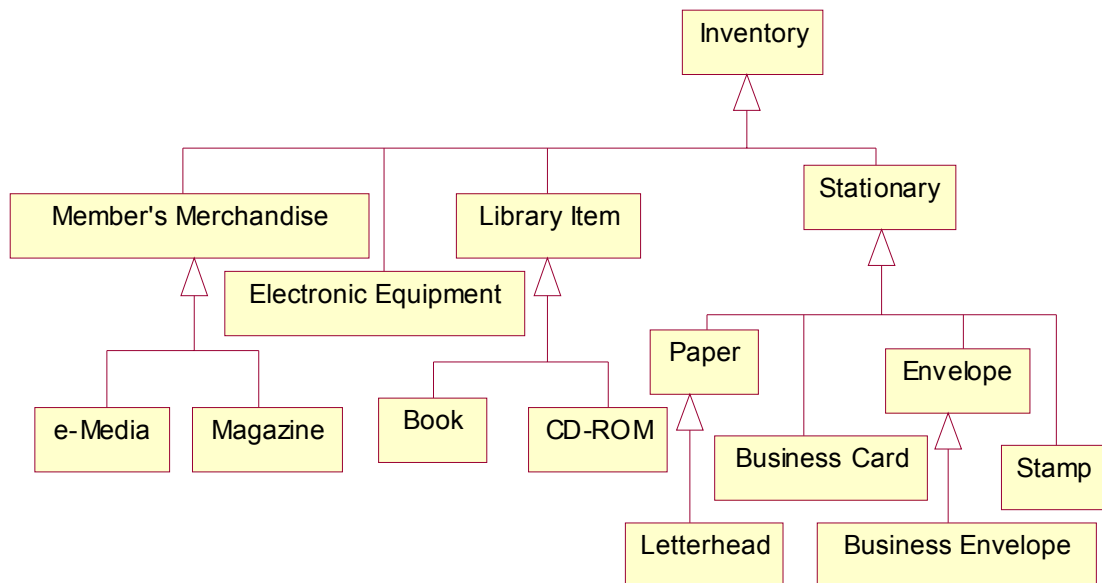


Figure 3 Inventory Types data model

A physical object may be defined as an inventory if it can be categorized as either *Member's Merchandise*, *Electronic Equipment*, *Library Item*, or *Stationary*, exclusively. The system will only store inventory data about BNCC-owned items. Those items that are no longer owned must either be removed from the inventory data or marked as deleted.

Members' merchandises are items that will be given to members. Currently, those items consist of copies of magazines and CD-ROMs.

Library items are items in the secretariate that may be lent by the members or staff. Currently, these items include books and CD-ROMs.

Stationary are consumable materials needed for administrative tasks. They include paper (mostly cut-sheet blanks), letterheads, business cards, envelope, business envelopes (special preprinted envelopes), and stamp.

3.4 Event Organizer

This section describes data about the events that the system will help manage.

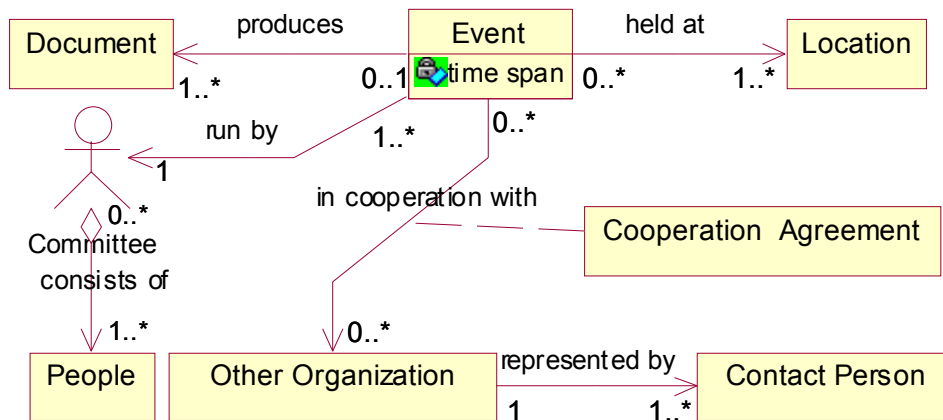


Figure 4 Event Organizer data model

Each *event* is run by a *committee* responsible for that event. These committees consist of one or more *people*. The event may produce one or more *documents* written by the committee members. A particular event may be held in one or several *locations* at a certain *time span*.

Other organizations may cooperate in the execution of an event. The means of cooperation is defined by a *cooperation agreement* – a kind of contract that specifies the roles of the organization in the event. One or more *contact persons* represent the organization as a whole.

3.5 Public Relations

This section describes data that will be managed by system users involved in public relations.

The public relations division manages the relationship of BNCC to other organizations. During the

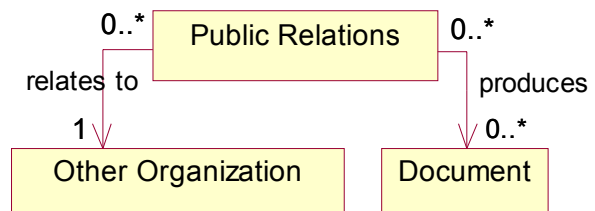
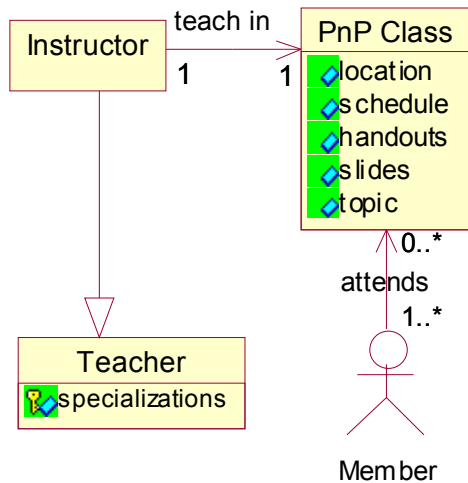


Figure 5 Public Relations data model

relation, it may produce documents such as proposals, memos, or other correspondence letters.

3.6 Educational Services

This section describes a model of data in relation to BNCC’s educational services – especially PnP classes.



An *instructor* teaches in a *class*; for each class there may be only one instructor that is teaching it. Each class has a *location*, a *schedule*, and a *topic*. Optionally, the instructor may release *handouts* or *slides* (inclusively) about the materials that he or she is teaching in the class. Classes are attended by *members* who enroll in that class.

Every instructor is a *teacher* who is currently instructing in a class. Teachers that currently do not own any class may not be categorized as instructors. Optionally, these non-instructing teachers may be highly-skilled people who train the instructors instead. Every teacher has one or more *specializations*, a list of the special skills that he or she possesses.

Figure 6 Educational Services data model

3.7 Financial Services

This section describes financial-related data that will be managed by the system. Note that for the initial development of Buncis, the financial-management functionalities will be kept simple – it only accommodates the cash-in, cash-out paradigm. Only after the initial release of the system, complete financial-management functionalities may be implemented.

There are two kinds of data that the system manages. One is the *expense* data, and the other is the *income* data. The meanings of the attributes for both types of data are similar; They differ only in their names. The attributes are:

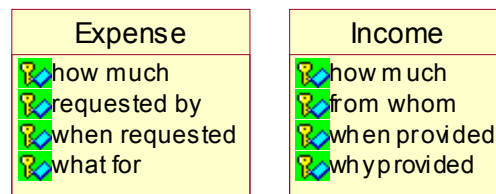


Figure 7 Financial Services data model

- how much – The amount of money spent/received.
- requested by / from whom – the name of the person or organization who requests/provide the money.
- when requested / when provided – the date and time of the request/grant.

- what for / why provided – the reason so that the money was requested/granted.

3.8 Internet Services

This section describes the data about Internet-related services that the system will manage.

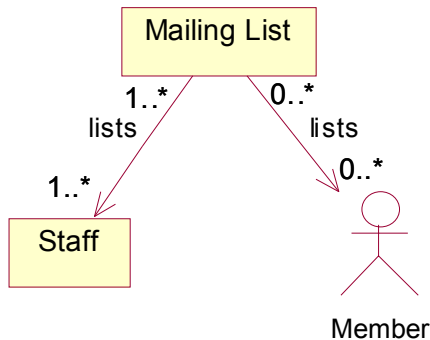


Figure 8 Internet Services data model

The Internet-management portion of Bun-cis will primarily revolve around the mailing list. The staff may create one or more *mailing lists*. For each list, there must be at least one staff enlisted, whom they are in charge of moderating it. One or more *members* may be enlisted in the mailing list, but that is not required; there may be staff-only mailing lists.

3.9 Administrative Services

This section describes the administrative data that will be managed by the system. These data include *questionnaire*, *member*

payment, and *activist judgements*.

Conforming to the specification in section 3.2, a questionnaire is a type of document structured by a template. Templates that structure questionnaire documents are a special case, thus the system provides additional functionalities for them.

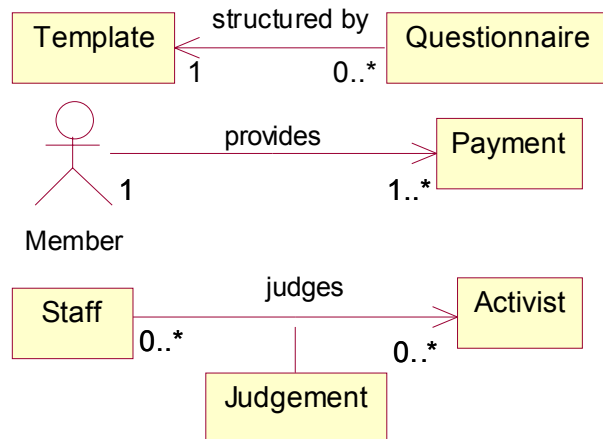


Figure 9 Administrative Services data model

The *members* provide *payment* to the administrative services division. This payment is recorded for further reference, especially to validate the member's access to the services offered by the organization, such as the request of magazines.

Each *staff* may optionally judge one or more *activist*. The activists may be judged by one or more staff, or may not be judged at all. These *judgement* records are kept for performance appraisal data. The system will not impose any limitation about who can judge whom – no explicit staff-activist relation will be kept.

3.10 Library

This section describes the data model about the local library within the scope of the system.

Each *library item* may optionally be owned by a person (*people*), in which case that person lends the item to the library. When an item is not owned, ownership is assumed to be at the BNCC Library. Conforming to the specification in section 3.3, library items consist of *books* and *CD-ROMs*.

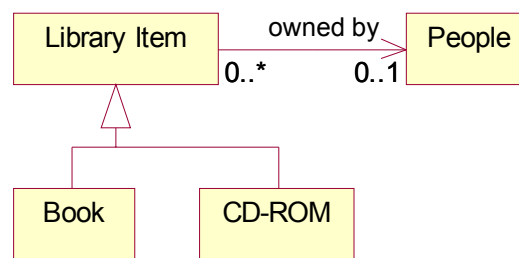


Figure 10 Library data model

3.11 User Roles

This section describes the roles of the users from the system’s point of view. Each user role defines the access rights and available functionalities to that user. These rights and functionalities will be described in section 5. As defined in section 3.1, users need not to be people.

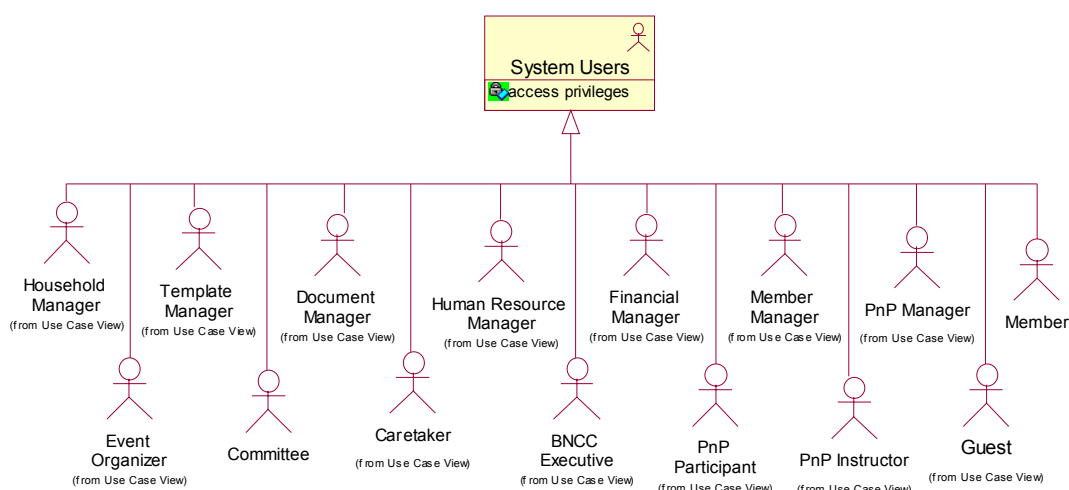


Figure 11 User Roles data model

4 System Interfaces

This section outlines the system’s interfaces to the outside world. The interfaces are described in terms of data that the system receives, and the information it provides.

4.1 System Inputs

- Documents – the system will store various documents for later retrieval. Documents may optionally be related to a template.

- Member profiles – The system will store the profile of each member, such as name, address, etc.
- Member payment
- Activist judgements – the judgements are made by the staff.
- Attendance reports – especially for PnP and FA sessions.
- Inventory status – the system will keep track of the inventory such as magazines, CDs, library items, stationaries, etc.
- Financial data – primarily the organization’s incomes and expenses.
- PnP class data – participants, handouts, slides, instructors, and gurus.
- Other organization’s data – the system shall record data about corporations and organizations that met BNCC.
- Mailing lists – the participants of the list and moderators of each list.
- Numbering schemes – the number format for correspondence letters.

4.2 System Outputs

- A member list
- Top 10 most active activists
- Member composition charts – demographical pie charts, especially by major.
- Free-form graphs – displays graphs about the number of members per year, member-count history, and the average number of members.
- Certificates – printed certificates for seminar participants.
- List of organizations – accompanied by their roles in each event (as sponsor, spokesperson providers, etc) along with their contact persons.
- Inventory status reports
- Questionnaire summary reports
- Members’ performance graphs – the graphs are devised from custom (user-defined) formulas, through the calculation of various factors of the member, such as attendance.
- Attendance reports and summaries, especially for PnP and FA sessions.
- Member payments report.
- Magazine and CD distribution reports.
- PnP class data – along with printable handouts and slides.

5 Functional Requirements

This section describes the various functionalities that we propose to be incorporated in the system. Some of these functionalities may differ from what you originally requested. The reason for the differences is either to resolve conflicting requirements, or because we feel that what we propose may better suit your needs.

5.1 Member Management

This section describes the functionalities required to manage BNCC's members and the users which may access those functions.

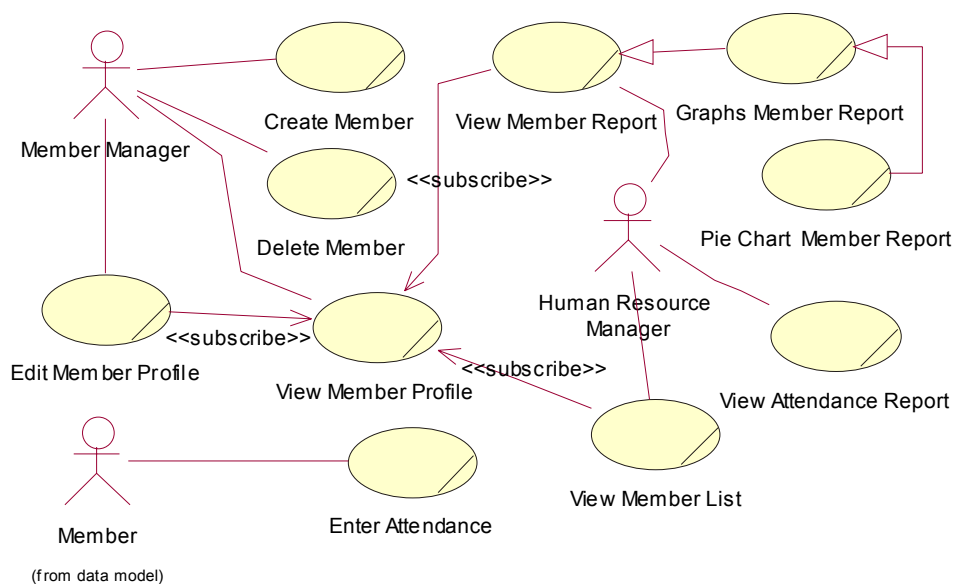


Figure 12 Member Management use cases

A *Member Manager* may create member data, edit the member's profile (name, address, etc), and delete the member's data. Additionally, he or she may view the member profile. The *edit member profile* functionality uses the *view member profile* to display the profile before editing.

A *Human Resource Manager* may view the list of members, view the attendance report, and view/generate various reports extracted from the member data. The reports may be raw lists, graphs, or pie charts. The view member list functionality uses the view member profile functionality to display the detailed profile of each member. The view member report also uses the view profile functionality to generate the reports.

Occasionally, a *member* may enter his or her own *attendance* in a session. These occasions are most likely special occasions, where the member is

given (restricted) on-line access to the Buncis system. The attendance data is collected to *generate reports* for the Human Resource Manager(s).

5.2 Document Management

This section describes the document-management functionalities of Buncis. As defined in section 3.2, templates are used to structure documents. Non-templated documents are stored by the system as unstructured binary data.

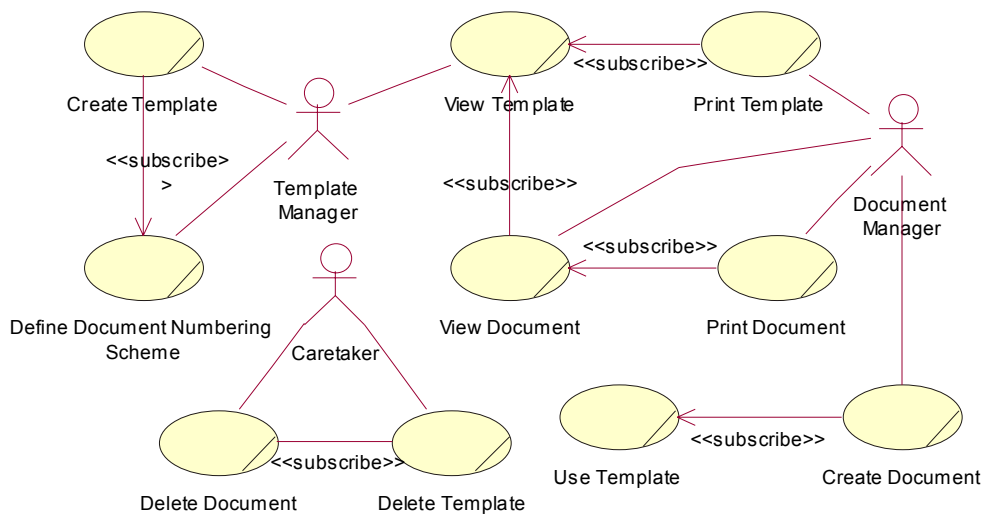


Figure 13 Document Management use cases

A *Template Manager* may create and view templates. As a part of the template-creation process, the manager may define a numbering scheme for documents that will use the template. Because documents may rely on the template, once created, a template may not be modified.

A *Document Manager* may create documents, view documents, or print the documents. The creation of structured documents requires the use of templates structuring the document.

The *Caretaker* may delete the documents and/or templates to save disk space. The removal of a template requires the removal of all documents that depend on it.

5.3 Event Organizer

This section describes the functionalities in relation to event-organizing activities.

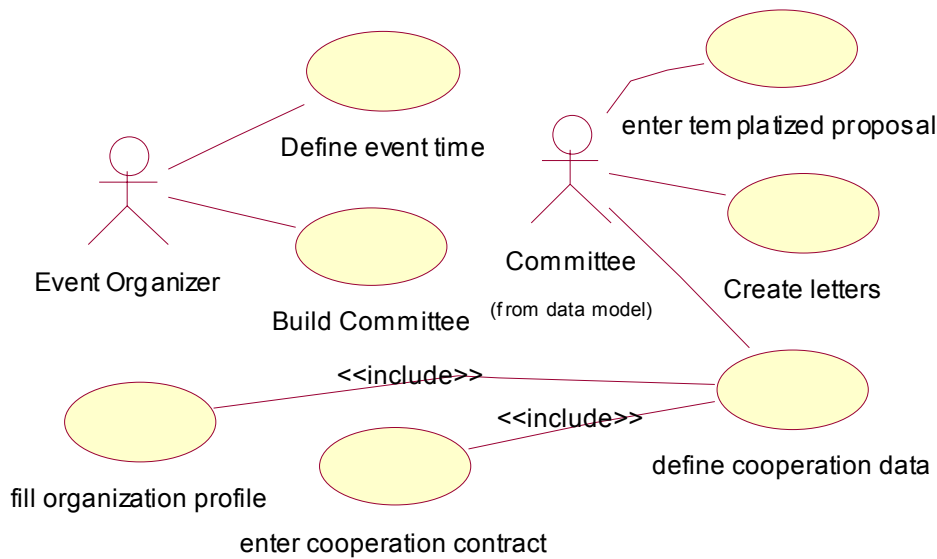


Figure 14 Event Organizer use cases

An *Event Organizer* may build a *committee* that will be responsible for the execution of the event; he or she selects the people that will become members of the committee. Each committee will last only for the duration of the event, including overhead times (preparation and cleanup). This implies that the organizer must define the *time* of the event.

A committee may enter one or more *proposals*. These proposals are structured documents that rely on a specific group of templates. They are *proposal templates*. Additionally, they may create correspondence letters about the event.

When external organizations cooperate in the execution of the event, the event committee is responsible for interfacing with that organization. The committee enters the *cooperation data* into the system. These cooperation data also include the *organization's profile* and the *contract of cooperation*.

5.4 Educational Services

This section describes the functionalities provided for PnP classes.

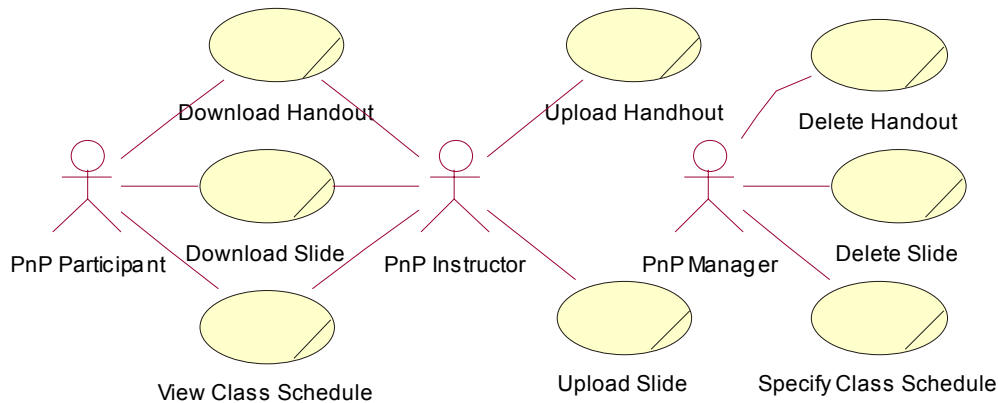


Figure 15 Educational Services use cases

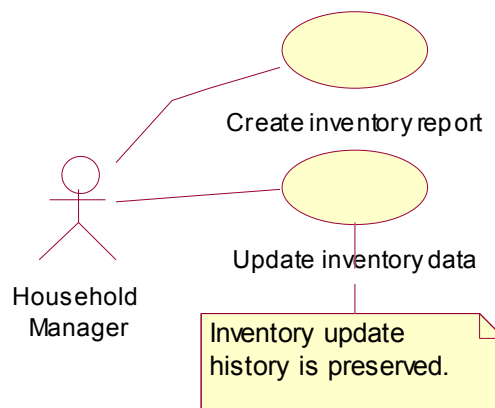
A *PnP Instructor* may upload handouts or slides related to the materials he or she is currently teaching. These materials may be downloaded by the *PnP Participants*, or may be re-downloaded by the instructor. Only the *PnP Manager* may delete these handouts and slides.

Both the instructors and the participants may view the PnP schedule. The schedule is set by the manager.

5.5 Inventory Management

This section describes inventory management functionalities provided by the system.

For the initial release, the inventory-management functionalities are kept simple. The *Household Manager* keeps tracks about the inventory and notifies the system of any changes. The system records history data about each inventory updates, which will be used to generate the inventory reports.



5.6 Financial Services

This section describes the financial functionalities provided by the system. For the initial release of the system, it only accommodates the cash-in cash-out paradigm. More comprehensive functionalities may be provided in subsequent releases of Buncis.

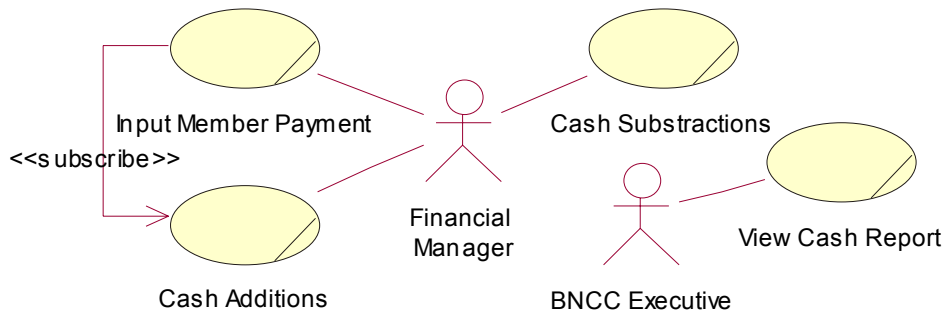


Figure 17 Financial Services use cases

The *Financial Manager* may perform *cash subtractions* and *cash additions*. Cash subtractions are done upon fund requests by various divisions of BNCC. Cash additions are done when there is income to BNCC. Additionally, the manager also inputs *member payment* data – a special case of income.

At any time, the BNCC Executive may view the current financial status, and *generate reports* from the financial data.

5.7 Miscellaneous

This section describes miscellaneous functionalities that do not fit the previous categories.

Buncis accommodates a type of user known as Guest. This user represents the general public, which are granted restricted anonymous access. Guests may view the various summaries provided by Buncis. These summaries serve to provide information to the general public about the status of BNCC.

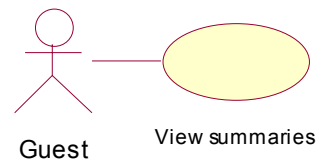


Figure 18 Miscellaneous use cases

5.8 System Access Matrix

This section depicts the access matrix of the system. Each column specifies the user role eligible for access, while each row specifies the entity for which the user is granted access. The user roles specified are taken from section 3.11.

At the cells which a user role and an entity intersect lies the access flags for the corresponding (role, entity) pair. The flags consist of {C, R, U, D} values. The meanings of each flag are as follows:

- C – create the entity, or add an entry to the entity.

- R – read access to the entity, for reports this means generate the report.
- U – update/modify access to the entity, this flag is not valid for reports.
- D – delete/remove the entity, this flag is not valid for reports.

6 Conclusion

This section concludes our requirements statement of the Buncis system. Following this phase will be the design phase, in which we will translate these requirements into system design and architecture specifications.

At this point, we can estimate the requirements imposed on the personnel that will perform the implementation and continue the redevelopment of Buncis. These estimations are obtained from our understanding on our perceptions of the system's design.

Generally, the personnel may be classified into two categories: programmers and analysts. The programmers will work directly with the Buncis' source code, while the analysts will work with both the programmers and the system's users. This implies that programmers will need to possess strong technical skills, and the analyst will need to focus on the conceptual skills. Both types will need to prove strong analytical skills.

It is visible in this and previous documents that we mixed the use of structured and object-oriented analysis, emphasizing on the latter. Recognizing this, the programmers and analysts involved in Buncis will need to use the same paradigm and speak the same language, which are object-oriented and the Unified Modeling Language (UML).

6.1 Programmer Requirements

These are the skills and concepts required from the programmer:

- Java Programming
- Web Programming
- Database Programming and SQL
- XML Parsers and Tools

6.2 Analyst Requirements

These are the concepts that will need to be mastered by the system analysts to continue redevelopment of Buncis:

- Database Design
- Design Patterns
- XML Concepts