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Budget / Account system

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BUDGET/ACCOUNT SYSTEM

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A report on the specification, design and implementation of the Budget/Account system
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I would like to express my deepest gratitude to my supervisor Prof. Juris Reinfelds, Chairman of the Department of Computing Science at the University of Wollongong. Throughout the project he has been giving me advice and encouragement which are of great value to the successful completion of this project. I also wish to thank Dr. Dromey for his comments and suggestions about the structured method employed in this project. I would like to thank specially Dr. N. Gray for directing me to discuss this project with Prof. Reinfelds. Finally, I wish to thank Ms. Josephine Batty for polishing my accounting principles.
"The Budget/Account System" is a project in the Computing Science Honours Seminar. This project is a partial fulfillment of the Honours Master of Science in the Department of Computing at the University of Wollongong. The accounting package here is designed and implemented for the Department of Computing Science. A new method of system specification and design is also employed in this project. It is the structured method suggested by T. DeMarco, E. Yourdon and L. Constantine. Hopefully, this structured method can help to produce a more precise specification for the system than the traditional method and therefore lead to better designs and implementations which can meet users' requirements.
Introduction

Traditionally system analysis and system specifications are relying mainly on the creativity and intuition of the analyst(s) involved. The functional specifications produced are characterised by the use of huge volume of English narrative text. Demarco suggested the use of English narrative text in specifying computer systems as "inefficient" and "inappropriate". This method of system analysis and specification makes partitioning of the system difficult. The ability to partition the system at this early stage of system development is vital to the successful partitioning of the system at the later stages.

An alternative way has been developed for system specifications and design. (Demarco, Yourdon and Constantine) It is suggested that this structured method can help the analyst(s) to have an early and precise partitioning of the system. This method helps the analyst to understand the system and to communicate his/her understanding to the system user.

This structured method is applied in the specification and the design of the Budget/Account System. In this document there will not be a lengthy discussion, as we traditionally do, about the functions and design of the Budget/Account System. Rather they are specified in the form
of structured specifications in Volume III of this document.
Structured Specifications

Structured specifications is a form of system specifications which is different from the traditional one. In structured specifications, diagrams are used wherever appropriate. It is not a single specification. Rather it is a network of partitioned and small process specifications. It is not presented in a linear manner. It is presented in a hierarchical manner. It goes from the abstract level to the bottom detail level. A structured specification is made up of three components. They are the Data Flow Diagram, Data Dictionary and Process Specifications.

[2.1]

Data Flow Diagram

It is a network representation of a system. It presents the system in terms of its component processes. All the interfaces among these processes are declared. It starts with the abstract upper level and proceeds to the more detail lower level diagrams. As we go from the abstract level to the detail level the system is partitioned.

Different levels of data flow diagrams must also be balanced. It means that the interface data of a process at the upper level must equal to total data interfaces of its
sub-processes at the lower level.

[2.2]

Data Dictionary

It is a collection of the definitions of the interfaces declared on the Data Flow Diagrams. The Data Flow Diagrams declare the interfaces between processes. All these interfaces must be defined in the Data Dictionary.

[2.3]

Process Specifications

There should be one process specification for each of the processes on the bottom level Data Flow Diagrams. It describes the functions of the process. It should be restricted to describe "what" the process does but not how the "what" is to be achieved. The process specifications can be written in a number of ways. They are the Structured English, Decision Table and even narrative English.

[2.3.1]

Structured English

It is a specification language that makes use of limited vocabulary and a limited syntax. The Vocabulary of it
should consist of a) imperative English verb, b) terms defined in the Data Dictionary, c) certain reserved words for logic formulation. The syntax of its statement should be limited to the following, a) simple declarative sentence, b) closed-end decision construct, c) closed-end repetition construct.

[2.3.2]

Decision Table.

Decision tables are best for defining complicated policies formulation. As there are lots of book on decision tables, we shall not include the discussion of decision tables in this document.

[2.3.3]

Narrative English

If the processes are carefully partitioned and all the inter-processes interfaces are declared and defined then the readability of narrative specifications are greatly improved. But still it is not recommended to write narrative specifications as better ways are available.
HOW STRUCTURED SPECIFICATION IS APPLIED TO THE DEVELOPMENT OF THE BUDGET/ACCOUNT SYSTEM

The actual structured specifications are included in volume III of this document. The following paragraphs is a discussion of how they are created and used. The structured specifications of the Budget/Account system are divided into two levels. They are the functional specifications and the design specifications.

[3.1]
The Functional Specifications

The functional specifications define the functions of the Budget/Account System. It consists of a set of leveled Data Flow diagrams, a functional specification dictionary and a set of process specifications for each of the processes on the bottom level of the Data Flow Diagrams.

[3.2]
The Design Specifications

The design specifications define the algorithms to achieve the functions defined by the functional specifications. It consists on a set of leveled structure charts, a
design specification dictionary and a set of module specifications. Each module in the design specifications corresponds to an actual program module during implementation. The structure charts serve to describe the hierarchical relations between the modules. The data interfaces between modules are also declared on the charts. The data dictionary serves to define these interfaces. The module specifications are the descriptions of the actual algorithms of each of the modules. It should be noted that the module specifications should be as programming language independent as possible. As a result the whole specification up to this point is still independent of the implementation language.
A Field Oriented Editor

A field oriented editor has been specially designed and implemented for the BudgetAccount System. It is designed in such a way that it is independent of the application system that it serves. This editor can be separated from the current system and used in some other application systems.

[4.1]

Aim

The Budget/Account system requires several data entry screens. One possible way is to have the screen handling algorithms embedded in the several modules which accepts input from screen. Another way is to have a process serve as a front-end processor so that the other processes can be relieved from the screen handling algorithms. The latter solution is chosen for this system. A field oriented editor is designed in place of the front-end processor. Every process which requires a full screen data input can simply call on the editor by supplying a data structure which describes the screen layout. The editor will handle all the necessary processing and return the necessary data to the caller.
The Screen Data Structure

The input to the editor is a data structure called "screen". It is a structure in the language "C". The format of "screen" is as follow:

```c
struct screen {
    int fldcnt; /* number of fields on the screen */
    struct fldstruct field[MAX_FLD]; /* the fields */
}

struct fldstruct {
    int fldnamy;
    int fldnamx;
    char *fldname;
    int atr;
    int fldy;
    int fldx;
    int fldlng;
    int fldendptr;
    char *fld;
}
```

The "screen" consists on a count of number of fields on the current screen and an array of another structure "fldstruct". The structure "fldstruct" describes a field. The character pointer "fldname" points to the title of the field that is to be displayed on the screen. "fldnamy" and "fldnamx" are the x and y coordinates of this title. The integer "atr" describes the attribute of the data field. It tells the editor that whether the expected input to this field is numeric, or alphabetic etc. The editor will perform some checking of the input character so that invalid character can be rejected immediately. "fldx" and "fldy" are the x
and y coordinates of the actual data field. The character pointer "fld" points to the buffer in which the input data is to be stored. The above information already describe the layout of the screen and the characteristics of each field. We have not yet discussed the integer "fldendptr". It is up to discussion that whether this field worth its existence. It points to the end of the data string. It is there to save the trouble of calling the system routine "strlen" to find out the end of the data string. It may be a save of time since it is quite often that the editor needs to know the end of the data string.

[4.3]

Defining a Screen

The above data structure describes the general framework of a screen. The actual layout of a particular screen can then be defined as the following:
The definition of the Account Screen

```c
struct screen nwacscrn = {
    8, /* no of field */
    0,27, "[ADD NEW ACCOUNT]", HDRFLD, 0,0,0,0,0,
    2,0,"main account number : ",
        MANDFLD, 2,22, MNACLNG, 0, &(nwacbuf[0]), /* main ac no. */
    4,0,"sub account number : ",
        0,4,22, SUBACLNG, 0, &(nwacbuf[10]), /* sub-ac no. */
    6,0,"account category : (a=assets, b=budget, c=commitment, e=equity)",
        ACCATFLD+MANDFLD, 6,22,1,0, &(nwacbuf[30]),
    7,0,"account name : ",
        HDRFLD, 0,0,0,0,0,
    8,0,"account name : ",
        MANDFLD, 8,22, ACNMLNG, 0, &(nwacbuf[40]),
    10,0,"normal balance : (c=credit, d=debit)",
        ACTYPFLD+MANDFLD, 10,22,1,0, &(nwacbuf[80]),
    12,0,"account alias : ",
        0,12,22,80,0, &(nwacbuf[100]), /* ac alias */
};
```

This provides a fast and convenient way to define or change the layout of a screen. The screen handling algorithms are independent of the actual screen layout. They only assume a general structure. To change the physical screen layout simply means to change the actual definition of the screen. No modifications of any algorithms are need.

[4.4]

Possible Enhancement

One of the possible criticism of such a mechanism may be on the procedure to define the actual layout of the screen. The position of each parameter is important. One possible solution to alleviate this trouble is to have a
screen definition processor. The screen designer can simply make up the actual layout of a screen in a file or even on the actual screen. The screen definition processor is then invoked to process the screen layout made up by the designer and produces the corresponding data structures. This may be justified if large number of screens are to be defined.
VOLUME II

Budget/Account System
User manual
References


Introduction

The Budget/Account System (BAS) is designed for the Department of Computer Science of the University of Wollongong. It is an interactive system which enables the user to get the most up-to-date information of the accounting system. All input to the BAS are done through the terminal under the administration of a user-friendly mechanism, a field oriented editor. Under this mechanism user can formulate the input at his/her own pace and at the same time under the guidance of the system.

It has been decided that the BAS has to be able to reconcile with the accounting system of the University Administration. Therefore the BAS does possess some unique features which may not be provided by other commercially available accounting package.
The BAS is basically a general ledger posting system. The accounting principle at work in it is the simple "double-entry system". (Hermanson, p63) This system of accounting "requires that the debits must equal the credits in every entry to record a transaction". (Hermanson, p63)

In other words, a transaction is consisting of two or more journal entries. The total amount debited must balance the total amount credited by these journal entries. In order to make use of this concept of transaction, the journal entries of the BAS are not separately posted, but are posted in terms of transactions. The journal entries of a transaction will only be posted when the total debits equal total credit.

Since the Department of Computing Science is not a separate accounting body and therefore it is important that the BAS must be able to reflect the same accounting picture as that provided by the University Administration. In order to achieve this, the structure of accounts and journal posting practice are designed to be as similar to that of the University Administration as possible.

[2.1]

Account Category
The usual account categories are used in the BAS, namely the assets, expenses, liability, equity, revenue (or income). Besides these, two not so common categories are introduced in the BAS as they are used by the University Administration. They are the "commitment" and "budget".

The "budget" account, though called differently, is in fact viewed as the equity account in the BAS. That is to say the annual budget is viewed as an investment and therefore the equity of the Department. Further budget adjustment can then be treated as increase or decrease of the equity.

The meaning of "commitment" account may be different from the usual accounting context. It is treated differently in order to comply with the system of the University Administration. "A commitment occurs when approval is given to place an order or enter into a contract for provision of goods and services." (University accounting document, p23)

In order that we can distinguish the commitment from the actual reception of services or goods, we treat the commitment as a form of pre-paid services. For a commitment transaction, the corresponding journal entries should therefore be posted to the commitment account as an increase in pre-paid services, (i.e. debit) and the liability account as an increase in liability (i.e. credit).

Another problem occurs when the actual amount paid is different from that of the commitment. In order to save the trouble of readjusting the journal entries, the following
practice is assumed, When the actual goods or services are paid, a transaction should be posted in order to reverse the earlier posted commitment transaction. The amount of this reversal transaction should be of the same value of the commitment transaction, but not the actual amount paid. This reversal transaction should credit the corresponding commitment account (i.e. decrement the pre-paid goods or services) and debit the liability account (i.e. decrement the liability). This serves to indicate that the commitment is no longer a form of pre-paid goods or services. The BAS provides a special function to enter this reversal transaction. The user needs to specify the corresponding document and the reversal entries will automatically be posted. User can then proceed to post the transaction for the actual reception of the goods or services in the usual manner.

[2.2]  
The Accounting Equation  

In usual accounting practice, the balance sheet "is made of three essential elements - assets, liabilities, and owner's equity". (Hermanson, p16) The relation of this three elements is called the "accounting equation". The basic accounting equation is:

\[
\text{Assets} + \text{Expenses} = \text{Liabilities} + \text{Owner's Equity} + \text{Income}
\]

This equation must always be in balance.
This equation also applies in the BAS, but with some slight modifications. With the introduction of the "commitment" and "budget" account, the accounting equation in BAS is:

\[
\text{Assets + Expense + Commitment} = \text{Liabilities + Budget + Income}
\]

This accounting equation is applied when preparing the balance sheet of the BAS.
Account Structures

The accounts in the BAS are assumed to consist of main accounts and sub-accounts. The purpose of a main account is to group together a number of related accounts, so that these related accounts are treated as the sub-accounts of it. However the BAS imposes no limitation on the user to design the account structures in this manner. User can still treat each account as a separate main account without any sub-account. This structure of main account and sub-account is recommended as it is similar to that of the University Administration.

A recommended account structure is the use of main account and sub-account. The classification of main account can be the classification of ledgers of the University Administration. While the sub-account can then be the cost centre of the University Administration. Keeping the account structures in line with that of the University Administration facilitates the posting procedure of the Department from the statements provided by the University Administration. However, it should be noted that, the BAS imposes no restrictions on such account structures.

Each account under the BAS is identified by a unique account number. It is a string of maximum 19 characters. The structure of the account number is as follows:
Assumptions on Account Structures

It has been decided with the Department that the number of accounts should be limited in the sense that we do not introduce new account when it is not absolutely necessary. This limitation reduces the chances of error posting and facilitates control.

Budget and Commitment Accounts

For each assets and expenses account, there should be a corresponding commitment account if commitment will be made against the account. If there is a budget for an assets or expenses account then a budget account should be created for it. The creation of the commitment and budget account can automatically be created by the BAS as instructed by the user.
Cash and Payable Accounts

In order to reduce the chances of error posting and limit the number of accounts, the BAS assumes that there is only one cash account and one payable account for the Department. They will automatically be created during the installation of the BAS. They have predefined account numbers. The account number of the "System Cash Account" is "900a" and that of the "System Payable Account" is "9011". User may add alias ( see section 5.2 ).
Transaction Posting

The usual meaning of "debit" and "credit" also applies in the BAS. A summary of their meanings to different accounts is as follows:

<table>
<thead>
<tr>
<th>assets account or commitment account or expenses account</th>
</tr>
</thead>
<tbody>
<tr>
<td>debit</td>
</tr>
<tr>
<td>increase</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>liabilities accounts or budget or equity accounts or income accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>debit</td>
</tr>
<tr>
<td>decrease</td>
</tr>
</tbody>
</table>
We try to illustrate the posting of transaction by an example. Assume that we have the following transactions:

1. annual budget = $500,000-
2. terminal purchase = $1,000-
3. commitment of plotter = $2,000-
4. actual payment for plotter = $1,500-
5. budget adjustment (increase') = $20,000-

The transactions are posted to the appropriate account as shown by the number.

<table>
<thead>
<tr>
<th>computer equipment (assets)</th>
<th>commitment of computer equipment (commitment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dr</td>
<td>cr</td>
</tr>
<tr>
<td>(2) 1,000</td>
<td></td>
</tr>
<tr>
<td>(4) 1,500</td>
<td></td>
</tr>
<tr>
<td>(3) 2,000</td>
<td>(4) 2,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>budget of computer equipment (budget)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dr</td>
</tr>
<tr>
<td>(1) 500,000</td>
</tr>
<tr>
<td>(5) 20,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>system cash account (assets)</th>
<th>system payable account (liabilities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dr</td>
<td>cr</td>
</tr>
<tr>
<td>(1) 500,000</td>
<td>(2) 1,000</td>
</tr>
<tr>
<td>(5) 20,000</td>
<td>(4) 2,000</td>
</tr>
<tr>
<td>(3) 2,000</td>
<td>(3) 2,000</td>
</tr>
</tbody>
</table>
Entering the BAS

The BAS can be invoked by typing "BAS" and hit RETURN.

User will then be presented with a main menu as follow:

--------------------------------------------------------------------
| University of Wollongong                                    |
| Department of Computing Science                             |
| Budget/Account System                                       |
| main menu                                                   |
| 0) exit                                                      |
| Account Commands                                           |
| 1) add new account                                          |
| 2) add account alias                                        |
| Journal Commands                                           |
| 3) post transaction                                        |
| 4) reverse commitment                                      |
| Report Commands                                            |
| 5) balance sheet                                            |
| 6) account report                                           |
| 7) supplier report                                          |
| 8) summary report                                           |
| 9) detail report                                            |
| 10) keyword trace report                                    |
| 11) budget balance                                          |
| Supplier Commands                                          |
| 12) add supplier                                            |
| 13) update supplier                                         |
| 14) delete supplier                                         |
| please enter function :                                    |
--------------------------------------------------------------------

To select the appropriate "Command" or function, the user

can type in the correct number and hit RETURN.
Account Commands

When presented with the main menu, user can type in "1" to add new account or "2" to add account alias. The BAS will then display an account screen as follow:

<table>
<thead>
<tr>
<th>[title]</th>
</tr>
</thead>
<tbody>
<tr>
<td>main account number :</td>
</tr>
<tr>
<td>sub-account number :</td>
</tr>
<tr>
<td>account category : (a=assets,b=budget,c=commitment,e=equity, i=income,l=liability,x=expenses)</td>
</tr>
<tr>
<td>account name :</td>
</tr>
<tr>
<td>normal balance : ( c=credit, d=debit )</td>
</tr>
<tr>
<td>account alias :</td>
</tr>
</tbody>
</table>

Fig. 5.1

The "title" of the screen will either be "ADD NEW ACCOUNT" or "UPDATE ACCOUNT", depending on the command selected by the user.

[5.1]

Add New Account

Besides being presented with the screen in Fig. 5.1, the user will then be informed to "enter data or type ctrl-d to terminate" by a line of message at the bottom of the screen. The user can then proceed to enter information about
the new account. For the procedure entering data on the
screen, please refer to section 9 of this appendix. After
all the data have been entered, user can type "control d" to
terminate the data entry session. The BAS will then proceed
to validate the data of the new account. If any error is
detected, the BAS will display the appropriate error mes­
sages. User can then correct the error and the new account
will be added.

[5.2]

Add Account Alias

The BAS is designed such that the accounts can be
selected by the account number, name or abbreviations or any
other alias as decided by the user. The account alias is the
group of words the user choose to identify the account. The
account alias need not be unique. When selecting account by
alias the user will be presented with all the accounts which
contain the alias and the user can then select the correct
one. This add account alias command is for the user to put
in additional alias to the account. The same screen in Fig
5.1 will be displayed and the user can follow the data
entry procedure to add in account alias.
Journal Commands

The "journal commands" are selected when the user type in "3" or "4" in the main menu.

[6.1]

Post Transaction

If the user selects "3" in the main menu then the following transaction posting menu will be displayed.

```
0) exit
1) add journal entry
2) update journal entry ( current transaction )
3) list journal entry ( current transaction )
4) delete current transaction
5) file transaction
```

```
enter selection :
```

Fig. 6.1

Functions can then be selected by typing in the corresponding number and hit RETURN. All the functions on this menu are concerned with the journal entries of the current tran-
saction. These journal entries are stored in a transaction file and will only be posted to the journal file when instructed by the user.
Add Journal Entry

User will firstly be asked to select the account the journal entry is to be posted. The message "please enter account identification" will be displayed at the bottom of the screen. User can then select the account by entering an identification of the account. Please refer to section 9 of this appendix for procedure to select an account. After the account is selected a journal screen (Fig. 6.2) will be displayed with date, account number and name present. Information of this journal entry can be entered by the normal data entry procedure. After one journal entry is added, user will then be asked to select another account to which the current transaction should be posted. The posting of other journal entries of a transaction is made easy as the information of the previous entry is retained on the screen. User can simply select the account and instruct the BAS to add the entry to the transaction file if no changes is needed.

The date field of the journal entry will contain the current date. It is the date of the posting of the entry and can not be altered by the user. The keyword field is any additional words that the user wants to put it to identify the journal entry in order that it can be included in later keyword trace report.
As for the journal type, i.e. whether the entry is a debit entry or credit entry, the BAS assumes that the first entry is the credit entry, and a character 'c' will be displayed in the journal type field. However user can change it to debit if it is in fact a debit entry. The BAS will then assumes that the next entry will be the corresponding offset entry by filling in the journal type field for the user.

To quit from this journal posting session, user can simply hit RETURN without typing in any other key when asked to select an account. Then the user will go back to the transaction posting menu.

---

[POST JOURNAL]

date : 841116
account number : 999a
account name : departmental cash account

amount : [ ] cr/dr : ( c=credit,d=debit )
document number :
voucher number :
requisition number :
purchase order number :
supplier code :
description :
keywords :

Fig. 6.2
6.1.2

Update Journal Entry

This function enables the user to change the information on the journal entries currently stored in the transaction file. Each journal entry will be displayed and the user will be asked whether he/she wants to update the entry. User can choose to update the entry, go to next entry if there is any, or quit to the transaction posting menu. These selection can be made by typing in 'y', 'n' or 'q' when a journal entry is displayed and the message "update this entry <y/n/q>" is displayed at the bottom of the screen.

6.1.3

List Journal Entry

User can simply inspect all the journal entries in the transaction file by selecting this function. Each journal entry will then be displayed. The message "hit RETURN to continue or 'q' to quit" will be displayed at the bottom of the screen. User can go on to the next journal entry by simply hitting RETURN or go back to the menu by type in 'q' and hit RETURN. This function will not alter any information of the journal entries.
Delete Current Transaction

This function should be used with care as it will erase all the journal entries in the transaction file. After this function is selected, the message "delete all entries of current transaction <y/n>" will be displayed. If the user responds by typing in 'y' and hit RETURN then all journal entries in the transaction file will be erased and user can proceed to start a new transaction. If 'n' is responded by the user, then the BAS will perform no action and return to the transaction posting menu.

File Current Transaction

After all journal entries related to the current transaction have been posted, user can select this function to post the current transaction to the journal file. Before the actual posting to the journal file, the BAS will check if the total amount debited balances the total amount credited by this transaction. If they are not equal then an error message will be displayed. The user will be informed of which amount is greater than the other amount. The transaction will be unchanged and the user can proceed to correct the journal entries by the update function or even choose to delete the transaction. If the balances are correct then the
transaction will be posted to the journal file and the trans-
saction file will be cleaned. User will then be presented
with the transaction posting menu so that he/she can go on
to post other transactions.

[6.1.6]

Exit from Transaction Posting Menu

This function enable the user to return to the main
menu of the BAS. Before return to the main menu the BAS
will check if the transaction file still contains any
unposted transaction. If transaction still exits in the
transaction file, the BAS will ask the user whether the
transaction should be posted or simply discarded before
exit. If the transaction is to be posted, the normal pro-
cedure and checking will be performed by BAS for posting the
transaction. After the transaction is posted, the BAS will
return to the main menu. User will be informed of any error
in the transaction as if the function file current tran-
saction is selected. If the user instructs the BAS not to file
the transaction before exit, then the transaction file will
be erased before the BAS return to the main menu.
Reverse Commitment

This function enables the user to reverse earlier commitment. User will be asked to enter the requisition number of the commitment made. If commitment entry is found, the journal entry will be displayed. The BAS will then ask the user to confirm the reversal of the commitment. The BAS will also check if the reversal has already been made so the no double reversal can be made. The reversal entries will then be automatically created and posted to offset the corresponding commitment account and the department payable account.
Report Commands

These commands enable the user to select the various reports provided by the BAS. Basically the user will be presented with the report request screen as in Fig. 7.1 so that he/she can specify the parameters for generating reports. Before the user can go ahead to enter these parameters to the request screen, he/she may be asked to select the appropriate account if the reports concern a specific account. This is the normal account selection procedure.

```
[REPORT REQUEST]
report type :
start date : ( ymmdd or blank for start of accounting period )
end date : ( ymmdd or blank for current date )
account number :
( blank for all accounts )
account name :
supplier id :
( blank for all suppliers )
keyword :
destination : ( p=printer ; t=terminal )
```

Fig. 7.1

The report type field will contain the name of report as selected by the user in the main menu. The start and end date, if specified, should be in the format of year-month-day with two digit in each sub-field. The account number
and name fields will be that of the account selected by the user. The BAS will assist the user to select the account in the normal account selection procedure. The supplier id field should contain the appropriate supplier code or blank for all suppliers. The user can specify whether the report is to be displayed to the terminal or sent to the printer by putting in 't' or 'p' in the destination field. The default destination is the terminal. It is obvious that not all the fields on the screen in Fig. 7.1 is relevant to the report, e.g. the keyword field is irrelevant to the balance sheet. The information needed for each type of report will be discussed in the following section. However the user need not remember them or even need not refer to this manual when generating reports. It is because all irrelevant field will be protected by the BAS in such a way that the user can not enter data onto these fields.

[7.1]

Balance Sheet

Start date and end date can specified for the balance sheet so the the balance sheet reflects the accounting situation of the specified period. Please refer to Fig. 7.2 for format of the balance sheet.

[7.2]

Account Report
For this report only the account number and name are needed. If all accounts are to be reported then these fields can be simply left blank. If a certain account is selected, the BAS will automatically include all the sub-accounts and the corresponding budget and commitment accounts. This report gives the static information of an account. Please refer to Fig. 7.3 for the format of the account report.

[7.3]

Supplier Report

Obviously only the supplier id is needed for this report. In order to generate report of all suppliers the supplier id field can simply be left blank. Please refer to Fig. 7.4 for the format of this report.

[7.4]

Summary Report

This report gives the total amount debited and credited to the account. It also gives the net balance of the account. If the account selected contains sub-account then the balances of its sub-account will also be included. In this case the balances of this account will include that of its sub-account. If corresponding budget or commitment accounts are present they will also be included. The start and end date
can also specified in order to restrict the balances to a
refer
certain period of time. Please to Fig. 7.5 for the format of
this report.

[7.5]

Detail Report

This report gives a list of the journal entries that
has been posted to an account. Again the corresponding
budget and commitment account and all its sub-account will
also be included in the report. Start date and end date can
also be specified. Please refer to Fig. 7.6 for the format
of this report.

[7.6]

Keyword Trace Report

This report gives a list of journal entries that con-
tains a certain keyword specified by the user. Start date
and end date can be specified to restrict the search for
journal entries. Please refer to Fig. 7.7 for the format of
this report.

[7.7]

Budget Balance
This report provides the information of the amount budgeted, the amount already spent and the net balance of a certain account. Please refer to Fig. 7.8 for the format of this report.
Fig. 7.2 Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>500000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>2000.00</td>
</tr>
<tr>
<td>Expenses</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Assets + Commitment + Expenses</strong></td>
<td><strong>502000.00</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equity</th>
<th>500000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liability</td>
<td>2000.00</td>
</tr>
<tr>
<td>Income</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Equity + Liability + Income</strong></td>
<td><strong>502000.00</strong></td>
</tr>
</tbody>
</table>
Fig. 7.3 Account Report

Main account number : 200
Sub-account number : 201
Account category : a
Account name : equipment computer
Normal balance : c
Account alias : computer
Fig. 7.4 Supplier Report

| Supplier code | apple |
| Supplier name | apple computers |
| Description   | selling apples |
| Address       | sydney |
| Phone         | 6055853 |
Fig. 7.5 Summary Report

<table>
<thead>
<tr>
<th>account number</th>
<th>account name</th>
<th>debit</th>
<th>credit</th>
<th>balance</th>
<th>balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>260b201</td>
<td>budget account</td>
<td>0.00</td>
<td>500000.00</td>
<td>2000.00</td>
<td>0.00</td>
</tr>
<tr>
<td>200c201</td>
<td>commitment account</td>
<td></td>
<td></td>
<td>2000.00</td>
<td>0.00</td>
</tr>
<tr>
<td>200a201</td>
<td>equipment computer</td>
<td></td>
<td></td>
<td>1100.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

THE UNIVERSITY OF WOLLONGONG  
DEPARTMENT OF COMPUTING SCIENCE  
ACCOUNT SUMMARY REPORT  
840101 - 841231  
page 1  
841125
**Account Detail Report**

<table>
<thead>
<tr>
<th>Account Name</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Computer</td>
<td>1000.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Printer Paper</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

---

**Vou Nr**: 9876

**Total**: 1100.00

**Balance**: 1100.00
Fig. 7.17 Keyword Trace Report

<table>
<thead>
<tr>
<th>Date</th>
<th>Account Number</th>
<th>Account Name</th>
<th>Description</th>
<th>Date</th>
<th>Account Number</th>
<th>Account Name</th>
<th>Description</th>
<th>Req Nr</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>841124</td>
<td>200c201</td>
<td>Commitment account</td>
<td>Plotter commitment</td>
<td>841124</td>
<td>9981</td>
<td>Department Payable</td>
<td>Plotter commitment</td>
<td>12345</td>
<td>2000.00</td>
<td>2000.00</td>
</tr>
</tbody>
</table>

Total: 2000.00 2000.00
# Fig. 7.8 Budget Balance

<table>
<thead>
<tr>
<th>Account Number</th>
<th>Account Name</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>200b201</td>
<td>budget account</td>
<td>3100.00</td>
<td>500000.00</td>
</tr>
</tbody>
</table>

**Balance:** 496900.00
Supplier Commands

These commands enable the user to manipulate records in the supplier file. User can choose to add new supplier, delete supplier and update supplier record. Each supplier in the supplier file is identified by a unique supplier code of maximum 5 characters. The supplier code is assigned by the user during the addition of a new supplier. Other information of the supplier stored in the supplier is the actual name, address, description and phone number.

Add New Supplier

This function enable the user to add the record of a new supplier to the BAS. The User will be presented with a screen as in Fig 8.1. Data can then be entered following the normal data entry procedure. After all the data are entered, the BAS will check to see if the supplier code assigned by the user is already present in the supplier file. If it is found, the BAS will inform the user to change it.
Delete Supplier

User will firstly be asked to specify the supplier code of the supplier that he/she wants to delete. If the supplier code is found in the supplier file then the information of the supplier will be displayed to the user. The BAS will then ask user to confirm the deletion of the supplier. If the BAS is instructed to delete the supplier, then the supplier record will be removed from the supplier. Otherwise the BAS will do nothing to the supplier file.
Update Supplier

This function enables the user to change the information about a supplier that is already in the supplier file. User will be asked to specify the supplier code. The information of the supplier will then be displayed as the screen in Fig. 8.1. User can then proceed to change the information that is displayed on the screen. It should be noted that the supplier code cannot be modified by this update function. If the supplier code has to be changed, the way to do it is to delete the supplier and add in a new record of the supplier using desired supplier code.
Account Selection Procedure

The BAS provides a convenient way for user to select an account wherever an active references an account. Through this there is no need to remember or to find out the actual account number or name in order to tell the BAS which account is to be referenced.

Whenever an account is referenced, for example posting of a transaction or generating of a report, the BAS will firstly ask for the identification of an account. This identification can be the account number, name or any other identification that the user had assigned to identify an account. Recall that there is a field called the "Account alias" when an account is created. It is where the user can put in additional information to identify the account. When selecting the account the identification supplied by the user need not be the whole word that had been assigned. Rather, it can be part of the identification. All the account that contain similar identification will be collected by the BAS and be displayed to the user one at a time. The BAS will then ask the user to select the correct account. The information of an account will be displayed as the screen shown in Fig. 5.1. The message "is this the correct account <y/n/q>" will also be displayed at the bottom of the screen. If the account shown is the correct one, user can simply type in 'y' and hit RETURN. Otherwise, user can type in 'n' and hit RETURN, then the BAS will display
the information of the next account that matched the identification. If the user do not want to select an account with
the identification that he/she has just specified, he/she can type in 'q' and hit RETURN. The BAS will then ask the
user to supply a new piece of identification to select an account. In order to terminate this session with the BAS
to select an account, user can simply hit RETURN when asked to enter an identification. In this case the BAS will return
to the previous menu or screen.
Data Entry Procedure

The BAS is designed such that the procedure of entering data is the same throughout the system. In general there are two situations in which user is required to enter data to the BAS. The first case is to supply instructions to the BAS, such as selecting functions, selecting accounts. The second case is to enter the actual data to the BAS, such as entering a new journal entry, or a new account.

Instructing the BAS

The BAS will ask user to supply instructional data. This is done through a communication message line at the bottom part of the screen. The maximum number of characters to be entered will be shown by a pair of square brackets as follows:

please enter account identification [ ]

User can then proceed to type in the characters. After all necessary data are typed, user can simply hit RETURN to inform the BAS that the data are ready.
Actual Data Input

In this case user is usually presented with a full screen. The screen is consisting of several fields. The cursor will initially be positioned at the first field. A pair of square brackets will be displayed around the area in which the data for the field is to be entered. This pair of brackets also serve to indicate the maximum length of the field. The input of data to these fields are not necessary in the physical order of the fields. User can go freely from one field to the next or to the previous. Hitting the TAB or the RETURN key will position the cursor to the start of the next field, while hitting the 'upward arrow' will position the cursor to the start of the previous field. The 'left arrow' and the 'right arrow' keys will move the cursor one position to the left or to the right respectively with a field. When the end of the field is reached, the cursor will automatically be moved to the start of next field. When the cursor is moved past the start of a field by the 'left arrow' it will be moved to the start of the previous field.

When all the data are entered, the user can inform the BAS by holding the 'control' key (ctrl) down and hit letter 'd' (ctrl-d). The BAS will then ask the user whether he/she thinks that the data is correctly entered or not with the following message:
"is the data correct <y/n/other key to continue edit> [ ]"
Both letters 'y' and 'n' signify the end of this data entry session with the BAS. The letter 'y' indicates to the BAS that the data is correct and it can proceed to process it. The letter 'n' means that the user does not want the BAS to proceed to process the data but rather to ignore the data entered on the screen and return to the previous screen. User may discover that some more changes is needed after the key ctrl-d is pressed, then he/she can respond with any character, other than 'y' or 'n', in order to continue the data entry session.
VOLUME III

Budget/Account System
Structured Specifications
Errata

The following pages have been deleted from this volume:

p.31 - p.33
p.87 - p.88
p.92
p.100
The Budget/Account System Development Menu

One of the purposes of the use of structured specifications is to produce a form of system specification that is maintainable. System documentation which is difficult to maintain is destined to be a failure. Such documentation is useless once there is any change or enhancement to the system. Such documentation can no longer reflect the current state of the system. Therefore in order to have a maintainable system it is also important that the related documentation can easily be maintained. A development menu has been developed for maintaining the documentation of the Budget/Account System. The following sections will be a discussion of this menu and some guidelines for its user.

[1.1]

Design of the Development Menu

The programs in this menu are all shell scripts. They are written in the early stages of the development of the Budget/Account System. It is decided not to spend too much time on the development of this menu as it serves only to provide a convenient method to access the documentation. But obviously it is not the only way to gain access to the documentation. Therefore it has to be stressed that these
scripts are by no means good scripts. They are written to serve the basic functions. If this menu is to be used intensively or used for some other applications, then further modifications should be made. For example, the field oriented editor, which is developed in the later stage of the Budget/Account System, may be used to implement the updating of data item in the dictionary. Other modifications may be necessary to improve the response time of this menu.
Some User guidelines

In order to gain access to the documentation of the Budget/Account, user can use the command /cs/900/9csc/411/aids/menu after the normal sign-on procedure on system B. A menu is then presented as follows:

```
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BUDGET SYSTEM DEVELOPMENT MENU</td>
<td>请进入功能：</td>
</tr>
<tr>
<td>0 - EXIT</td>
<td></td>
</tr>
<tr>
<td>1 - VIEW DICTIONARY</td>
<td></td>
</tr>
<tr>
<td>2 - EDIT DICTIONARY</td>
<td></td>
</tr>
<tr>
<td>3 - SORT DICTIONARY</td>
<td></td>
</tr>
<tr>
<td>4 - PRINT DICTIONARY</td>
<td></td>
</tr>
<tr>
<td>5 - EDIT DESIGN SPECIFICATION</td>
<td></td>
</tr>
<tr>
<td>6 - FORMAT DESIGN SPECIFICATION</td>
<td></td>
</tr>
<tr>
<td>7 - EDIT FUNCTIONAL SPECIFICATION</td>
<td></td>
</tr>
<tr>
<td>8 - FORMAT FUNCTIONAL SPECIFICATION</td>
<td></td>
</tr>
<tr>
<td>9 - PRINT DESIGN SPECIFICATION</td>
<td></td>
</tr>
<tr>
<td>10 - PRINT FUNCTIONAL SPECIFICATION</td>
<td></td>
</tr>
</tbody>
</table>
```

Items on the menu can then be selected by typing the corresponding number and then press the key 'return'. When working within any selected functions, one can always return to the main menu by typing in nothing but just the return key. Functions of each item are as follows:

(0) EXIT - exit from the menu.
(1) **VIEW DICTIONARY** - read data word from a certain data dictionary. After item "1" is selected user is then asked to enter the name of the data dictionary. A default data dictionary name is provided and if the default name is the one desired, just press the key "return". After selecting the dictionary "word=" will be displayed to solicit the desired data name. If the data name is found in the dictionary its comment and definition will be displayed, otherwise a not found message will be displayed. Press "return" key to return to main menu.

(2) **EDIT DICTIONARY** - add, delete or update data word in dictionary. Dictionary selection is same in "1". The screen based editor is used to implement this updating process. After date name is entered the screen based editor is invoked for the user to edit a file with the following content:

```
WORD = data name entered by user
COMMENT = comment of the data if the data already exists otherwise
DEFINITION = definition of the data if it already exists otherwise
```

Comment and definition of the data can then be entered in the usual way of an editor except that care should be taken as not to change the heading "WORD =", "COMMENT =" and "DEFINITION =". After all information are
entered type ctrl "d" and answer "y" when prompted to
exit the editor. User will then be prompted for the
following option: fi, fd, om. Type "fi" to file the
changes and "om" to omit the changes. "fd" is for
deleting the data name from the dictionary.

The following conventions are adopted in the
definition of the items in the data dictionary.

a) \( a = n \{ b \}^m \)

The pairs braces stands for the iterations of the
item "b". If the number "n" and "m" are present then
it means that there are at least "n" occurances of "b"
and at most "m" occurances of "b".

b) \( d = [ a / b / c / \ldots ] \)

This pair of square bracket serves to include the
possible alternative of the content of an item "d".
That is to say the possible content may be "a" or "b"
or "c" or others.

c) \( a = b + c \)

This means that the item a is made up of two other
items b and c.

d) \( a = b + ( c ) \)

It indicates that the item c is optional. It may
or may not be present in a.
(3) SORT DICTIONARY - sort data names in dictionary according to alphabetical order. Dictionary selection as above.

(4) PRINT DICTIONARY - print the whole dictionary to printer. Dictionary selection as above.

(5) EDIT DESIGN SPECIFICATION - update or add module description for design specification. The screen based editor is used to enter the description. The constructs used in the modules should be limited to the following:

if condition
then statements
else statements
fi

or

repeat until condition
statements
endrepeat

or

for ...
statements
endfor
or

select case ...

case 1: ...

    statements

.
.

case n: ...

    statements

endcase

or

while condition

    statements

endwhile

or

begin

    statements

end

It is not necessary to indent in order to show the above construct when enter the module description because function is available to format the module (see FORMAT below).
(6) FORMAT DESIGN SPECIFICATION - format the module so that the control structures are clearly shown with indentation. Data names used in the module will also be looked up in the design specification dictionary. If it is present in the dictionary it will be converted to upper case otherwise remain lower case. Thus after formatting a module, if a data name becomes upper case then it is defined in the dictionary.

(7) EDIT FUNCTIONAL SPECIFICATION - same as [5] except that it works on functional specifications.


(9) PRINT DESIGN SPECIFICATION - print a design specification module to printer.

(10) PRINT FUNCTIONAL SPECIFICATION - print a functional specification module to printer.
Data Flow Diagrams

This section is a collection of the data flow diagrams of the Budget/Account System. It starts with Diagram 0 which is the overview of the system. Each process of Diagram 0 is further divided into sub-processes. These sub-processes are depicted on separate data flow diagrams labeled as Diagram 2, Diagram 3 etc. The convention used in labeling the data flow diagrams is that Diagram n describes the sub-processes of process n.

As mentioned above that each process is partitioned into sub-processes. These sub-processes are then further partitioned into sub-processes. The criteria of the partitioning is that the bottom level sub-processes are small enough such that the process specifications are reasonably small, e.g. can be described in a single page.
DIAGRAM 2

2.1 ADD NEW SUPPLIER
   ADD SUPPLIER-INFO
   ADD SUPPLIER-SEL

2.2 DELETE SUPPLIER
   DELETE SUPPLIER-INFO
   DELETE SUPPLIER-SEL

2.3 UPDATE SUPPLIER
   UPDATE SUPPLIER-INFO
   UPDATE SUPPLIER-SEL

SUPPLIER RECORD
SUPPLIER RECORD
SUPPLIER RECORD

SUPPLIER FILE
Diagram 3 (Part 1)
Diagram 5
Diagram 5.1
The Functional Specifications

In this section the functions of each of the bottom level processes of the data flow diagrams are specified. There is one module for each of these processes.
MODULE NAME : 1
DESCRIPTION : accept user selection

Procedure :
display MAIN-MENU
get MAIN-MENU-SELECTION
if valid MAIN-MENU-SELECTION
    then pass on to corresponding process
    else reject selection
fi
MODULE NAME : 2.1
DESCRIPTION : add new supplier

Procedure :
display ADD-SUPPLIER-SCREEN
get NEW-SUPPLIER-INFO
if SUPPLIER-CODE already exists on SUPPLIER-FILE
   then reject NEW-SUPPLIER-INFO
   else make up SUPPLIER-RECORD from NEW-SUPPLIER-INFO
      write SUPPLIER-RECORD to SUPPLIER-FILE
fi
MODULE NAME : 2.2
DESCRIPTION : delete supplier

Procedure :
get DELETE-SUPPLIER-INFO
if SUPPLIER-CODE does not exist on SUPPLIER-FILE
then reject DELETE-SUPPLIER-INFO
else get corresponding SUPPLIER-RECORD from SUPPLIER-FILE
display DELETE-SUPPLIER-SCREEN
ask user to confirm the deletion
if positive confirmation
then delete the SUPPLIER-RECORD from SUPPLIER-FILE
fi
fi
MODULE NAME : 2.3
DESCRIPTION : update supplier

Procedure :
get SUPPLIER-CODE from user
if SUPPLIER-CODE does not exist on SUPPLIER-FI LE
then reject SUPPLIER-CODE
else
get corresponding SUPPLIER-RECORD from SUPPLIER-F I LE
display UPDATE-SUPPLIER-SCREEN
get UPDATE-SUPPLIER-INFO
make up SUPPLIER-RECORD from UPDATE-SUPPLIER-INFO
rewrite SUPPLIER-RECORD to SUPPLIER-FI LE
fi
MODULE NAME: 3.1
DESCRIPTION: generate balance sheet

Procedure:
display REPORT-SCREEN
get BAL-SHEET-INFO from user
for all JOURNAL-RECORD which within the start date and end-date
   select case according to AC-CATEGORY of ACCOUNT-NUMBER of JOURNAL-RECORD
   case 1: assets-ac
      if JOURNAL-TYPE = debit
         then add JOURNAL-AMOUNT to ASSETS-TOTAL
         else subtract JOURNAL-AMOUNT from ASSETS-TOTAL
      fi
   case 2: budget-ac
      if JOURNAL-TYPE = debit
         then subtract JOURNAL-AMOUNT from EQUITY-TOTAL
         else add JOURNAL-AMOUNT to EQUITY-TOTAL
      fi
   case 3: commitment-ac
      if JOURNAL-TYPE = debit
         then add JOURNAL-AMOUNT to COMMITMENT-TOTAL
         else subtract JOURNAL-AMOUNT from COMMITMENT-TOTAL
      fi
   case 4: expense-ac
      if JOURNAL-TYPE = debit
         then add JOURNAL-AMOUNT to EXPENSE-TOTAL
         else subtract JOURNAL-AMOUNT from EXPENSE-TOTAL
      fi
   case 5: liability-ac
      if JOURNAL-TYPE = debit
         then subtract JOURNAL-AMOUNT from LIABILITY-TOTAL
         else add JOURNAL-AMOUNT to LIABILITY-TOTAL
      fi
   case 6: income-ac
      if JOURNAL-TYPE = debit
         then subtract JOURNAL-AMOUNT from INCOME-TOTAL
         else add JOURNAL-AMOUNT to INCOME-TOTAL
      fi
   endcase
BAL-SHEET-DR-TOTAL = ASSETS-TOTAL + COMMITMENT-TOTAL + EXPENSE-TOTAL
BAL-SHEET-CR-TOTAL = LIABILITY-TOTAL + EQUITY-TOTAL + INCOME-TOTAL
display BALANCE-SHEET
MODULE NAME : 3.2
DESCRIPTION : generating account report

Procedure :
1. get AC-ID from user
2. if AC-ID = all
   then goto step 5
   fi
3. get all ACCOUNT-RECORD which match the AC-ID
4. for each of the ACCOUNT-RECORD got
   4.1 make up DISPLAY-AC-SCREEN
   4.2 display the DISPLAY-AC-SCREEN
   4.3 ask user to confirm the correct account
   4.4 if positive confirmation
       then get all sub-account, budget-ac and commitment-ac of this account
       goto step 6
       fi
   endfor
5. get all ACCOUNT-RECORD from ACCOUNT-FILE
6. make up ACCOUNT-REPORT from the ACCOUNT-RECORD got
MODULE NAME : 3.3
DESCRIPTION : generating supplier report

Procedure :
display REPORT-SCREEN
get SUP-RPT-INFO
get corresponding SUPPLIER-RECORD as indicated by SUPPLIER-CODE from SUPPLIER-FILE
make up SUPPLIER-REPORT from the SUPPLIER-RECORD got
MODULE NAME: 3.4
DESCRIPTION: generating summary report

Procedure:
1. get AC-ID from user
2. if AC-ID = all
    then goto step 5
   fi
3. get all ACCOUNT-RECORD which match the AC-ID
4. for each of the ACCOUNT-RECORD got
   4.1 make up DISPLAY-AC-SCREEN
   4.2 display the DISPLAY-AC-SCREEN
   4.3 ask user to confirm the correct account
   4.4 if positive confirmation
       then get all sub-account, budget-ac and commitment-ac of this account
       goto step 6
   fi
   endfor
5. get all ACCOUNT-RECORD from ACCOUNT-FILE which is within the
   start and end-date
6. make up SUMMARY-REPORT as following steps
7. for each of the ACCOUNT-RECORD got
   7.1 get all JOURNAL-RECORD of this account and its sub-account
   7.2 for each JOURNAL-RECORD got
       7.2.1 if JOURNAL-TYPE = debit
           then add JOURNAL-AMOUNT to debit-total
           else subtract JOURNAL-AMOUNT to credit-total
       fi
   endfor
   7.3 if AC-CATEGORY = assets-ac or commitment-ac or expense-ac
    then total-balance = debit-total - credit-total
    else total-balance = credit-total - debit-total
   fi
MODULE NAME : 3.5
DESCRIPTION : generating detail report

Procedure :
1. get AC-ID from user
2. if AC-ID = all
   then goto step 5
fi
3. get all ACCOUNT-RECORD which match the AC-ID
4. for each of the ACCOUNT-RECORD got
   4.1 make up DISPLAY-AC-SCREEN
   4.2 display the DISPLAY-AC-SCREEN
   4.3 ask user to confirm the correct account
   4.4 if positive confirmation
       then get all sub-account, budget-ac and commitment-ac of this account
       goto step 6
   endiffor
5. get all ACCOUNT-RECORD from ACCOUNT-FILE, which is within the
   start and end-date
6. make up DETAIL-REPORT as following steps
7. for each of the ACCOUNT-RECORD got
   7.1 get all JOURNAL-RECORD of this account and its sub-account
   7.2 for each JOURNAL-RECORD got
       7.2.1 put the JOURNAL-RECORD to the DETAIL-REPORT
       7.2.2 if JOURNAL-TYPE = debit
           then add JOURNAL-AMOUNT to debit-total
           else subtract journal-amount to credit-total
       endif
   endfor
7.3 if AC-CATEGORY = assets-ac or commitment-ac or expense-ac
   then total-balance = debit-total - credit-total
   else total-balance = credit-total - debit-total
fi
MODULE NAME : 3.6
DESCRIPTION : generating keyword trace report.

Procedure :
display REPORT-SCREEN
get KEYW-TRACE-INFO
get all JOURNAL-RECORD which contain the keyword and
are within the start date and end-date
for each of the JOURNAL-RECORD got
  put JOURNAL-RECORD to KEYWORD-TRACE-REPORT
  if JOURNAL-TYPE = debit
    then add JOURNAL-AMOUNT to total-debit
  else add JOURNAL-AMOUNT to total-credit
  fi
endfor
MODULE NAME : 3.7
DESCRIPTION : generating budget balance

Procedure:
1. get AC-ID from user
2. if AC-ID = all
   then goto step 5
fi
3. get all ACCOUNT-RECORD which match the AC-ID
4. for each of the ACCOUNT-RECORD got
   4.1 make up DISPLAY-AC-SCREEN
   4.2 display the DISPLAY-AC-SCREEN
   4.3 ask user to confirm the correct account
   4.4 if positive confirmation
       then get all sub-account, budget-ac and commitment-ac of this account
       if budget-account not found
           then reject this account
       else goto step 6
   fi
fi
defor
5. get all ACCOUNT-RECORD from ACCOUNT-FI LE which is within the
   start and end-date
6. make up BUDGET-BALANCE-REPORT as following steps
7. for each of the ACCOUNT-RECORD got
   7.1 get all JOURNAL-RECORD of this account and its sub-account
   7.2 for each JOURNAL-RECORD got calculate the budget balance
       according to the following decision table

<table>
<thead>
<tr>
<th></th>
<th>assets-ac</th>
<th>budget-ac</th>
<th>commitment-ac</th>
<th>expense-ac</th>
<th>income-ac</th>
<th>credit</th>
<th>debit</th>
<th>add to balance</th>
<th>subtract from balance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
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<td>x</td>
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<td>x</td>
<td>x</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

endfor
endfor
MODULE NAME : 4.1
DESCRIPTION : add new account

Procedure :
display NEW-AC-SCREEN
get NEW-ACCOUNT-INFO
if it is a sub-account
    then check whether its main-account and upper level account exist
        if not found
            then reject NEW-ACCOUNT-INFO
        fi
    fi
check whether ACCOUNT-NUMBER already exist on ACCOUNT-FILE
if found
    then reject NEW-ACCOUNT-INFO
else add NEW-ACCOUNT-INFO to ACCOUNT-FILE
fi
MODULE NAME : 4.2
DESCRIPTION : add account alias

Procedure:
1. get AC-ID from user
2. get all ACCOUNT-RECORD which match AC-ID from ACCOUNT-FILE
3. for each of the ACCOUNT-RECORD got
   3.1 make up DISPLAY-AC-SCREEN
   3.2 display the DISPLAY-AC-SCREEN
   3.3 ask user to confirm the correct account
   3.4 if positive confirmation
      then goto
      fi
   endfor
4. if ACCOUNT-RECORD got
   then make up UPDATE-AC-SCREEN
   display UPDATE-AC-SCREEN
   get UPDATE-ACCOUNT-INFO
   rewrite ACCOUNT-RECORD to ACCOUNT-FILE
   fi
MODULE NAME: 5.1.1
DESCRIPTION: accept transaction menu selection

Procedure:
display TRANSACTION-MENU
get TRANS-MENU-SEL
if invalid selection
    then reject TRANS-MENU-SEL
    else pass on TRANS-MENU-SEL to corresponding process
fi
MODULE NAME : 5.1.2
DESCRIPTION : add new journal entry

Procedure:
1. get AC-ID from user
2. get all ACCOUNT-RECORD which match the AC-ID from ACCOUNT-FILE
3. for each of the ACCOUNT-RECORD got
   3.1 make up DISPLAY-AC-SCREEN
   3.2 display the DISPLAY-AC-SCREEN
   3.3 ask user to confirm the correct account
   3.4 if positive confirmation
       then goto 4
   f1
endfor
4. if ACCOUNT-RECORD got
   then put ACCOUNT-NUMBER and account-name to ENTER-JOURNAL-SCREEN ;
       put current date to ENTER-JOURNAL-SCREEN
       display ENTER-JOURNAL-SCREEN ;
       get NEW-JOURNAL-INFO ;
       put JOURNAL-RECORD to TRANSACTION-FILE ;
fi
MODULE NAME : 5.1.3
DESCRIPTION : update journal entry

Procedure :
for each JOURNAL-RECORD in TRANSACTION-FILE
    make up update-journal-screen
    ask user to confirm update
    if positive confirmation
        then get NEW-JOURNAL-INFO from user
        rewrite the JOURNAL-RECORD to TRANSACTION-FILE
    fi
endfor
MODULE NAME : 5.1.4
DESCRIPTION : delete transaction

Procedure :
discard all JOURNAL-RECORD on TRANSACTION-FILE
MODULE NAME : 5.1.5
DESCRIPTION : list journal entry

Procedure :
for each JOURNAL-RECORD in TRANSACTION-FILE
    make up DISPLAY-JOURNAL-SCREEN from the JOURNAL-RECORD
    display the DISPLAY-JOURNAL-SCREEN
endfor
MODULE NAME : 5.1.6
DESCRIPTION : file transaction

Procedure :
if TRANSACTION-FILE not empty then
    for each JOURNAL-RECORD in TRANSACTION-FILE
        if JOURNAL-TYPE = credit
            then add JOURNAL-AMOUNT to total-credit;
            else add JOURNAL-AMOUNT to total-debit;
        fi
    endfor
    if total-credit = total-debit
        then add TRANSACTION-FILE to JOURNAL-FILE;
        else display error message
    fi
fi
MODULE NAME : 5.2
DESCRIPTION : reverse commitment

Procedure :  
get REVERSE-COMMITMENT-INFO from user
get all JOURNAL-RECORD which contain the requisition-number and are posted to a commitment-ac from JOURNAL-FILE
for each of the JOURNAL-RECORD got
   make up DISPLAY-JOURNAL-SCREEN
   display the DISPLAY-JOURNAL-SCREEN
   ask user to confirm the reversal
   if positive confirmation
      then check whether this commitment has be reversed
         if not yet reversed
            then make up the reversal JOURNAL-RECORD
               post it to the corresponding commitment-ac and payable-ac
   fi
fi
endfor
Functional Specification Dictionary
ac-category
    /* */
    = [ assets-ac / budget-ac / commitment-ac / expense-ac /
        liability-ac / income-ac ]

ac-id
    /* an identification for selecting an account.*/
    =

ac-rpt-info
    /* parameter for generating account report*/
    = ( account-number + account-name ) + report-destn

ac-screen-hdhrs
    /* Headings present on an account screen. Refer to screen layout for
     exact format.*/
    =

account-alias
    /* any identification that the user assigned to identify the account*/
    =

account-file
    /* file containing information of all the accounts.*/
    = { account-record }

account-info
    /* */
    = [ new-account-info / update-account-info ]

account-number
    /* a unique number assigned to an account*/
    = main-ac-nr + ac-category + 0{ sub-ac-nr }4

class-account-record
    /* */
    = account-number + account-name + account-balance + account-alias

account-report
    /* a report of the information about an account*/
    =

class-account-screen
    /* It is a data entry or display screen of an account record*/
    = [ new-ac-screen / display-ac-screen / update-ac-screen ]

account-selection
    /* */
    = [ new-account-sel / update-account-sel ]

add-supplier-screen
    /* a data entry screen for entering new supplier information*/
assets-total
/* sum of balances of all assets account*/
=

bac-input-information
/* */
= [ account-info / journal-info / supplier-info / report-info ]

bal-sheet-cr-total
/* sum of balances of all liability, equity and revenue accounts*/
=

bal-sheet-dr-total
/* sum of balances of all assets, commitment and expense account*/
=

bal-sheet-info
/* parameter for generating the balance sheet*/
= ( start date ) + ( end date ) + report-destn

balance-sheet
/* */
= assets-total + commitment-total + expense-total +
  liability-total + income-total + equity-total + bal-sheet-cr-total +
  bal-sheet-dr-total

budget-bal-info
/* parameter for generating budget balance report*/
= ( account-number ) + ( account-name ) + report-destn

budget-balance-report
/* a report of the balance of the budget account*/
= { account-number + account-name + total-debit +
    total-debit + total-balance }

commitment-total
/* sum of balances of all commitment account*/
=

delete-supplier-info
/* */
= supplier-code

delete-supplier-screen
/* a data entry screen for entering information for deleting supplier*/
=

detail-report
/* a report of journal entry of selected accounts*/
= { journal-record + total-balance }

detail-rpt-info
/* parameter for generating detail report*/
= ( start date ) + ( end date ) + ( account-number ) +
( account-name ) + report-destn

display-ac-screen
/* a screen for displaying of an account record*/
= ac-screen-hdrs + account-record

equity-total
/* sum of balances of all budget and equity accounts*/
=

expense-total
/* sum of balances of all expense account*/
=

income-total
/* sum of all balances of all revenue account*/
=

journal-amount
/* amount of money posted by a journal entry*/
=

journal-file
/* file containing all the journal entries*/
= { journal-record }

journal-info
/* */
= [ new-journal-info / reverse-commit-info ]

journal-keywords
/* some user assigned keywords to identify the journal entry*/
=

journal-record
/* */
= account-number + account-name + date + journal-type +
  journal-amount + ( description ) + ( journal-keywords ) + ( supplier-code )
  + ( voucher-number ) + ( requisition-number ) + ( purchase-order-number ) +
  ( journal-doc-nr )

journal-screen
/* a screen for data entry or display of a journal entry. Refer to
  screen layout for exact format.*/
= [ enter-journal-screen / update-journal-screen /
  display-journal-screen ]

journal-selection
/* */
= [ post-trans-sel / reverse-commitment-sel ]

journal-type
/* */
= [ credit / debit ]

`keyw`-trace-info
/* parameter for generating keyword trace report*/
= ( start date ) + ( end date ) + keyword + report-destn

`keyw`-trace-report
/* a report of all journal entries which contains a certain keyword*/
= { journal-record } + total-debit + total-credit

`liability-total`
/* sum of balances of all liability account*/
=

`main-ac-nr`
/* main account number. It is the first 3 digit of an account number.*/
=

`main-menu-selection`
/* selections on the main menu*/
= [ account-selection / journal-selection / supplier-selection / report-selection ]

`main-menu`
/* It is the main menu for the budget/account system. Refer screen layout for the exact screen layout.*/
= [ main-menu-selection ]

`new-ac-screen`
/* a data entry screen for entering new account information*/
= account-record

`new-account-info`
/* information of a new account to be added*/
= account-record

`new-journal-info`
/* information of a new journal entry*/
= journal-record

`new-supplier-info`
/* */
= supplier-code + supplier-name + address + phone + description

`report-destn`
/* it indicates where the report is to be sent*/
= [ printer / terminal ]

`report-info`
/* */
= [ bal-sheet-info / ac-rpt-info / sup-rpt-info / summary-rpt-info / detail-rpt-info / keyw-trace-info / budget-bal-info ]
report-screen
/* a data entry screen for entering report parameter*/
= ( start date ) + ( end date ) + ( account-number ) +
( account-name ) + ( keyword ) + ( supplier-code ) + report-destn

report-selection
/* */
= [ balance-sheet-sel / account-rpt-sel / supplier-rpt-sel /
summary-rpt-sel / detail-rpt-sel / keyword-trace-rpt-sel / budget-bal-sel ]

report-type
/* types of report*/
= [ balance-sheet / account-report / supplier-report /
summary-report / detail-report / keyword-trace-report /
budget-balance-report ]

sub-ac-nr
/* sub account number. It is in unit of 3 digits. It starts from
the 5th digit of an account number*/
=

summary-report
/* a report of the balances of selected accounts*/
= { account-number + account-name + debit-total + credit-total +
total-balance }

summary-rpt-info
/* parameter for generating account summary report*/
= ( start date ) + ( end date ) + ( account-number ) +
( account-name ) + report-destn

sup-rpt-info
/* parameter for generating supplier report*/
= ( supplier-code ) + report-destn

supplier-code
/* a unique identification for each supplier*/
= 1{ character }5

supplier-file
/* */
= { supplier-record }

supplier-record
/* */
= supplier-code + supplier-name + description +
address + phone

supplier-report
/* a report of the information of suppliers*/
= { supplier-record }

supplier-screen
/* */
= [ add-supplier-screen / delete-supplier-screen / 
    update-supplier-screen ]

supplier-selection
/* */
= [ add-supplier-sel / update-supplier-sel / delete-supplier-sel ]

trans-menu-sel
/* functions available for updating current transaction.*/
= [ add-journal-sel / update-journal-sel / list-journal-sel / 
    delete-trans-sel / file-trans-sel / exit-trans-sel ]

transaction-menu
/* a menu for user to select function related to the posting of 
a transaction.*/
= { trans-menu-sel }

update-supplier-info
/* */
= supplier-code + supplier-name + description + address + phone

update-supplier-screen
/* a data entry screen for updating supplier information*/
= supplier-record
Structure Charts

The Data Flow Diagrams, Data Dictionary and the Process Specifications form the functional specification of the Budget/Account System. The functional specification specifies what functions are to be provided by the system. It does not specify how to achieve the provision of the functions. It is the purpose of the design specifications. The design specifications describe the algorithms involved.

Based on the partitioning of the functional specifications, the system is then further partitioned in modules for implementation. This section is a collection of the structure charts of these modules. It describes the hierarchical relations between these modules. The interfaces between these modules are also defined on these charts.

The first chart is the top level module of the system. All the other charts are arranged in alphabetical order of the top level module on it.
[6]

Design Specifications
module name : acrpt
description : generating account report
input parameter :
update parameter :
output parameter :

procedure :
call gvrprqtrt( account-rpt-sel : REPORT-SCREEN : status )
if status == true
    then
        if ACCOUNT-NUMBER in REPORT-SCREEN == blank
            then copy ACCOUNT-FILE to temp-file
            else call gallsbac( ACCOUNT-NUMBER : temp-file )
        fi
        for each of the ACCOUNT-RECORD in temp-file
            make up the ACCOUNT-REPORT
        endfor
        if REPORT-DESTN == printer
            then put the ACCOUNT-REPORT to printer
            else put the ACCOUNT-REPORT to terminal
        fi
    fi
fi
module name: addacal

description: add account alias

input parameter:
update parameter:
output parameter:

procedure:
call getvalac(: UPDATE-AC-SCREEN : status)
while ( status == true )
    call edit(: UPDATE-AC-SCREEN : status)
    if status == true
        then call updac( UPDATE-AC-SCREEN )
    fi
    call getvalac(: UPDATE-AC-SCREEN : status)
endwhile
module name : addjnl
description : add journal entry to TRANSACTION-FILE
input parameter :
update parameter : TRANSACTION-FILE
output parameter :

procedure :
while
call setup( : ENTER-JOURNAL-SCREEN : status )
if status == quit
then return
fi
call edit( : ENTER-JOURNAL-SCREEN : status )
while status == true
if valjnl( ENTER-JOURNAL-SCREEN :: status )
then get JOURNAL-RECORD from ENTER-JOURNAL-SCREEN
add JOURNAL-RECORD to TRANSACTION-FILE
break
fi
call edit( : ENTER-JOURNAL-SCREEN : status )
endwhile
d endwhile
module name: addnewac

description: add new account

input parameter:
update parameter:
output parameter:

procedure:
eof = false
while ( eof == false )
    call edit(: new-ac-screen :status)
    if status == true
        then call valnwac( new-ac-screen ::status)
        if status == true
            then extract ACCOUNT-RECORD from NEW-AC-SCREEN
            add ACCOUNT-RECORD to ACCOUNT-FILE
            call bldrelac( new-ac-scrn )
            sort ACCOUNT-FILE
            eof = true
        fi
    else eof = true
fi
endwhile
module name : addnewsup

description : add new supplier

input parameter :

update parameter :

output parameter :

procedure :

eof = false

while ( eof == false )

call edit(: ADD-SUPPLIER-SCREEN : status )

if status == true

then call valnewsp( ADD-SUPPLIER-SCREEN :: status )

if status == true

then get SUPPLIER-RECORD from ADD-SUPPLIER-SCREEN

add SUPPLIER-RECORD to SUPPLIER-FILE

eof = true

fi

else eof = true

fi

endwhile
module name : balsheet
description : generating balance sheet
input parameter : 
update parameter : 
output parameter : 

procedure :
call gvrptrqt( balance-sheet-sel : REPORT-SCREEN : status )
if status == true
then get all JOURNAL-RECORD which are within the start-date and end-date
for each of the JOURNAL-RECORD got
if JOURNAL-TYPE == debit
then
select case according to AC-CATEGORY of ACCOUNT-NUMBER of JOURNAL-RECORD
case 1 : assets-ac
   add JOURNAL-AMOUNT to dr-assets
   break
case 2 : budget-ac or equity-ac
   add JOURNAL-AMOUNT to dr-equity
   break
case 3 : liability-ac
   add JOURNAL-AMOUNT to dr-liability
   break
case 4 : expense-ac
   add JOURNAL-AMOUNT to dr-expense
   break
case 5 : income-ac
   add JOURNAL-AMOUNT to dr-income
   break
case 6 : commitment-ac
   add JOURNAL-AMOUNT to dr-commitment
   break
endcase
else
select case according to AC-CATEGORY of ACCOUNT-NUMBER of JOURNAL-RECORD
case 1 : assets-ac
   add JOURNAL-AMOUNT to cr-assets
   break
case 2 : budget-ac or equity-ac
   add JOURNAL-AMOUNT to cr-equity
   break
case 3 : liability-ac
   add JOURNAL-AMOUNT to cr-liability
   break
case 4 : expense-ac
   add JOURNAL-AMOUNT to cr-expense
   break
case 5 : income-ac
   add JOURNAL-AMOUNT to cr-income
   break
case 6 : commitment-ac
   add JOURNAL-AMOUNT to cr-commitment
   break
endcase
endcase

fi

ASSETS-TOTAL = dr-assets - cr-assets
COMMITMENT-TOTAL = dr-commitment - cr-commitment
EXPENSE-TOTAL = dr-expense - cr-expense
liability-total = cr-liability - dr-liability
INCOME-TOTAL = cr-income - dr-income
EQUITY-TOTAL = cr-equity - dr-equity

BAL-SHEET-CR-TOTAL = ASSETS-TOTAL + COMMITMENT-TOTAL + EXPENSE-TOTAL
BAL-SHEET-DR-TOTAL = LIABILITY-TOTAL + INCOME-TOTAL + EQUITY-TOTAL

if REPORT-DESTN = printer
  then put BALANCE-SHEET to printer
else display BALANCE-SHEET to terminal
fi
module name : bgtbal

description : budget balance

input parameter :

update parameter :

output parameter :

procedure :
call gvrptrqt( budget-bal-sel : REPORT-SCREEN : status )
if status == true
then get ACCOUNT-NUMBER from REPORT-SCREEN
   if ACCOUNT-NUMBER not == blank and AC-CATEGORY not == budget-ac
      then check whether corresponding budget-ac exists
         if not found
            then display error message
            return
   fi
fi
if ACCOUNT-NUMBER == blank
   then get all ACCOUNT-RECORD of budget-ac from ACCOUNT-FILE to temp-ac-file
else get the ACCOUNT-RECORD of the corresponding budget-ac from ACCOUNT-FILE to temp-ac-file
fi
while ( not end-of temp-ac-file )
   get ACCOUNT-RECORD from temp-ac-file
   create temp-jnl-file
   call gallaejnl( ACCOUNT-NUMBER : temp-jnl-file )
   if ( start-date not == blank or end-date not == blank )
      then call filter( start-date, end-date : temp-jnl-file )
   fi
   call pbgtbal( account-number, account-name : temp-jnl-file, BUDGET-BALANCE-REPORT )
endwhile
if REPORT-DESTN == printer
   then put BUDGET-BALANCE-REPORT to printer
else display BUDGET-BALANCE-REPORT to terminal
fi
fi
module name: bldrelac

description: build related account

input parameter:

update parameter: NEW-AC-SCREEN

output parameter:

procedure:

get ACCOUNT-NUMBER from NEW-AC-SCREEN

if it is a main-account number or a first level sub-account number then

if corresponding commitment-ac does not exists

then ask user to confirm creation of commitment-ac

if positive confirmation

then make up ACCOUNT-RECORD of the corresponding commitment-ac

put ACCOUNT-RECORD to NEW-AC-SCREEN

call edit(: NEW-AC-SCREEN : status)

if status == true

then get ACCOUNT-RECORD from NEW-AC-SCREEN

add ACCOUNT-RECORD to ACCOUNT-FILE

fi

fi

if corresponding budget-ac does not exists

then ask user to confirm creation of budget-ac

if positive confirmation

then make up ACCOUNT-RECORD of the corresponding budget-ac

put ACCOUNT-RECORD to NEW-AC-SCREEN

call edit(: NEW-AC-SCREEN : status)

if status == true

then get ACCOUNT-RECORD from NEW-AC-SCREEN

add ACCOUNT-RECORD to ACCOUNT-FILE

fi

fi

fi
module name : delsup
description : delete SUPPLIER-RECORD
input parameter :
update parameter :
output parameter :

procedure :
call getsupcde(: SUPPLIER-CODE : status)
while ( status not = quit )
dspsup( SUPPLIER-CODE : DELETE-SUPPLIER-SCREEN )
ask user to confirm deletion
if positive confirmation
then remove corresponding SUPPLIER-RECORD from SUPPLIER-FILE
fi
call getsupcde(: UPDATE-SUPPLIER-SCREEN :status)
endwhile
module name : deltran

description : delete current transaction

input parameter :
update parameter : TRANSACTION-FILE
output parameter :

procedure :

discard all JOURNAL-RECORD in TRANSACTION-FILE
module name : dspsup

description : display SUPPLIER-RECORD to DELETE-SUPPLIER-SCREEN

input parameter : SUPPLIER-CODE

update parameter :

output parameter :

procedure :

get SUPPLIER-RECORD as indicated by SUPPLIER-CODE from SUPPLIER-RECORD

put SUPPLIER-RECORD to DELETE-SUPPLIER-SCREEN

display DELETE-SUPPLIER-SCREEN
module name : dtlrpt

description : dtlrpt report

input parameter :

update parameter :

output parameter :

procedure :

call gvrptrqt( detail-rpt-sel : REPORT-SCREEN : status )

if status == true

then create temp-ac-file

if ACCOUNT-NUMBER of REPORT-SCREEN == blank

then copy ACCOUNT-FILE to temp-ac-file

else call gallsubac( ACCOUNT-NUMBER : temp-ac-file )

fi

while ( not end-of temp-ac-file )

get ACCOUNT-RECORD from temp-ac-file

create temp-jnl-file

call gacjnl( ACCOUNT-NUMBER : temp-jnl-file )

if ( start-date of REPORT-SCREEN not == blank or

end-date of REPORT-SCREEN not == blank )

then call filter( start-date, end-date : temp-jnl-file )

fi

call pdtlrpt( ACCOUNT-NUMBER , account-name : temp-jnl-file, 

SUMMARY-REPORT )

endwhile

if REPORT-DESTN == printer

then put SUMMARY-REPORT to printer

else put SUMMARY-REPORT to terminal

fi
module name : filechk

description : checking whether transaction amount balance

input parameter : TRANSACTION-FILE

update parameter : 

output parameter : status

procedure :
if TRANSACTION-FILE not empty
then
    for each JOURNAL-RECORD in TRANSACTION-FILE
        if JOURNAL-TYPE = credit
            then add JOURNAL-AMOUNT to total-credit;
            else add JOURNAL-AMOUNT to total-debit;
        fi
    endfor
    if total-credit = total-debit
        then status = true
        else display error message
        status = false
        fi
    else status = true
    fi
module name : filter

description : exclude all journal entry in input file which in out of range;

input parameter : start-date, end-date

update parameter : temp-jnl-file

output parameter :

procedure :
create temp-file
while ( not end-of temp-jnl-file )
    get JOURNAL-RECORD from temp-jnl-file
    if start-date <= date of JOURNAL-RECORD <= end-date
    then write JOURNAL-RECORD to temp-file
    fi
endwhile

copy temp-file to temp-jnl-file
module name: gacjnl

description: get all JOURNAL-RECORD of an account

input parameter: ACCOUNT-NUMBER

update parameter: temp-jnl-file

output parameter:

procedure:
get all JOURNAL-RECORD of the ACCOUNT-NUMBER and its sub-account from
JOURNAL-FILE

put all JOURNAL-RECORD got to temp-jnl-file
module name: gallacjnl

description: get relevant JOURNAL-RECORD of an account

input parameter: ACCOUNT-NUMBER

update parameter: temp-jnl-file

output parameter:

procedure:
get JOURNAL-RECORD of the ACCOUNT-NUMBER and its corresponding
budget-ac, commitment-account and sub-account from JOURNAL-FILE
put all JOURNAL-RECORD got to temp-jnl-file
module name: gallsubac

description: get the ACCOUNT-RECORD of an account and all its sub-account

input parameter: ACCOUNT-NUMBER

update parameter: temp-file

output parameter: 

procedure:
get the ACCOUNT-RECORD as indicated by ACCOUNT-NUMBER from ACCOUNT-FILE
get also the ACCOUNT-RECORD of all its sub-account,
corresponding commitment-ac and budget-ac from ACCOUNT-FILE
put all ACCOUNT-RECORD got to temp-file
module name : genrpt
description : despatch the appropriate report generation routine
input parameter : REPORT-SELECTION
update parameter :
output parameter :

procedure :
select case according to REPORT-SELECTION
  case 1 : balance-sheet-sel
    call balsheet() break
  case 2 : account-rpt-sel
    call acrpt() break
  case 3 : supplier-rpt-sel
    call suprpt() break
  case 4 : summary-rpt-sel
    call sumrpt() break
  case 5 : detail-rpt-sel
    call dtlrpt() break
  case 6 : keyword-trace-rpt-sel
    call keywrpt() break
  case 7 : budget-bal-sel
    call bgtbal() break
endcase
module name: getcmt

description: get commitment entry to be reversed

input parameter:
update parameter: DISPLAY-JOURNAL-SCREEN
output parameter: status

procedure:
get REVERSE-COMMITMENT-INFO from user
get all JOURNAL-RECORD which contain the requisition-number and
are posted to a commitment-ac from JOURNAL-FILE
for each of the JOURNAL-RECORD got
  make up DISPLAY-JOURNAL-SCREEN
  display the DISPLAY-JOURNAL-SCREEN
  ask user to confirm the reversal
  if positive confirmation
    then check whether this commitment has been reversed
      if not yet reversed
        then status = true
        return status
  fi
fi
endfor
module name: getrptac

description: get ACCOUNT-RECORD for report generation

input parameter:

Update parameter: DISPLAY-AC-SCREEN

output parameter: status

procedure:

while

got AC-ID from user
    if AC-ID == blank
        then status = true
            clear ACCOUNT-NUMBER and account-name of DISPLAY-AC-SCREEN
            return status
        else get all ACCOUNT-RECORD which match AC-ID from ACCOUNT-FILE
            write ACCOUNT-RECORD got to temp-file
    fi

while (not end-of temp-file)
    get an ACCOUNT-RECORD from temp-file
    display the ACCOUNT-RECORD
    ask user to confirm the correct account
    if positive confirmation
        then put the ACCOUNT-RECORD to UPDATE-AC-SCREEN
        status = true
        return status
    fi

endwhile

endwhile
module name : getsupcde
description : get SUPPLIER-CODE to be updated
input parameter :
update parameter : SUPPLIER-CODE
output parameter : status

procedure :
status = false
while ( status == false )
   get SUPPLIER-CODE from user
   if SUPPLIER-CODE = blank
      then status = quit
   else check whether SUPPLIER-CODE exists on SUPPLIER-FILE
      if found
         then status = true
      else status = false
      display error message
   fi
fi
endwhile
return status
module name : getvalac  
description : get valid account  
input parameter :  
update parameter : UPDATE-AC-SCREEN  
output parameter : status

procedure :  
while  
get AC-ID from user  
if AC-ID == blank  
then status = false  
return status  
else get all ACCOUNT-RECORD which match AC-ID from ACCOUNT-FILE  
write ACCOUNT-RECORD got to temp-file  
fi  
while ( not end-of temp-file )  
get an ACCOUNT-RECORD from temp-file  
display the ACCOUNT-RECORD  
ask user to confirm the correct account  
if positive confirmation  
then put the ACCOUNT-RECORD to UPDATE-AC-SCREEN  
status = true  
return status  
fi  
endwhile
endwhile
module name : getvaltran

description : get valid transaction

input parameter :

update parameter : TRANSACTION-FILE

output parameter :

procedure :

while

display TRANSACTION-MENU

get TRANS-MENU-SEL from user

select case according to TRANS-MENU-SEL

case 1 : add-journal-sel

call addjnl( TRANSACTION-FILE )

break

case 2 : update-journal-sel

call updjnl( TRANSACTION-FILE )

break

case 3 : list-journal-sel

call listjnl( TRANSACTION-FILE )

break

case 4 : delete-trans-sel

call deltran( TRANSACTION-FILE )

break

case 5 : file-trans-sel

call filechk( TRANSACTION-FILE :: status)

if status == true

then return status

fi

break

case 6 : exit-trans-sel

call quitchk( TRANSACTION-FILE :: status)

if status == quit

then return status

else

if status == true

then return status

else break

fi

fi

endcase

endwhile
module name : gvldnwac
description : get valid new account information
input parameter :
update parameter :
output parameter : NEW-AC-INFO

procedure :
initialise the AC-SCREEN as follows :
begin
for i := 0 to (sc-fld-cnt - 1) do
    sc-field[i].sc-fld-endptr := 0
endfor
sc-field[0].sc-fld-atr := num-fld
sc-field[1].sc-fld-atr := alpnum-fld
sc-field[2].sc-fld-atr := alpha-fld
sc-field[3].sc-fld-atr := alpnum-fld
end
ok := false
while ok = false do
    if ( edit( AC-SCREEN ) = true )
        if ( vldnwac( AC-SCREEN ) = true )
            then status := true
                ok := true
        fi
    else status := false
        ok := true
    fi
endwhile
return status
module name : gvrptrqt

description : get valid report request

input parameter : REPORT-SELECTION

update parameter : REPORT-SCREEN

output parameter : status

procedure :
getac-flg = true
select case according to REPORT-SELECTION
  case 1 : balance-sheet-sel
    set FLD-ATR of SUPPLIER-CODE and keyword of REPORT-SCREEN to protect-fld
    getac-flg = false
    break
  case 2 : account-rpt-sel
    set FLD-ATR of start-date, end-date, SUPPLIER-CODE and keyword of REPORT-SCREEN to protect-fld
    break
  case 3 : supplier-rpt-sel
    set FLD-ATR of start-date, end-date and keyword of REPORT-SCREEN to protect-fld
    getac-flg = false
    break
  case 4 : summary-rpt-sel
    set FLD-ATR of supplier-code, keyword of REPORT-SCREEN to protect-fld
    break
  case 5 : detail-rpt-sel
    set FLD-ATR of supplier-code, keyword of REPORT-SCREEN to protect-fld
    break
  case 6 : keyword-trace-rpt-sel
    set FLD-ATR of SUPPLIER-CODE to protect-fld
    break
  case 7 : budget-bal-sel
    set FLD-ATR of start-date, end-date, SUPPLIER-CODE and keyword of REPORT-SCREEN to protect-fld
    getac-flg = false
    break
endcase

set FLD-ATR of ACCOUNT-NUMBER and account-name of REPORT-SCREEN to protect-fld
if getac-flg == true
  then call getrptac(: DISPLAY-AC-SCREEN : status)
  copy ACCOUNT-NUMBER and account-name from DISPLAY-AC-SCREEN to REPORT-SCREEN
fi

call edit(: REPORT-SCREEN : status)
while ( status == true )
  call valrptrqt( REPORT-SCREEN :: status )
  if status == true
    then return status
  fi
  call edit(: REPORT-SCREEN : status)
endwhile
module name : keywrpt

description : keyword trace report

input parameter :

update parameter :

output parameter :

procedure :
call gvrptrqt( keyword-trace-rpt-sel : REPORT-SCREEN : status )
if status == true
    then get all JOURNAL-RECORD which contain keyword in REPORT-SCREEN from JOURNAL-FILE
       put all JOURNAL-RECORD to temp-jnl-file
       if start-date of REPORT-SCREEN not == blank ||
           end-date of REPORT-SCREEN not == blank
           then call filter(start-date, end-date : temp-jnl-file )
       fi
       for each JOURNAL-RECORD in temp-jnl-file
           put JOURNAL-RECORD to KEYWORD-TRACE-REPORT
           if ( JOURNAL-TYPE == debit )
               then add JOURNAL-AMOUNT to debit-total
               else add JOURNAL-AMOUNT to credit-total
           fi
       endfor
    fi
if ( REPORT-DESTN == printer )
    then put KEYWORD-TRACE-REPORT to printer
    else put KEYWORD-TRACE-REPORT to terminal
fi
module name: listjnl

description: list JOURNAL-RECORD in TRANSACTION-FILE

input parameter: TRANSACTION-FILE

update parameter:

output parameter:

procedure:

for each JOURNAL-RECORD in TRANSACTION-FILE

    make up DISPLAY-JOURNAL-SCREEN from the JOURNAL-RECORD

    display the DISPLAY-JOURNAL-SCREEN

endfor
module name : MAIN.MENU
description : get user selection and despatch the corresponding routine
input parameter :
update parameter :
output parameter :

procedure :
display MAIN-MENU
get MAIN-MENU-SELECTION
while ( MAIN-MENU-SELECTION not = quit )
    select case according to MAIN-MENU-SELECTION
    case 1 : new-account-sel
        call addnewac()
        break
    case 2 : update-account-sel
        call addacal()
        break
    case 3 : post-trans-sel
        call posttrans()
        break
    case 4 : reverse-commitment-sel
        call revcmt()
        break
    case 5 : REPORT-SELECTION
        call genrpt(report-selection)
        break
    case 6 : add-supplier-sel
        call addnewsup()
        break
    case 7 : update-supplier-sel
        call updsup()
        break
    case 8 : delete-supplier-sel
        call delsup()
        break
    case 9 : none of the above
        display error message
    endcase
get MAIN-MENU-SELECTION
endwhile
module name : pbgtbal
description : make up budget balance of an account
input parameter : ACCOUNT-NUMBER , account-name , temp-jnl-file
update parameter : BUDGET-BALANCE-REPORT
output parameter : 
output parameter :

procedure :
while ( not end-of temp-jnl-file )
    get JOURNAL-RECORD from temp-jnl-file
    calculate budget balance according to the following decision table

<table>
<thead>
<tr>
<th></th>
<th>assets-ac</th>
<th>budget-ac</th>
<th>commitment-ac</th>
<th>expense-ac</th>
<th>income-ac</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>credit</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>debit</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>add to balance</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>subtract from balance</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

endwhile
module name : pdtlrpt

description : make up DETAIL-REPORT of an account

input parameter : ACCOUNT-NUMBER, account-name, temp-jnl-file

update parameter : SUMMARY-REPORT

output parameter :

procedure :
for each JOURNAL-RECORD in temp-jnl-file
  if JOURNAL-TYPE == debit
    then add JOURNAL-AMOUNT to debit-total
    else add JOURNAL-AMOUNT to credit-total
  fi
  put JOURNAL-RECORD to DETAIL-REPORT
endfor

if debit-total >= credit-total
  then total-balance = debit-total - credit-total
else total-balance = credit-total - debit-total
fi
module name: posttrans

description: handle post transaction selection

input parameter:

update parameter:

output parameter:

procedure:
call getvaltran(: TRANSACTION-FILE: status)
while ( status not = quit )
    add TRANSACTION-FILE to JOURNAL-FILE
    clear TRANSACTION-FILE
    call getvaltran(: TRANSACTION-FILE :status)
endwhile
module name: psumrpt

description: make up SUMMARY-REPORT of an account

input parameter: account-number, account-name, temp-jnl-file

update parameter: SUMMARY-REPORT

output parameter:

procedure:

for each JOURNAL-RECORD in temp-jnl-file
    if JOURNAL-TYPE == debit
        then add JOURNAL-AMOUNT to debit-total
    else add JOURNAL-AMOUNT to credit-total
    fi
endfor

if debit-total >= credit-total
    then total-balance = debit-total - credit-total
else total-balance = credit-total - debit-total
fi
module name : quitchk
description : check transaction balance before exit
input parameter : TRANSACTION-FILE
update parameter :
output parameter : status

procedure :
ask user to confirm filing TRANSACTION-FILE before exit
if positive confirmation
  then call filechk( TRANSACTION-FILE :: status )
else status = quit
fi
return status
module name : revcmt
description : reverse commitment
input parameter :
update parameter :
output parameter :

procedure :
call getcmt(: DISPLAY-JOURNAL-SCREEN :status)
if status = true
    then get JOURNAL-RECORD from DISPLAY-JOURNAL-SCREEN
       make up two reversal JOURNAL-RECORD
       add the two JOURNAL-RECORD to JOURNAL-FILE
fi
module name: setSUP

description: set up UPDATE-SUPPLIER-SCREEN

input parameter: SUPPLIER-SCREEN

update parameter: UPDATE-SUPPLIER-SCREEN

output parameter:

procedure:
get SUPPLIER-RECORD as indicated by SUPPLIER-RECORD from SUPPLIER-FILE
put SUPPLIER-RECORD to UPDATE-SUPPLIER-SCREEN
module name : setup
description : set up ENTER-JOURNAL-SCREEN
input parameter :
update parameter : ENTER-JOURNAL-SCREEN
output parameter :

procedure :

; )

:LE-JOURNAL-SCREEN
module name : sumrpt
description : summary report
input parameter:
update parameter:
output parameter:

procedure:
call gvrptrqt ( summary-rpt-sel : REPORT-SCREEN : status )
if status == true
  then create temp-ac-file
    if ACCOUNT-NUMBER of REPORT-SCREEN == blank
      then copy ACCOUNT-FILE to temp-ac-file
    else call gallsubac( ACCOUNT-NUMBER : temp-ac-file )
fi
while ( not end-of temp-ac-file )
  get ACCOUNT-RECORD from temp-ac-file
  create temp-jnl-file
  call gacjnl( ACCOUNT-NUMBER : temp-jnl-file )
  if ( start-date of REPORT-SCREEN not == blank or
    end-date of REPORT-SCREEN not == blank )
    then call filter( start-date, end-date : temp-jnl-file )
  fi
  call psumrpt( account-number, account-name : temp-jnl-file, 
                SUMMARY-REPORT )
endwhile
if REPORT-DESTN == printer
  then put SUMMARY-REPORT to printer
else put SUMMARY-REPORT to terminal
fi
module name: suprpt

description: supplier report

input parameter:
update parameter:
output parameter:

procedure:
call gvrprtrqt( supplier-rpt-sel : REPORT-SCREEN : status )
if status == true
    then
        if SUPPLIER-CODE of REPORT-SCREEN == blank
            then copy SUPPLIER-FILE to temp-sup-file
            else get all SUPPLIER-RECORD which match the SUPPLIER-CODE
                 from SUPPLIER-FILE
            put SUPPLIER-RECORD got to temp-sup-file
        fi
        for each SUPPLIER-RECORD in temp-sup-file
            put SUPPLIER-RECORD to SUPPLIER-REPORT
        endfor
        if ( REPORT-DESTN == printer )
            then put SUPPLIER-REPORT to printer
            else put SUPPLIER-REPORT to terminal
        fi
    fi
fi
module name : updac

description : update account file

input parameter : UPDATE-AC-SCREEN

update parameter :

output parameter :

procedure :
get ACCOUNT-RECORD from UPDATE-AC-SCREEN
rewrite ACCOUNT-RECORD to ACCOUNT-FILE
module name : updjnl
description : update JOURNAL-RECORD in TRANSACTION-FILE
input parameter :
update parameter : TRANSACTION-FILE
output parameter :

procedure :
for each JOURNAL-RECORD in TRANSACTION-FILE
    make up update-journal-screen
    ask user to confirm update
    if positive confirmation
        then get NEW-JOURNAL-INFO from user
        rewrite the JOURNAL-RECORD to TRANSACTION-FILE
    fi
endfor
module name : updsup

description : update SUPPLIER-RECORD

input parameter :

update parameter :

output parameter :

procedure :
call getsupcde(: SUPPLIER-CODE : status)
while ( status not = quit )
  setup( SUPPLIER-CODE : UPDATE-SUPPLIER-SCREEN )
call edit(: UPDATE-SUPPLIER-SCREEN :status)
  if status == true
    then get SUPPLIER-RECORD from UPDATE-SUPPLIER-SCREEN
    rewrite SUPPLIER-RECORD to SUPPLIER-FILE
  fi
call getsupcde(: UPDATE-SUPPLIER-SCREEN :status)
endwhile
module name : valjnl
description : validate journal entry
input parameter : ENTER-JOURNAL-SCREEN
update parameter :
output parameter : status

procedure :
status = true
validate the JOURNAL AMOUNT
if not valid
    then status = false
fi
check whether SUPPLIER-CODE exists in SUPPLIER-FILE
if not found
    then status = false
fi
return status
module name : valnewsup
description : validate new SUPPLIER-RECORD
input parameter : ADD-SUPPLIER-SCREEN
update parameter :
output parameter : status

procedure :
get SUPPLIER-CODE from ADD-SUPPLIER-SCREEN
if SUPPLIER-CODE already exists on SUPPLIER-FILE
    then status = false
        display error message
    else status = true
fi
return status
module name : valnwac
description : validate new account
input parameter : NEW-AC-SCREEN
output parameter : status

procedure :
get ACCOUNT-NUMBER and account-name from NEW-AC-SCREEN
select case according to ACCOUNT-NUMBER
  case 1 : it is a main-account number
    if ACCOUNT-NUMBER exist on ACCOUNT-FILE
      then display error message
      status = false
    fi
  break
  case 2 : it is a sub-account number
    if its MAIN-AC-NR and upper level SUB-AC-NR exist on ACCOUNT-FILE
      then if ACCOUNT-NUMBER does exist on ACCOUNT-FILE
        then status = true
        else status = false
        display error message
      fi
    else status = false
    display error message
    fi
  break
endcase
if account-name not present
then status = false
  display error
fi
return status
module name : va1rptrqt
description : validate report request
input parameter : REPORT-SCREEN
update parameter :
output parameter : status

procedure :
status = true
if start-date of REPORT-SCREEN is invalid
then status = false
   display error message
fi
if end-date of REPORT-SCREEN is invalid
then status = false
   display error message
fi
if start-date > end-date
then status = false
   display error message
fi
return status
[7]

Design Specification Dictionary
ac-category
/** */
= [ assets-ac / budget-ac / commitment-ac / expense-ac /
    liability-ac / income-ac ]

ac-id
/** an identification for selecting an account.*/ 

ac-rpt-info
/** parameter for generating account report*/
= ( account-number + account-name ) + report-destn

ac-screen-hdrs
/** Headings present on an account screen. Refer to screen layout for
   exact format.*/ 

account-alias
/** any identification that the user assigned to identify the account*/ 

account-file
/** file containing information of all the accounts. A sequential
   file arranged in ascending order of the main account number.*/
= { account-record }

account-info
/** */
= [ new-account-info / update-account-info ]

account-number
/** main-ac-nr + ac-category + 0{ sub-ac-nr }4

account-record
/** a record in the account-file. Each field is separated by
   the character '|' and each record is separated by a newline character*/
= account-number + '|' + account-name + '|' +
  account-balance + '|' + account-alias + '|' + newline

account-report
/** a report of the information about an account*/

account-screen
/** It is a data entry or display screen of an account record*/
= [ new-ac-screen / display-ac-screen / update-ac-screen ]

account-selection
/** */
= [ new-account-sel / update-account-sel ]
add-supplier-screen
/* a data entry screen for entering new supplier information. */
  Refer to screen-struct for its physical structure.*/
= supplier-code + supplier-name + description + address + phone

assets-total
/* sum of balances of all assets account*/
=

bac-input-information
/* */
=[ account-info / journal-info / supplier-info / report-info ]

bal-sheet-cr-total
/* sum of balances of all liability, equity and revenue accounts*/
=

bal-sheet-dr-total
/* sum of balances of all assets, commitment and expense account*/
=

bal-sheet-info
/* parameter for generating the balance sheet*/
= (start date) + (end date) + report-destn

balance-sheet
/* */
= assets-total + commitment-total + expense-total +
  liability-total + income-total + equity-total + bal-sheet-cr-total +
  bal-sheet-dr-total

budget-bal-info
/* parameter for generating budget balance report*/
= (account-number) + (account-name) + report-destn

budget-balance-report
/* a report of the balance of the budget account*/
= {account-number + account-name + total-debit +
    total-debit + total-balance}

commitment-total
/* sum of balances of all commitment account*/
=

delete-supplier-info
/* */
= supplier-code

delete-supplier-screen
/* a data entry screen for entering information for deleting supplier*/
= supplier-code + supplier-name + description + address + phone + screen-mask
detail-report
/* a report of journal entry of selected accounts*/
= [ journal-record + total-balance ]

detail-rpt-info
/* parameter for generating detail report*/
= ( start date ) + ( end date ) + ( account-number ) +
( account-name ) + report-destn

display-ac-screen
/* a screen for displaying of an account record. Refer to screen-struct
for the physical structure.*/
= account-number + account-name + account-balance +
account-alias

display-journal-screen
/* a display screen for display a journal entry. Refer to
screen-struct for the physical structure*/
= journal-record

take-journal-screen
/* a data entry screen for entering new journal entry. Refer to
screen-struct for its physical structure.*/
= journal-record

equity-total
/* sum of balances of all budget and equity accounts*/
=

expense-total
/* sum of balances of all expense account*/
=

field-mask
/* information describing a field on a screen*/
= fld-hdr-xy + fld-hdr + fld-data-xy + fld-data-lng + fld-atr

fld-atr
/* attribute of a field*/
= [ text-fld / numeric-fld / alpha-fld / ac-cat-fld /
money-fld / hdr-fld / protect-fld ] + ( mandatory-fld )

fld-data
/* a buffer which contains the data of a field on the screen*/
=

fld-hdr
/* the actual text of the header of a field*/
=

income-total
/* sum of all balances of all revenue account*/
=
Journal-amount
/* amount of money posted by a journal entry*/
=

Journal-file
/* file containing all the journal entries. It is a serial
 file in which the journal-records are arranged in the order of posting*/
= [ journal-record ]

Journal-info
/* */
= [ new-journal-info / reverse-commit-info ]

Journal-keywords
/* some user assigned keywords to identify the journal entry*/

Journal-record
/* a record in the journal file. Each field is separated by the
 character '|' and each record is separated by a newline character.*/
= account-number + account-name + date + journal-type +
  journal-amount + ( description ) + ( journal-keywords ) + ( supplier-code )
  + ( voucher-number ) + ( requisition-number ) + ( purchase-order-number ) +
  ( journal-doc-nr )

Journal-screen
/* a screen for data entry or display of a journal entry. Refer to
 screen layout for exact format.*/
= [ enter-journal-screen / update-journal-screen /
  display-journal-screen ]

Journal-selection
/* */
= [ post-trans-sel / reverse-commitment-sel ]

Journal-type
/* */
= [ credit / debit ]

Keyword-trace-info
/* parameter for generating keyword trace report*/
= ( start date ) + ( end date ) + keyword + report-destn

Keyword-trace-report
/* a report of all journal entries which contains a certain keyword*/
= { journal-record } + total-debit + total-credit

Liability-total
/* sum of balances of all liability account*/
=

Main-ac-nr
/* main account number. It is the first 3 digit of an account number.*/
main-menu-selection
/* selections on the main menu*/
= [ account-selection / journal-selection / supplier-selection /
   report-selection ]

main-menu
/* It is the main menu for the budget/account system. Refer
   screen layout for the exact screen layout.*/
= [ main-menu-selection ]

new-ac-screen
/* a data entry screen for entering new account information*/
= account-record

new-account-info
/* information of a new account to be added*/
= account-record

new-journal-info
/* information of a new journal entry*/
= journal-record

new-supplier-info
/* */
= supplier-code + supplier-name + address + phone + description

report-destn
/* it indicates where the report is to be sent*/
= [ printer / terminal ]

report-info
/* */
= [ bal-sheet-info / ac-rpt-info / sup-rpt-info /
    summary-rpt-info / detail-rpt-info / keyw-trace-info / budget-bal-info ]

report-screen
/* a data entry screen for entering report parameter. Refer
   to screen-struct for the physical structure.*/
= ( start date ) + ( end date ) + ( account-number ) +
  ( account-name ) + ( keyword ) + ( supplier-code ) + report-destn

report-selection
/* */
= [ balance-sheet-sel / account-rpt-sel / supplier-rpt-sel /
    summary-rpt-sel / detail-rpt-sel / keyword-trace-rpt-sel / budget-bal-sel ]

report-type
/* types of report*/
= [ balance-sheet / account-report / supplier-report /
    summary-report / detail-report / keyword-trace-report /
budget-balance-report ]

reverse-commitment-info
/** */
= requisition-number

screen-mask
/* a data struct which together with the corresponding data to be
displayed form a display screen*/
= { field-mask }

screen-struct
/* a data structure which describes the layout of a screen*/
= { fld-data } + screen-mask

sub-ac-nr
/* sub account number. It is in unit of 3 digits. It starts from
the 5th digit of an account number*/
=

summary-report
/* a report of the balances of selected accounts*/
= { account-number + account-name + debit-total + credit-total +
total-balance }

summary-rpt-info
/* parameter for generating account summary report*/
= ( start date ) + ( end date ) + ( account-number ) +
( account-name ) + report-destn

sup-rpt-info
/* parameter for generating supplier report*/
= ( supplier-code ) + report-destn

supplier-code
/* a unique identification for each supplier*/
= 1{ character }5

supplier-file
/* a sequential file arranged in ascending order of the
supplier code.*/
= { supplier-record }

supplier-record
/* a record in the supplier. Each field is separated by the character
'\n' and each record is separated by a newline character.*/
= supplier-code + '\n' + supplier-name + '\n' + description +
'\n' + address + '\n' + phone + '\n' + newline

supplier-report
/* a report of the information of suppliers*/
= { supplier-record }

supplier-screen
/* */
= [ add-supplier-screen / delete-supplier-screen / 
  update-supplier-screen ]

supplier-selection
/* */
= [ add-supplier-sel / update-supplier-sel / delete-supplier-sel ]

trans-menu-sel
/* functions available for updating current transaction. */
= [ add-journal-sel / update-journal-sel / list-journal-sel / 
  delete-trans-sel / file-trans-sel / exit-trans-sel ]

transaction-file
/* a temporary file which contains the journal-record of a transaction */
= { journal-record }

transaction-menu
/* a menu for user to select function related to the posting of 
 a transaction. */
= { trans-menu-sel }

update-ac-screen
/* a data entry screen for entering new account alias. Refer to 
 screen-struct for the physical structure. */
= account-record

update-account-info
/* */
= account-record

update-supplier-info
/* */
= supplier-code + supplier-name + description + address + phone

update-supplier-screen
/* a data entry screen for updating supplier information */
= supplier-record