Goals;
Structured Analysis, Design, Estimation, Development.

Discussion of the use of a structuring technique which simplifies the entire system life cycle. An example using the technique. And the resultant impact of the Dynamic Subprogram code in the HP/3000 environment.

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Documentation
1 General Statement
2 Goals, Structural Notation
3 General System Structure

1 General Statement

The purpose of documentation is to assist in the maintainence and operation of a system. To those ends software documentation must be flexible, easily modifiable, current and easy to read.

Witan has developed a system of documentation called Goals which uses simple text files associated through control numbers to meet the criteria listed above.

The following sections (2 and 3) describe the general features of the structural notation used in Goals and the General system structure used in system projects.

2 Goals, Structural Notation

Formally structured systems permit three primitive operations Sequence, Repetition and Alternation. Structural Notation was developed to meet the criteria of formal systems in a generalized way and was guided by the assumption that systems must be rendered in a machine sensible form. Because of this Goals relies upon text sequences and key words as it basis. Structural Notation is the syntax of Goals.

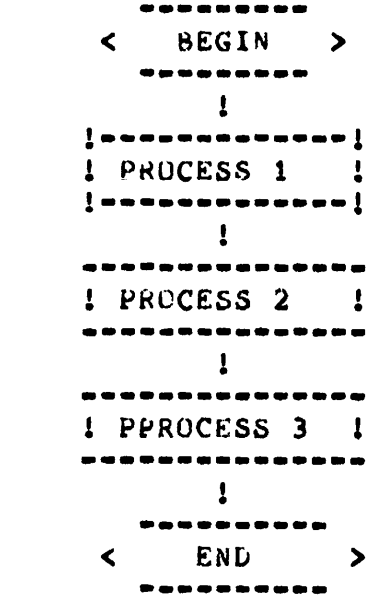
Goals is used throughout the life of a project. It is used to:
1 To state requirements
2 Render flow and components in the analysis phase
3 To develop, test and render a general design
4 As a pseudo code or structured english for detail design
5 As a high level programming language
6 As a project network descriptor.

The following are the representations of the primitive structures in flowcharts and in Goals. The word process is used to represent a step, a process or an item depending on the use of the Notation at the time.

Goals Primitive Structures

S E Q U E N C E

FLOW

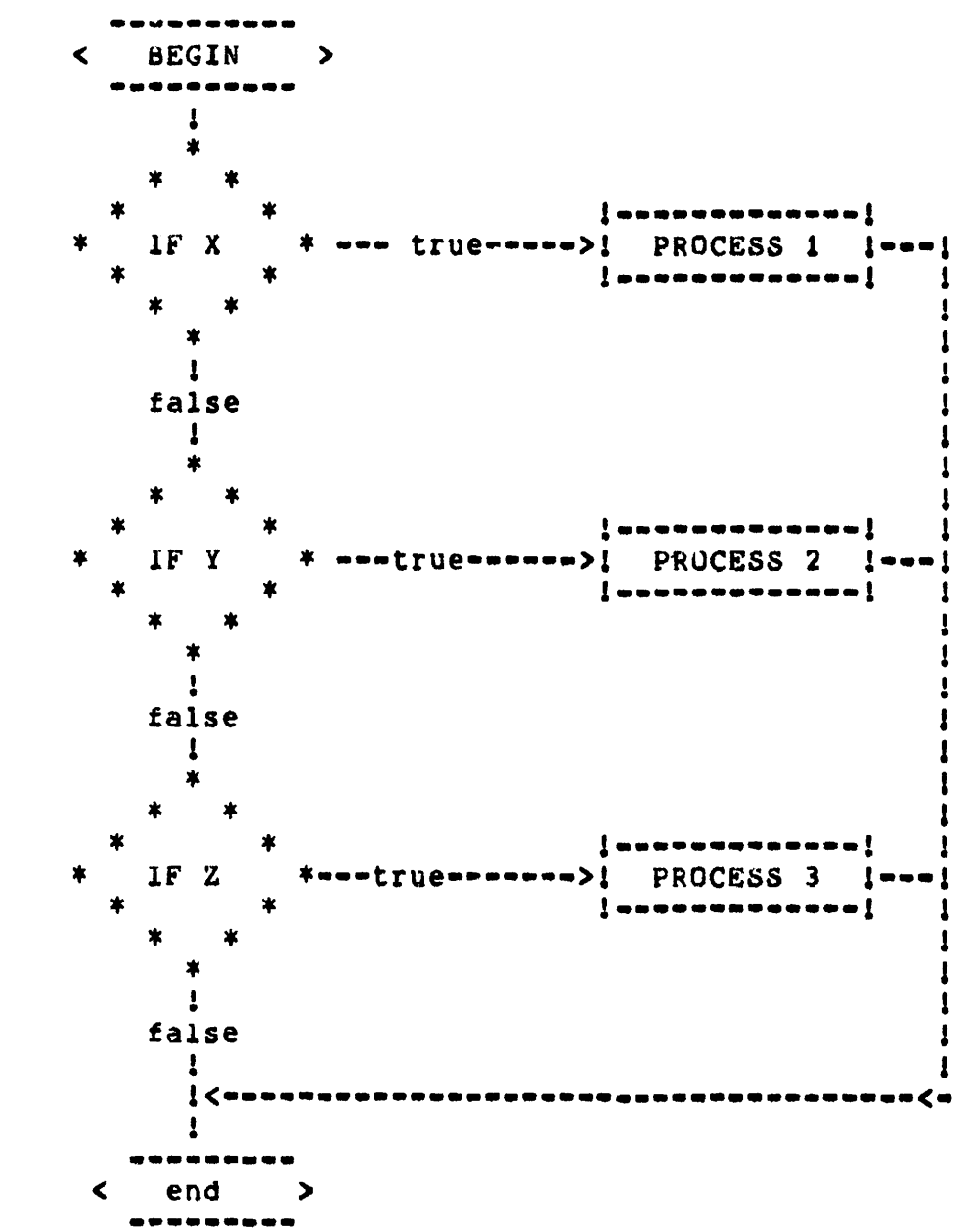


GOALS

1 PROCESS 1
2 PROCESS 2
3 PROCESS 3

A L T E R N A T I O N

FLOW

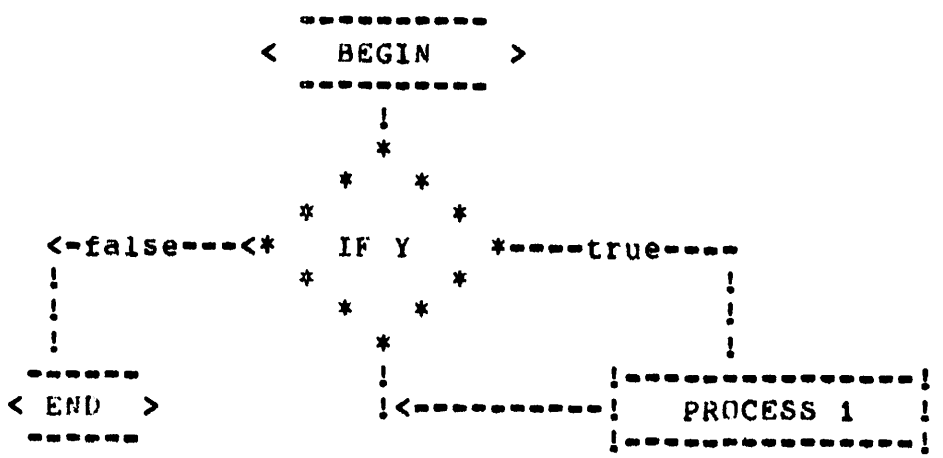


GOALS

```
IF X IS TRUE
   PROCESS 1
IF Y IS TRUE
   PROCESS 2
IF Z IS TRUE
.  PROCESS 3
```

R E P E T I T I O N

FLOW



GOALS

```
REPEAT UNTIL Y IS FALSE
   PROCESS 1
      PROCESS 1A
      PROCESS 1B
!     PROCESS 1C
```

Processes 1A through 1C were added to show a simple subsequence. NOTE: The exclamation point is used to signify control in the REPEAT loop. If the condition is met the control passes to the statement following the (!) on the same level. If the following statement is on a higher level periods terminating an IF block or exclamations ending higher level REPEATS will be present.

DATA STRUCTURING

Goals is also used to represent data structure. As with control structure there are three general structures which can be represented.

Data items listed line after line represent sequence:

```
1  item-1
2  item-2
3  item-3
```

Subsequences are represented as sequences on a level below the item of which they are are a part.

```
1  item-1
1A     item-1A
1B     item-1B
1C     item-1C
2  item-2
3  item-3
```

****
LEVELS: are represented graphically with the use of indentation the first character in a line is considered to begin an "A" level subsequent levels are indented an additional three spaces each.

Successively lower levels (higher value characters and more deeply indented) represent subordinate processes. As will be seen in the general system structure the highest most levels are controled by increments of time; years, quarters, months, days, etc. while lower levels are controlled by events or conditions.
****
CONTROL NUMBERS:

The control numbers used in Goals are developed by alternating the use of numbers and letters to represent sucessively lower levels within the system. The system is similiar to English outlining except that only capital letters and numeric characters are used. For a given statement there is nothing to indicate its position in the hierarchy unless the entire control number is dipicted or the starting control number on the page is given.

When Goals statements are machine store the entire control number is either store or is assumed.
****

Repetition in data structuring can be represented withe either tne REPEAT or with an "S" at the end of the item name which is repeated:

```
1 item-1(S)
1A   item-1
```

```
1 REPEAT
1A    item-1
```

Example: a file of accounts

```
          Account File
1 Account(s)
1A    Account
1B    Account number
1C    Name
1D    Address(s)
1D1       Address type (h=home,w=work)
1D2       Street number
1D3       Direction
1D4       Street name
1D5       Affix
1E    Amount due
1F    Order(s)
1F1       Order number
1F2       Item(s)
1F3          Item
```

ALTERNATION:
Alternation is represented with the 1F control word or with the notation (1,0).

```
1 Segment descriptive code
2 ALT
2A    IF segment descriptive code = 1
2A1       material
2B    IF segment descriptive code = 2
2B1       supply
```

The other type of alternation is within a string of data items where the item can either exist or not exist. Another way of representin a non-required item.

```
1 item-1
2 item-2
3 item-3(1,0)
```

This says that items 1 and 2 must exits or are required where item 3 can either be there or not be there.

Discussion:

The highest level of repetition within a data structure is assumed to be the key to the file or at least the major sort sequence. If additional keys are required they can be represented with the word KEY (i.e. item-3 (KEY)) or an additional data structure can be presented to represent the structure represented when the KEY is used.

Goals can be used to represent logical structures as well as the physical implementations. It is important that the required logical views of data be derrived and documented before any physical structures be planned. A recommended goal in system design is to have a one to one relationship between the physical and the logical structures of the system. The coding complexity is reduced appreciably as well as the maintainence activity.