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Title: **Memo - A Tool for Producing and Maintaining Documents.**

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ABSTRACT

Creating and maintaining a large volume of text in a reproducible and controlled manner is a non-trivial task. This is true especially of highly structured documents, i.e. documents organized in several levels of included source files.

In fact, for large documents a considerable amount of processing is done, since the user is likely to adopt the "brute force" approach, i.e. reprocess everything to insure an up-to-date document.

This paper describes the *memo* command, that can be used for producing and maintaining a document with a minimum of processing.

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subject: **Memo - A Tool for Producing and Maintaining Documents.**
Case: **49408-121**
File: **40324-2**

date: **February 20, 1980**

from: **Eugene Cristofor**
HO 3168
1G-326A x7891

TM: **80-3168-2**

ABSTRACT

Creating and maintaining a large volume of text in a reproducible and controlled manner is a non-trivial task. This is true especially of highly structured documents, i.e. documents organized in several levels of included source files.

In fact, for large documents a considerable amount of processing is done, since the user is likely to adopt the "brute force" approach, i.e. reprocess everything to insure an up-to-date document.

This paper describes the *memo* command, that can be used for producing and maintaining a document with a minimum of processing.

MEMORANDUM FOR FILE

1. Introduction

This memorandum addresses the problem of creating and maintaining large, or highly structured documents.

The manufacturing of software was considerably eased by the *make*(1) [3] facility, that uses its knowledge of dependancy and time of last change to execute only the minimum amount of work. In contrast, text formatting with *nroff*(1) or *troff*(1) [1] [2] is commonly done by a brute force method: either the user keeps track of the source files that have changed and invokes the formatters accordingly, or the whole document is placed in one (very large) file.

The *memo* command provides the user with a higher level interface to the formatters, based on the following ideas:

1. A document could, and should, be built with the *make*(1) facility, thus freeing the user from remembering what source files have changed from one version to the next, and insuring that only a minimum amount of processing will be required. The *make*(1) program requires instructions embodied in a *makefile* [3], directing *make* in the building process.
2. Even though a *makefile* could be built by the user, it is possible to build such a file automatically, thus freeing the user from any knowledge of *make*(1).

The *memo* command offers the following advantages over a manual method of producing and maintaining documents:

a. Introduces a high level, well defined interface between the user and the text formatters.

b. Insures that a minimum amount of processing will be required, without requiring any knowledge of *make*(1).

c. Maintains documents that undergo almost unlimited structural and content changes.

2. Requirements

To use *memo*, the user will have to adhere to the following restrictions:

a. One document per directory: all the source files needed for a document must reside in the same directory.

b. Local invocation: the *memo* tool must be invoked from the directory containing the files.

c. Suffix convention: each source file must have a suffix from the set below:

*.tb: *tbl*(1) source.
*.eq: *eqn*(1) or *neqn*(1) source.
*.tq: *tbl*(1) and *eqn*(1) source.
*.nr: *nroff*(1) or *troff*(1) source (except for manual pages).
*.[1-8]: *nroff*(1) or *troff*(1) source (manual pages).

d. All *.nr and *.[1-8] files may include only *.nr files, includes may be nested.

Memo uses a set of built-in transform rules, based on the file suffix. These rules are given in Appendix A.

3. Usage

3.1 Invocation

The *memo* command is invoked as follows:

memo [code] [options] stem...

The *code* consists of a hyphen and an upper case character: either -N (nroff) or -T (troff), and specifies which of the two formatters will be called. If not given, the code defaults to -N.

The options are all valid *nroff* or *troff* options. If no options are given, the *-mm* option will be suplied by default for the *.nr files, or the *-man* option for the *.[1-8] files.

One or more *stems* are also required; a *stem* is the name of a source file without the suffix. Each stem will produce a separate invocation of the formatter, and, unless overridden, the page numbers will start with 1 for each stem. For example, this document consists of a body, a manual page and 1 appendix. The source files and the corresponding stems are:

* Source files: body.nr, memo.1, appA.nr.
* Stems: body, memo, appA.

These source files include other files via the *.so* nroff macro, the complete document consisting of 17 source files. The document can then be produced with the command:

```
memo -rO8 -rB3 body memo appA
     or
memo 'cat myfile'
```

where *myfile* contains the options and the stems. *Memo* scans the source files given by the *stems*, and generates a *makefile* reflecting the current structure of the document, i.e. all the dependancies resulting from inclusion of files. Finally, it will invoke *make*(1) and produce the document.

It should be noted that *memo* promotes structured documents, i.e. the greatest savings are achieved when the document uses several levels of included files, and is organized into several *stems*. In such a case, *make*(1) will have to process a smaller percentage of the total number of

source files.

Returning to the previous example, if only some of files related to *appA* changed, the same invocation as before would have produced a new document without processing of the stems that remained the same.

3.2 Output

All output generated by *memo* will reside in the directory in which the command was invoked. The output consists of the formatted document and additional output.

1. The formatted document is written on a file called *memo.out*, consisting of the concatenation of all the stems given as arguments. Based on the *code* given on the command line, the complete document can be produced as follows:

   [-N] cat memo.out
   -T gcat [gcat_opt] memo.out

2. The additional output consists of two files that may be disregarded by the casual user:

   a. *memo.mk:* the makefile generated by *memo* to produce the formatted document.

   b. *memo.sl:* the *slist* [4] of all source files used to produce the document.

4. Conclusion

This paper has presented the *memo* command, used for creating and maintaining large, or highly structured documents.

To generate a document, a casual user needs only to build the source file(s) and to follow the restrictions given in Section 2 prior to invoking *memo*. A more sophisticated user may want to use the additional output, or to embed *memo* itself into a still higher level interface.

The overhead introduced by building the *makefile* dynamically was measured to be between 40 and 60 seconds (real time), for documents up to 60,000 bytes. It appears that *memo* is a reasonable tool for computer aided document preparation.

HO-3168-EC-nroff

Eugene Cristofor

Atts:
Manual page
Appendix A

References

[1] Ossanna, J. F., "NROFF/TROFF User's Manual", Memorandum for File, Oct. 11, 1976, Case 39199, File 39199-11.

[2] Smith, D. W and J. R. Mashey, "PWB/MM - Programmer's Workbench Memorandum Macros", Released Paper, Oct. 1977, Document T.2.

[3] Feldman, S. I., "Make - A Program for Maintaining Computer Programs", Computing Science Technical Report #57, Apr. 22, 1977.

[4] Wendt, T. A., "Use of Slists in a Development Environment", Memorandum for File, TM 80-3168-1, January 23, 1980.

NAME

memo — make and maintain documents

SYNOPSIS

memo [-NT] [options] stem ...

DESCRIPTION

Memo makes and maintains large, or highly structured documents.

-NT	-N (nroff), or -T (troff); default is -N.
options	any legal nroff(1) or troff(1) options; default is **-mm** for *.nr, or **-man** for *.[1-8] files.
stem	name of the source file without the suffix, each stem generates a new invocation of nroff(1) or troff(1).

Memo searches for the source files corresponding to each stem, generates a makefile that describes the dependancies, and invokes *make*(1).

FILES

memo.out	formatted document
memo.mk	makefile that produced document
memo.sl	list of names and SCCS versions
*.tx	generated text files

SEE ALSO

nroff(1), make(1), eqn(1), tbl(1), sccsfile(5), man(7)
"Memo - A Tool for Producing and Maintaining Documents", E. Cristofor, TM 80-3168-2

EXAMPLES

A document consists of abstract, body, appendix A and appendix B, contained in the source files *abs.nr, body.nr, appA.nr* and *appB.nr*. All of the following are valid uses of *memo:*

```
memo -T -rO8 abs body appA appB
memo appA appB
memo -rC3 abs
```

CAVEAT

All source files must reside in one directory; the following suffix convention is enforced:

*.nr	nroff(1)/troff(1) source, except for manual pages.
*.[1-8]	nroff(1)/troff(1) manual pages.
*.eq	eqn(1) source.
*.tb	tbl(1) source.
*.tq	tbl(1) and eqn(1) source.

BUGS

Appendix A - Transform Rules

Memo processing is based on the file suffix and the value of the [-NT] flag. The built-in transforms are performed in the following order:

a. Preprocessing: low level files (*.tb, *.eq, *.tq) are preprocessed and the corresponding *nroff*(1) source files are produced.

```
*.tb ----> tbl ----> *.nr
*.eq ----> $EQ ----> *.nr
*.tq -> tbl | $EQ -> *.nr
```

b. Text generation: *nroff*(1) source files are formatted into corresponding text files.

```
*.nr ----> $ROFF -mm | $PP ----> *.tx
*.[1-8] --> $ROFF -man | $PP --> *.tx
```

c. Formatted document: text files are concatenated into one document.

```
*.tx ---> cat ---> memo.out
```

The [-NT] flag determines the programs called; if not given, the default is -N.

Program	-N	-T
EQ	neqn	eqn
ROFF	nroff	troff -g
PP	col	cat