* System Proggramming and Operating System (SPOS) - Case Study - 2

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## GNU M4 Macro Processor

GNU M4 is an implementation of traditional UNIX macro processor. It is mostly SVR4 compatible, although it has some extensions.

M4 also has built-in function for including files, running shell commands, doing arithmetic etc.

History -

GNU M4 was originally written by Rene Seindal, with subsequent changes by Francois Pinard and other volunteers on the Internet. All names and email addresses can be found in the files from GNU M4 distributions. This is release 1.4.19 is now considered stable.

Macro Invocation -

Macro Invocation has one of the forms. `name` which is a macro invocation without any arguments or, name (arg1, arg2, ...., argn) for n arguments.

Defining a macro -

Build-in : define (name, [expansion])

Define name to expand to expansion. If expansion is not given, it is taken to be empty. The expansion of define is void. The macro define is recognized only with parameters.

define ('too', "Hello World")

Arguments to macros -

Macros can have arguments. The $n^{th}$ argument is denoted by $n in the expansion tent. and is replaced by the nth actual argument, where the macro is expanded

Example :-

composite : exchange (arg 1, arg 2).

Conditionals loops and recursion -

Macros, expanding to plain text, perhaps with argument, are not quite enough. We would like to have macros expand to different things, based on decision taken at run-time. For that we need some kind of conditional and loops.

- If def
- If else
- Shift
- for loop
- for each
- stacks
- Composition.

Debug macros and input -

When writing macros for M4, they often do not works as intended on the first try. fortunately there is support for macros debugging in M4.

- Dumpdef
- Trace
- Debug levels
- Debug Output

Input Control -

Describes various build-in macros for controlling the input to M4.

- Dnl - deleting whitespace in input
- changequote - changing the quote characters
- changeword - changing the lexical structure of words.
- changecom - changing the correct delimiters
- M4wrap - saving text untill end of input.

File inclusion -

M4 allows you to include named files at any point in the input.

- Include - Including named files.
- Search Path - Searching for includes files.

Macros for text handling -

There are numbers of built-in in M4 for manipulating text in various ways, extracting substrings, searching, substituting and soon.

Macros for running shell commands -

There are a few built-in macros in M4 that allows you to run shell command from with M4. The definition of a valid shell command is system dependent.

- Platform macros - Determining platform.
- Syscmd - Executing simple command.
- Esyscmd - Reading output of command.
- Sysval - Exit status.
- Mkstemp - Making temporary files.