**Introduction to Operating Systems**

**Assignment -II**

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Report

Problem statement:

Implement wc as system program on xv6 OS by modifying it as implemented on current LINUX system.

Introduction:

wc command used for counting number of lines,words and bytes in specified file.

syntax : wc [OPTION]... [FILE]...

options may be:

-c, --bytes

print the byte counts

-L, --max-line-length

print the length of the longest line

-l, --lines

print the newline counts

-w, --words

print the word counts

Implementation:

We included new files getopt.c and getopt.h to xv6 directory.

And modified existing wc.c file to support for options.

1.we included getopt.h file in xv6 directory,which includes prototype for getopt.c file.

Code:

#ifndef \_GETOPT\_H\_

#define \_GETOPT\_H\_

int getopt(int, char \* const \*, const char \*);

#endif

2.we included getopt.c file also,the getopt.c file contains getopt() function.

The **getopt**() function parses the command-line arguments. Its arguments *argc* and *argv* are the argument count and array as passed to the *main*() function on program invocation. An element of *argv* that starts with '-' is an option element. The characters of this element (aside from the initial '-') are option characters. If **getopt**() is called repeatedly, it returns successively each of the option characters from each of the option elements.

Code:

//getopt.c file

#include "getopt.h"

int optind=1; // index of the next element to be processed in argv

int new\_arg=1;

int next\_char=0;

int no\_option\_fields=0;

char \*place;

int

getopt (int nargc, char \* const \*nargv, const char \*options) {

//printf(1, "place:%c\n", \*place);

int optchar;

if (optind>=nargc) { // all arguments parsed

return (-1);

}

if (new\_arg) {

place=nargv[optind];

new\_arg=0;

}

if (next\_char==0) {

if (\*place!='-') { // its a non-option

new\_arg=1;

optind++;

}

else {

place++;

next\_char++;

no\_option\_fields++;

}

return(-2);

}

optchar=\*place++;

next\_char++;

if (optchar=='\0') {

new\_arg=1; // proceed to the next argument in the next iteration

next\_char=0;

optind++;

return -2;

}

return(optchar);

}

3.we modified existing wc file,such that it supports for options like –l,-c ,-w and –L.

Modified code of wc.c

for(i=0; i<n; i++){

c++;

if(buf[i] == '\n') {

if (c-line\_beg-1>max\_line\_length) {

max\_line\_length=c-line\_beg-1;

line\_beg=c;

}

l++;

}

if(strchr(" \r\t\n\v", buf[i]))

inword = 0;

else if(!inword){

w++;

inword = 1;

}

}

Citations:

1. <http://man7.org/linux/man-pages/man3/getopt.3.html>
2. <https://github.com/freebsd/freebsd/blob/master/lib/libc/stdlib/getopt_long.c#L402>