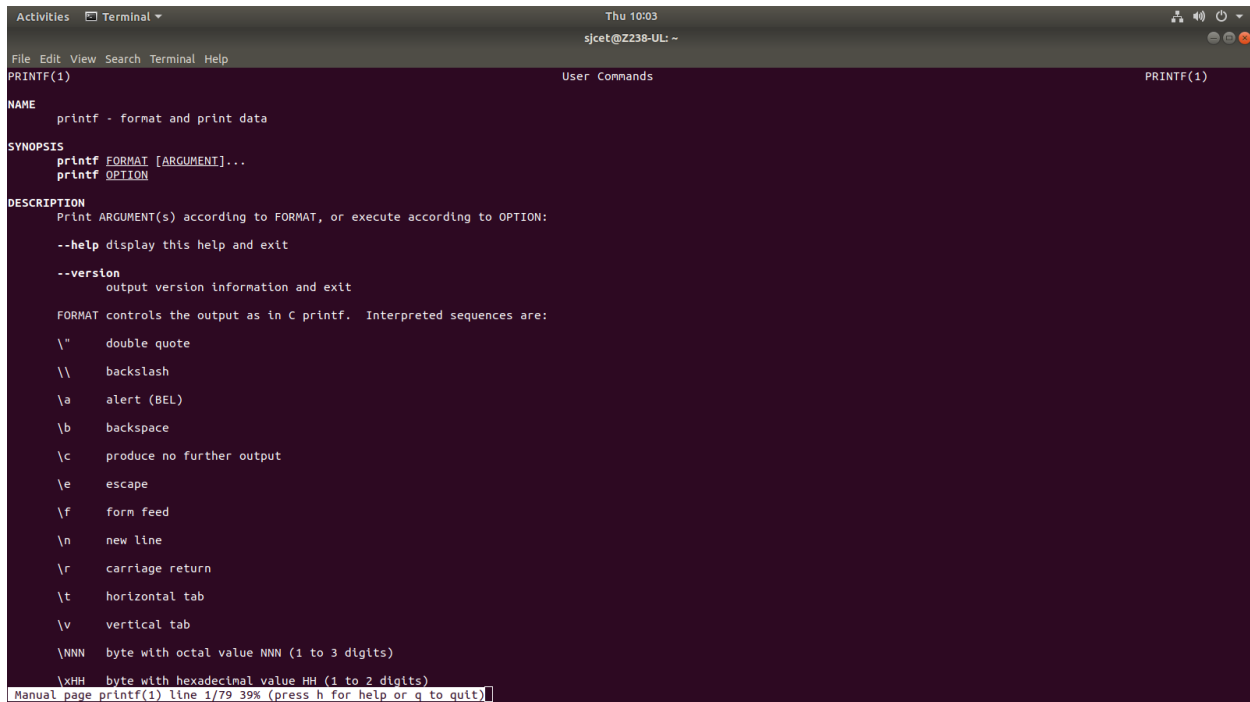


2. Study of a terminal based text editor such as Vim or Emacs. (By the end of the course, students are expected to acquire following skills in using the editor: cursor operations, manipulate text, search for patterns, global search and replace) Basic Linux commands, familiarity with following commands/operations expected

1. man
2. ls, echo, read
3. more, less, cat,
4. cd, mkdir, pwd, find
5. mv, cp, rm ,tar
6. wc, cut, paste
7. head, tail, grep, expr
- 8 chmod, chown
9. Redirections & Piping
10. useradd, usermod, userdel, passwd
11. df,top, ps
- 12 ssh, scp, ssh-keygen, ssh-copy-id.

1_cmd: \$ man printf



The screenshot shows a terminal window with a dark background. The title bar at the top indicates 'Activities' and 'Terminal'. The terminal content displays the man page for the 'printf' command. The page is titled 'printf(1)' and 'User Commands'. It includes sections for NAME, SYNOPSIS, and DESCRIPTION. The DESCRIPTION section explains that printf prints arguments according to a format or option, and lists various escape sequences like \", \\, \a, \b, \c, \e, \f, \n, \r, \t, \v, \NNN, and \xHH. The bottom of the screen shows the status 'Manual page printf(1) line 1/79 39% (press h for help or q to quit)'.

```
Activities Terminal Thu 10:03
sjcet@Z238-UL: ~
File Edit View Search Terminal Help
printf(1) User Commands printf(1)
NAME
    printf - format and print data
SYNOPSIS
    printf FORMAT [ARGUMENT]...
    printf OPTION
DESCRIPTION
    Print ARGUMENT(s) according to FORMAT, or execute according to OPTION:
    --help display this help and exit
    --version output version information and exit
    FORMAT controls the output as in C printf. Interpreted sequences are:
    \" double quote
    \\ backslash
    \a alert (BEL)
    \b backspace
    \c produce no further output
    \e escape
    \f form feed
    \n new line
    \r carriage return
    \t horizontal tab
    \v vertical tab
    \NNN byte with octal value NNN (1 to 3 digits)
    \xHH byte with hexadecimal value HH (1 to 2 digits)
Manual page printf(1) line 1/79 39% (press h for help or q to quit)
```

```
Activities Terminal Thu 10:03 sjcet@Z238-UL: ~
File Edit View Search Terminal Help
\r carriage return
\t horizontal tab
\v vertical tab
\NNN byte with octal value NNN (1 to 3 digits)
\HHH byte with hexadecimal value HH (1 to 2 digits)
\HHHHH Unicode (ISO/IEC 10646) character with hex value HHHH (4 digits)
\HHHHHHHHH Unicode character with hex value HHHHHHHH (8 digits)
%% a single %
%b ARGUMENT as a string with '\' escapes interpreted, except that octal escapes are of the form \0 or \0NNN
%q ARGUMENT is printed in a format that can be reused as shell input, escaping non-printable characters with the proposed POSIX '$' syntax.
and all C format specifications ending with one of diouxXfeGcs, with ARGUMENTs converted to proper type first. Variable widths are handled.
NOTE: your shell may have its own version of printf, which usually supersedes the version described here. Please refer to your shell's documentation for details about the options it supports.
AUTHOR
Written by David MacKenzie.
REPORTING BUGS
GNU coreutils online help: <http://www.gnu.org/software/coreutils/>
Report printf translation bugs to <http://translationproject.org/team/>
COPYRIGHT
Copyright © 2017 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.
SEE ALSO
printf(3)
Full documentation at: <http://www.gnu.org/software/coreutils/printf>
or available locally via: info '(coreutils) printf invocation'
GNU coreutils 8.28 January 2018 PRINTF(1)
Manual page printf(1) line 36/79 (END) (press h for help or q to quit)
```

cmd: \$ man 2 intro

```
Activities Terminal Thu 10:05 sjcet@Z238-UL: ~
File Edit View Search Terminal Help
INTRO(2) Linux Programmer's Manual INTRO(2)
NAME
intro - introduction to system calls
DESCRIPTION
Section 2 of the manual describes the Linux system calls. A system call is an entry point into the Linux kernel. Usually, system calls are not invoked directly:
instead, most system calls have corresponding C library wrapper functions which perform the steps required (e.g., trapping to kernel mode) in order to invoke the
system call. Thus, making a system call looks the same as invoking a normal library function.
In many cases, the C library wrapper function does nothing more than:
* copying arguments and the unique system call number to the registers where the kernel expects them;
* trapping to kernel mode, at which point the kernel does the real work of the system call;
* setting errno if the system call returns an error number when the kernel returns the CPU to user mode.
However, in a few cases, a wrapper function may do rather more than this, for example, performing some preprocessing of the arguments before trapping to kernel
mode, or postprocessing of values returned by the system call. Where this is the case, the manual pages in Section 2 generally try to note the details of both the
(usually GNU) C library API interface and the raw system call. Most commonly, the main DESCRIPTION will focus on the C library interface, and differences for the
system call are covered in the NOTES section.
For a list of the Linux system calls, see syscalls(2).
RETURN VALUE
On error, most system calls return a negative error number (i.e., the negated value of one of the constants described in errno(3)). The C library wrapper hides
this detail from the caller: when a system call returns a negative value, the wrapper copies the absolute value into the errno variable, and returns -1 as the
return value of the wrapper.
The value returned by a successful system call depends on the call. Many system calls return 0 on success, but some can return nonzero values from a successful
call. The details are described in the individual manual pages.
In some cases, the programmer must define a feature test macro in order to obtain the declaration of a system call from the header file specified in the man page
SYNOPSIS section. (Where required, these feature test macros must be defined before including any header files.) In such cases, the required macro is described in
the man page. For further information on feature test macros, see feature_test_macros(7).
CONFORMING TO
Certain terms and abbreviations are used to indicate UNIX variants and standards to which calls in this section conform. See standards(7).
NOTES
Calling directly
In most cases, it is unnecessary to invoke a system call directly, but there are times when the Standard C library does not implement a nice wrapper function for
you. In this case, the programmer must manually invoke the system call using syscall(2). Historically, this was also possible using one of the _syscall macros
Manual page intro(2) line 1 (press h for help or q to quit)
```

```
Activities Terminal Thu 10:05
sjcet@Z238-UL: ~

File Edit View Search Terminal Help

* trapping to kernel mode, at which point the kernel does the real work of the system call;
* setting errno if the system call returns an error number when the kernel returns the CPU to user mode.

However, in a few cases, a wrapper function may do rather more than this, for example, performing some preprocessing of the arguments before trapping to kernel mode, or postprocessing of values returned by the system call. Where this is the case, the manual pages in Section 2 generally try to note the details of both the (usually GNU) C library API interface and the raw system call. Most commonly, the main DESCRIPTION will focus on the C library interface, and differences for the system call are covered in the NOTES section.

For a list of the Linux system calls, see syscalls(2).

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In some cases, the programmer must define a feature test macro in order to obtain the declaration of a system call from the header file specified in the man page SYNOPSIS section. (Where required, these feature test macros must be defined before including any header files.) In such cases, the required macro is described in the man page. For further information on feature test macros, see feature_test_macros(7).

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Calling directly
In most cases, it is unnecessary to invoke a system call directly, but there are times when the Standard C library does not implement a nice wrapper function for you. In this case, the programmer must manually invoke the system call using syscall(2). Historically, this was also possible using one of the _syscall macros described in _syscall(2).

Authors and copyright conditions
Look at the header of the manual page source for the author(s) and copyright conditions. Note that these can be different from page to page!

SEE ALSO
_syscall(2), syscall(2), syscalls(2), errno(3), intro(3), capabilities(7), credentials(7), feature_test_macros(7), nq_overview(7), path_resolution(7), pipe(7), pty(7), sem_overview(7), shm_overview(7), signal(7), socket(7), standards(7), svipc(7), symlink(7), time(7)

COLOPHON
This page is part of release 4.15 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man-pages/.

Linux 2017-09-15 INTRO(2)
Manual page intro(2) line 15/58 (END) (press h for help or q to quit)
```

cmd: \$ man -f ls

```
Activities Terminal Thu 10:24
sjcet@Z238-UL: ~

File Edit View Search Terminal Help

sjcet@Z238-UL:~$ man 2 intro
sjcet@Z238-UL:~$ man -f ls
ls (1) - list directory contents
sjcet@Z238-UL:~$
```

cmd: \$ man -a intro

```
Activities Terminal Thu 10:31 sjcet@Z238-UL: ~
File Edit View Search Terminal Help
 4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31

$ ls
bin tel
$ ls -l
total 2
drwxr-xr-x 2 aeb 1024 Aug 6 23:51 bin
-rw-r--r-- 1 aeb 37 Aug 6 23:52 tel
$ cat tel
maja 0501-1136285
peter 0136-7399214
$ cp tel tel2
$ ls -l
total 3
drwxr-xr-x 2 aeb 1024 Aug 6 23:51 bin
-rw-r--r-- 1 aeb 37 Aug 6 23:52 tel
-rw-r--r-- 1 aeb 37 Aug 6 23:53 tel2
$ mv tel tel1
$ ls -l
total 3
drwxr-xr-x 2 aeb 1024 Aug 6 23:51 bin
-rw-r--r-- 1 aeb 37 Aug 6 23:52 tel1
-rw-r--r-- 1 aeb 37 Aug 6 23:53 tel2
$ diff tel1 tel2
$ rm tel1
$ grep maja tel2
maja 0501-1136285
$

Here typing Control-D ended the session.

The $ here was the command prompt—it is the shell's way of indicating that it is ready for the next command. The prompt can be customized in lots of ways, and one might include stuff like username, machine name, current directory, time, and so on. An assignment PS1="What next, master? " would change the prompt as indicated.

We see that there are commands date (that gives date and time), and cal (that gives a calendar).

The command ls lists the contents of the current directory—it tells you what files you have. With a -l option it gives a long listing, that includes the owner and size and date of the file, and the permissions people have for reading and/or changing the file. For example, the file "tel" here is 37 bytes long, owned by aeb and the owner can read and write it, others can only read it. Owner and permissions can be changed by the commands chown and chmod.

The command cat will show the contents of a file. (The name is from "concatenate and print": all files given as parameters are concatenated and sent to "standard output".)

Manual page intro(1) line 36/141 47% (press h for help or q to quit)
```

```
Activities Terminal Thu 10:31 sjcet@Z238-UL: ~
File Edit View Search Terminal Help
INTRO(1) Linux User's Manual INTRO(1)

NAME
intro - introduction to user commands

DESCRIPTION
Section 1 of the manual describes user commands and tools, for example, file manipulation tools, shells, compilers, web browsers, file and image viewers and editors, and so on.

NOTES
Linux is a flavor of UNIX, and as a first approximation all user commands under UNIX work precisely the same under Linux (and FreeBSD and lots of other UNIX-like systems).

Under Linux, there are GUIs (graphical user interfaces), where you can point and click and drag, and hopefully get work done without first reading lots of documentation. The traditional UNIX environment is a CLI (command line interface), where you type commands to tell the computer what to do. That is faster and more powerful, but requires finding out what the commands are. Below a bare minimum, to get started.

Login
In order to start working, you probably first have to open a session by giving your username and password. The program login(1) now starts a shell (command interpreter) for you. In case of a graphical login, you get a screen with menus or icons and a mouse click will start a shell in a window. See also xterm(1).

The shell
One types commands to the shell, the command interpreter. It is not built-in, but is just a program and you can change your shell. Everybody has her own favorite one. The standard one is called sh. See also ash(1), bash(1), chsh(1), csh(1), dash(1), ksh(1), zsh(1).

A session might go like:

knuth login: aeb
Password: *****
$ date
Tue Aug 6 23:50:44 CEST 2002
$ cal
      August 2002
Su Mo Tu We Th Fr Sa
          1  2  3
 4  5  6  7  8  9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31

$ ls
bin tel
$ ls -l
total 2
```

```
Manual page intro(1) line 1/141 25% (press h for help or q to quit)
```

```
Activities Terminal Thu 10:31 sjcet@Z238-UL: ~
File Edit View Search Terminal Help

The command cp (from "copy") will copy a file.

The command mv (from "move"), on the other hand, only renames it.

The command diff lists the differences between two files. Here there was no output because there were no differences.

The command rm (from "remove") deletes the file, and be careful! it is gone. No wastepaper basket or anything. Deleted means lost.

The command grep (from "g/re/p") finds occurrences of a string in one or more files. Here it finds Maja's telephone number.

Pathnames and the current directory
Files live in a large tree, the file hierarchy. Each has a pathname describing the path from the root of the tree (which is called /) to the file. For example, such a full pathname might be /home/aeb/tel. Always using full pathnames would be inconvenient, and the name of a file in the current directory may be abbreviated by giving only the last component. That is why /home/aeb/tel can be abbreviated to tel when the current directory is /home/aeb.

The command pwd prints the current directory.

The command cd changes the current directory.

Try alternatively cd and pwd commands and explore cd usage: "cd", "cd .", "cd ..", "cd /" and "cd ~".

Directories
The command mkdir makes a new directory.

The command rmdir removes a directory if it is empty, and complains otherwise.

The command find (with a rather baroque syntax) will find files with given name or other properties. For example, "find . -name tel" would find the file tel starting in the present directory (which is called .). And "find / -name tel" would do the same, but starting at the root of the tree. Large searches on a multi-GB disk will be time-consuming, and it may be better to use locate(1).

Disks and filesystems
The command mount will attach the filesystem found on some disk (or floppy, or CDROM or so) to the big filesystem hierarchy. And umount detaches it again. The command df will tell you how much of your disk is still free.

Processes
On a UNIX system many user and system processes run simultaneously. The one you are talking to runs in the foreground, the others in the background. The command ps will show you which processes are active and what numbers these processes have. The command kill allows you to get rid of them. Without option this is a friendly request: please go away. And "kill -9" followed by the number of the process is an immediate kill. Foreground processes can often be killed by typing Control-C.

Getting information
There are thousands of commands, each with many options. Traditionally commands are documented on man pages, (like this one), so that the command "man kill" will document the use of the command "kill" (and "man man" document the command "man"). The program man sends the text through some pager, usually less. Hit the space

Manual page intro(1) line 81/141 85% (press h for help or q to quit)

Activities Terminal Thu 10:31 sjcet@Z238-UL: ~
File Edit View Search Terminal Help

The command cd changes the current directory.

Try alternatively cd and pwd commands and explore cd usage: "cd", "cd .", "cd ..", "cd /" and "cd ~".

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The command rmdir removes a directory if it is empty, and complains otherwise.

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In documentation it is customary to refer to man pages by giving the name and section number, as in man(1). Man pages are terse, and allow you to find quickly some forgotten detail. For newcomers an introductory text with more examples and explanations is useful.

A lot of GNU/FSF software is provided with info files. Type "info info" for an introduction on the use of the program info.

Special topics are often treated in HOWTOS. Look in /usr/share/doc/howto/en and use a browser if you find HTML files there.

SEE ALSO
ash(1), bash(1), chsh(1), csh(1), dash(1), ksh(1), locate(1), login(1), man(1), xterm(1), zsh(1), wait(2), stdout(3), man-pages(7), standards(7)

COLOPHON
This page is part of release 4.15 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man-pages/.

Linux 2015-07-23 INTRO(1)
Manual page intro(1) line 98/141 (END) (press h for help or q to quit)
```

cmd: \$ man -k cd

```
Activities Terminal Thu 10:39
sjcet@Z238-UL: ~

File Edit View Search Terminal Help
sjcet@Z238-UL:~$ man -k cd
apt-cdrom (8) - APT CD-ROM management utility
cd-create-profile (1) - Color Manager Profile Creation Tool
cd-fix-profile (1) - Color Manager Testing Tool
cd-it8 (1) - Color Manager Testing Tool
cdbs-edit-patch (1) - create or edit a CDBS simple-patchsys.mk patch
gcov-dump (1) - offline gcda and gcno profile dump tool
gcov-dump-7 (1) - offline gcda and gcno profile dump tool
gcov-tool (1) - offline gcda profile processing tool
gcov-tool-7 (1) - offline gcda profile processing tool
hex2hcd (1) - firmware converter
hipercdecode (1) - Decode a HIPERC stream into human readable form.
mcd (1) - change MSDOS directory
Net::DNS::RR::CDNSKEY (3pm) - DNS CDNSKEY resource record
Net::DNS::RR::CDS (3pm) - DNS CDS resource record
rsyncd.conf (5) - configuration file for rsync in daemon mode
sbigtogpn (1) - convert an SBIG CCDOPS file into a portable graymap
systemd-timesyncd (8) - Network Time Synchronization
systemd-timesyncd.service (8) - Network Time Synchronization
tcdrain (3) - get and set terminal attributes, line control, get and...
timesyncd.conf (5) - Network Time Synchronization configuration files
timesyncd.conf.d (5) - Network Time Synchronization configuration files
x86_64-linux-gnu-gcov-dump (1) - offline gcda and gcno profile dump tool
x86_64-linux-gnu-gcov-dump-7 (1) - offline gcda and gcno profile dump tool
x86_64-linux-gnu-gcov-tool (1) - offline gcda profile processing tool
x86_64-linux-gnu-gcov-tool-7 (1) - offline gcda profile processing tool
XkbAllocDeviceInfo (3) - Obtain an XkbDeviceInfoRec structure
XkbAllocDeviceLedInfo (3) - Obtain an XkbDeviceLedInfoRec structure
XML::LibXML::CDATASection (3pm) - XML::LibXML Class for CDATA Sections
XwcDrawImageString (3) - draw image text using a single font set
XwcDrawString (3) - draw text using a single font set
XwcDrawText (3) - draw text using multiple font sets
sjcet@Z238-UL:~$
```

cmd: \$ man -w ls

```
Activities Terminal Thu 10:40
sjcet@Z238-UL: ~

File Edit View Search Terminal Help
sjcet@Z238-UL:~$ man -k cd
apt-cdrom (8) - APT CD-ROM management utility
cd-create-profile (1) - Color Manager Profile Creation Tool
cd-fix-profile (1) - Color Manager Testing Tool
cd-it8 (1) - Color Manager Testing Tool
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XwcDrawImageString (3) - draw image text using a single font set
XwcDrawString (3) - draw text using a single font set
XwcDrawText (3) - draw text using multiple font sets
sjcet@Z238-UL:~$ man -w ls
/usr/share/man/man1/ls.1.gz
sjcet@Z238-UL:~$
```

cmd: \$ man -I printf

```
Activities Terminal Thu 10:41
sjcet@Z238-UL: ~

File Edit View Search Terminal Help
PRINTF(1) User Commands PRINTF(1)

NAME
    printf - format and print data

SYNOPSIS
    printf FORMAT [ARGUMENT]...
    printf OPTION

DESCRIPTION
    Print ARGUMENT(s) according to FORMAT, or execute according to OPTION:

    --help display this help and exit

    --version
        output version information and exit

    FORMAT controls the output as in C printf. Interpreted sequences are:

    \" double quote
    \\ backslash
    \a alert (BEL)
    \b backspace
    \c produce no further output
    \e escape
    \f form feed
    \n new line
    \r carriage return
    \t horizontal tab
    \v vertical tab
    \NNN byte with octal value NNN (1 to 3 digits)
    \xHH byte with hexadecimal value HH (1 to 2 digits)
Manual page printf(1) line 1/79 39% (press h for help or q to quit)
```

```
Activities Terminal Thu 10:41
sjcet@Z238-UL: ~

File Edit View Search Terminal Help
\r carriage return
\t horizontal tab
\v vertical tab
\NNN byte with octal value NNN (1 to 3 digits)
\xHH byte with hexadecimal value HH (1 to 2 digits)
\UHHHH Unicode (ISO/IEC 10646) character with hex value HHHH (4 digits)
\UHHHHHHHH Unicode character with hex value HHHHHHHH (8 digits)
%% a single %
%b ARGUMENT as a string with '\' escapes interpreted, except that octal escapes are of the form \0 or \0NNN
%q ARGUMENT is printed in a format that can be reused as shell input, escaping non-printable characters with the proposed POSIX '$' syntax.
and all C format specifications ending with one of dlouxXfeEgGcs, with ARGUMENTs converted to proper type first. Variable widths are handled.
NOTE: your shell may have its own version of printf, which usually supersedes the version described here. Please refer to your shell's documentation for details about the options it supports.

AUTHOR
    Written by David MacKenzie.

REPORTING BUGS
    GNU coreutils online help: <http://www.gnu.org/software/coreutils/>
    Report printf translation bugs to <http://translationproject.org/team/>

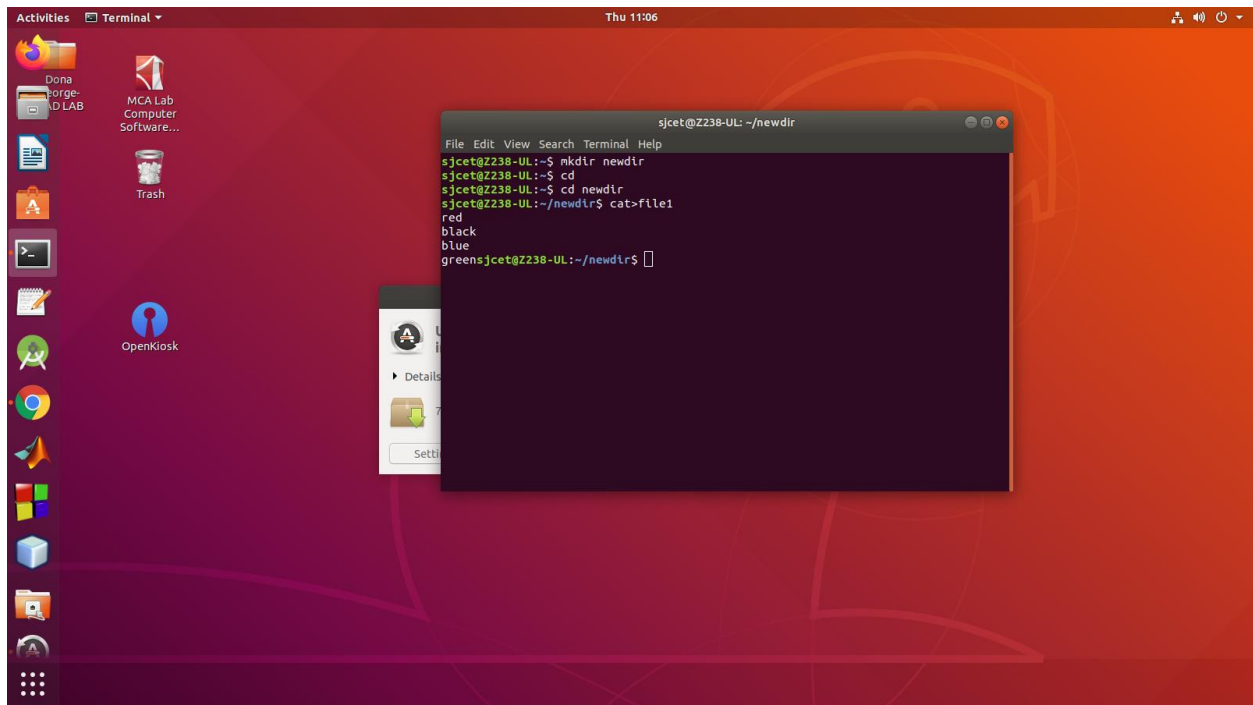
COPYRIGHT
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    This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
    printf(3)

    Full documentation at: <http://www.gnu.org/software/coreutils/printf>
    or available locally via: info '(coreutils) printf invocation'

GNU coreutils 8.28 January 2018
Manual page printf(1) line 36/79 (END) (press h for help or q to quit)
```

2_cmd:
mkdir newdir
Cd newdir
cat>files

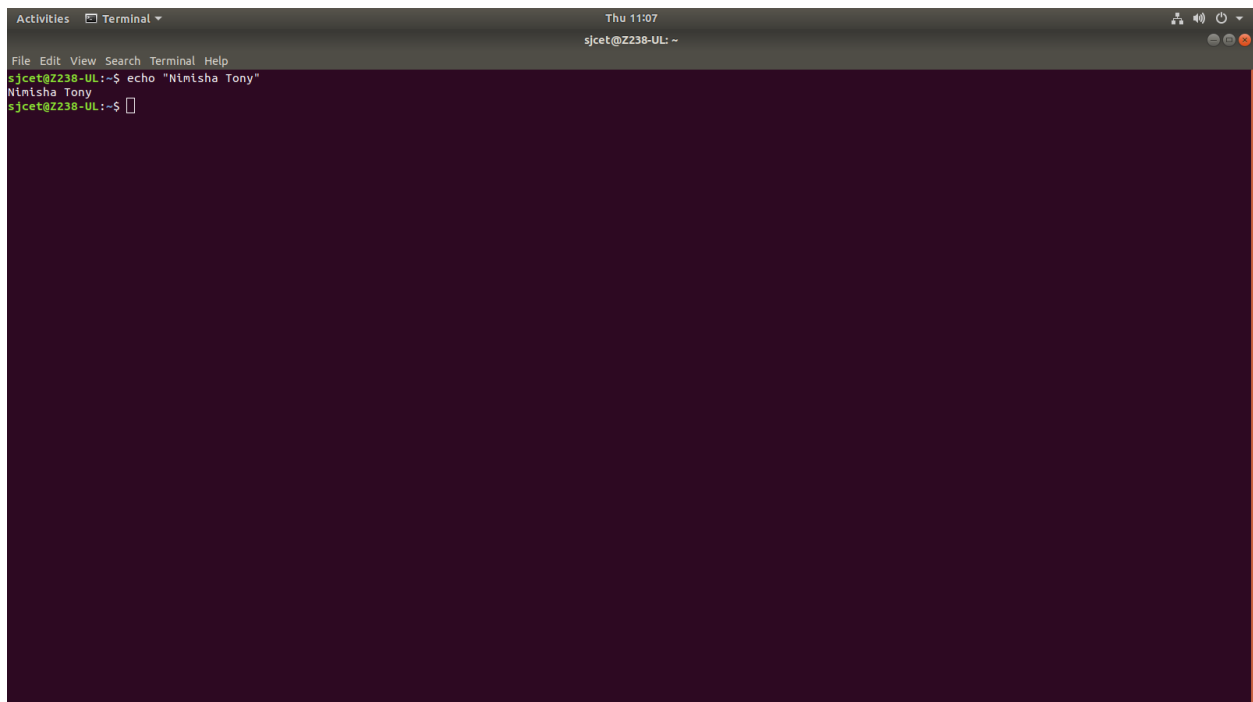


The screenshot shows a Linux desktop with a red and orange background. A terminal window is open, displaying the following commands and output:

```
sjcet@Z238-UL: ~/newdir
File Edit View Search Terminal Help
sjcet@Z238-UL:~$ mkdir newdir
sjcet@Z238-UL:~$ cd
sjcet@Z238-UL:~$ cd newdir
sjcet@Z238-UL:~/newdir$ cat>file1
red
black
blue
greensjcet@Z238-UL:~/newdir$
```

The desktop also shows a sidebar with various application icons and a top bar with system status indicators.

Cmd: echo



The screenshot shows a terminal window with the following commands and output:

```
sjcet@Z238-UL:~$ echo "Ninisha Tony"
Ninisha Tony
sjcet@Z238-UL:~$
```

The terminal window is titled "Terminal" and shows the user's prompt as "sjcet@Z238-UL:~".