

COMP1001

Computer Systems

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UNIX

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- ❑ UNIX is a family of multitasking, multiuser computer operating systems (OS)
- ❑ UNIX is most written using C programming language, which allows UNIX to operate on numerous platforms
- ❑ There are many different versions of UNIX, although they share many things in common
- ❑ UNIX is command line oriented, but a graphical interface is supported

Linux

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- ❑ Linux is the spiritual successor to the original UNIX system
- ❑ Linux is one of the most popular OS
- ❑ Linux is used everywhere
 - ▣ Smartphones, cars, supercomputers and home appliances, home desktop PCs, etc
- ❑ Why Linux?
 - ▣ It is free
 - ▣ It is open source – a linux user can control every aspect of the OS
 - ▣ Reliable
 - ▣ Consumes less hardware resources – it is faster than windows
 - ▣ Security
 - ▣ No need for reboots ...

Linux Distributions

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- ❑ Linux has a number of different versions to suit any type of user – these versions are called distributions
 - ▣ Examples include Ubuntu, Debian, Fedora etc
- ❑ How to install Linux? - Check this link
<https://www.pcworld.com/article/2918397/how-to-get-started-with-linux-a-beginners-guide.html>
 - ▣ Install a 2nd OS
 - ▣ Use a Virtual Machine
 - ▣ Run it from a DVD/USB
 - ▣ Use Windows Subsystem for Linux

What do you need to know?

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- ☐ Print your working directory
- ☐ Change directories & list all contents
- ☐ Create a file & a directory
- ☐ Redirect the output of a file
- ☐ Delete files/directories

1st Activity

(see the Linux_Basics.pdf for more information)

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- Open a terminal and type the following commands. What do they do?
 - ▣ *uname -a*
 - ▣ *man uname*
 - ▣ *Pwd*
 - ▣ *Echo* hi there
 - ▣ Use '*cd*' command to change directory
 - ▣ Use '*cat*' and '*nano*' to see the contents of a file
 - ▣ Use '*touch*' command to create a file
 - ▣ Use '*rm*' command to delete a file

Superuser

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- The superuser or root user, is a special user account who has all the rights or permissions to all the files and programs
- There are two different ways to log in as superuser :
 - ▣ Type '**su**' at the command line
 - ▣ Execute any command using the word '**sudo**' before the command

Ownership of Linux Files

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- Any file or directory has three sets of access permissions
 - ▣ -r (read)
 - ▣ -w (write)
 - ▣ -x (execute)
- Any file has 3 classes of people who can access it:
 - ▣ User, (owner) -u
 - ▣ Group -g
 - Groups are collections of zero or more users
 - A user belongs to a default group and can also be a member of any of the other groups
 - ▣ Other -o
 - Any other user that has access to a file

Read, write, execute permissions (1)

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- Permissions are the rights to act on a file or directory
 - ▣ Read permission (r) : allows the contents of the file/directory to be viewed
 - ▣ Write permission (w): allows to modify the contents of that file. For a directory, it allows to add/delete files
 - ▣ Execute permission (x): allows to run that file or search a directory
- To view the permissions on a file or directory, type '**ls -l**'

Read, write, execute permissions (2)

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1. File/directory permission rights, user, group, other
2. Link count
3. User name of person who owns the entry
4. Group that owns the file/directory
5. Size (in bytes)
6. Date file last modified
7. Name of file or directory

This is an example of the output the
ls -l
command might give

(1)	(2)	(3)	(4)	(5)	(6)	(7)
-rw-rw-r--	1	pb	staff	31200	Sep 3 08:30	intro.ps
drwx-----	5	pb	staff	512	Jul 8 09:33	private/
drwxrwxr-x	2	pb	staff	512	Jul 8 09:35	doc/
drwxrwx---	2	pb	student	512	Aug 3 14:13	student-proj/
-rw-r--r--	1	pb	staff	9423	Feb 24 2003	program.c
-rwxr-xr-x	1	pb	staff	20471	Feb 24 2003	program
drwx--x--x	4	pb	faculty	512	Jul 31 10:31	lib/
drwx-----	3	pb	staff	1024	Aug 29 06:52	mail/
drwxrwxrwx	3	pb	staff	512	Jul 8 09:35	test/

Change permissions using chmod command

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- Use chmod to give permission to write the file to group members and others
 - ▣ u – user , g – group, o – others , a – all
 - ▣ + to add permission , – to remove permission , = to assign permission
 - ▣ r w x is used for read , write, execute

- Examples:
 - ▣ Chmod u+w file , assigns execute permission to user
 - ▣ Chmod o-x file, removes execute permission to other users
 - ▣ Chmod a+rw file, assigns read, write, execute permission to all

Using gcc compiler via terminal (1)

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- You can compile your code using gcc compiler via terminal and run it
- How to compile:
 - ▣ ***gcc source_code.c -o executable_name -options***
- How to run it:
 - ▣ ***./executable_name*** (arguments)

Using gcc compiler via terminal (2)

without using input arguments

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```
#include <stdio.h> //needed for printf()
```

```
int main(){
```

```
printf("\nHello World\n");
```

```
return 0;  
}
```



□ How to compile:

▣ ***gcc hello_world.c -o exec1***

□ How to run it:

▣ ***./exec1***

□ Output:

Hello World

Using gcc compiler via terminal (3)

using input arguments

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```
#include <stdio.h> //needed for printf()
```

```
int main(int argc, char *argv[]){
```

```
    int i;  
    printf("\n argc = %d \n", argc);
```

```
    for (i=0; i<argc; i++)  
        printf(" arg[%d] = %s ", i, argv[i] );
```

```
    return 0;  
}
```



□ How to compile:

▣ **gcc program1.c -o exec1**

□ How to run it:

▣ **./exec1 arg1 arg2**

□ Output:

argc = 3

arg[0] = ./exec1

arg[1] = arg1

arg[2] = arg2

Further Reading

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- The Linux command line for beginners ,
<https://ubuntu.com/tutorials/command-line-for-beginners#3-opening-a-terminal>

Thank you