Network Engineering 2019 Exercises - Unit 1

1 Basic POSIX file permissions

Write a shell-script called unit1-solution1.sh that creates directories inside a directory called unit1exercise1 with the following properties, and then creates a compressed tar file called unit1-solution1.tgz

- 1. angeraucher, mode r-x-wxrw-
- 2. aussetzte, mode -w-rw-rw-
- 3. angetrautest, mode rwxrwx--x
- 4. enschmeckse, mode rw-r-x--x
- 5. zerfahrer, mode --xr-xr--
- 6. angekraust, mode rw-rw-r--
- 7. angehunds, mode -wxr--r--
- 8. aufpflumheit, mode ----rw-
- 9. aussetzte/gehundte, mode rw---xrw-
- 10. angehunds/angesitzt, mode -wx---r-x
- 11. aufpflumheit/ausgekaesen, mode rwx-----
- 12. angekraust/geschmecken, mode r-x-wxrwx
- 13. angekraust/enkatzetete, mode r-x---w-
- 14. angehunds/angesitzt/auspflums, mode -wxrw--wx
- 15. angehunds/angesitzt/aussetzt, mode rw-r--r--
- 16. angehunds/angesitzt/angeschmecken, mode ----w-r-x
- 17. angehunds/angesitzt/aufgerennen, mode -w-r-xr-x
- 18. angehunds/angesitzt/getrauen, mode r---xrw-
- 19. aufpflumheit/ausgekaesen/eingehen, mode -w-rwx---
- 20. angehunds/angesitzt/aufsetztete, mode --xr--r-x

Your work will be **automatically marked** by comparing the contents of the compressed tar file against a template. Therefore it is important that you have every detail correct.

This exercise can be be completed using the cd, mkdir, chown, chmod and sudo shell commands, although you can use other shell commands if you wish.

An unsophisticated script to complete this would be 2412 bytes long, while a compact script would be no larger than 978.

Grading for this exercise for you is according to the following guide:

Requirement	Percentage
Correctness of solution	60%
Compactness of solution	40%

The compactness scores are according to the following table:

Length of script	Percentage
2413 bytes or more	0%
1696 - 2412 bytes	5%
979 - 1695 bytes	15%
832 - 978 bytes	25%
less than 832 bytes	40%

To test your solution, use a command like:

```
sudo tar zcf unit1-solution1.tgz unit1exercise1
./unit1-exercise-1-grade.sh unit1-solution1.sh
```

To submit your solution (which you can do as many times as you like), use a command like:

2 User and groups

Write a shell-script called unit1-solution2.sh that creates directories inside a directory called unit1exercise2 with the following properties, and then creates a compressed tar file called unit1-solution2.tgz

- 1. aufgegeht, mode -wxr-x--x, owner uucp, group dip
- 2. angetrittte, mode rwxr-xrw-, owner proxy, group tape
- 3. angehaltung, mode -wxrw--wx, owner mail, group uucp
- 4. angesprachs, mode --x--x--, owner lp, group proxy
- 5. gefahrte, mode rw-r-x-wx, owner news, group voice
- 6. versetztete, mode r--rwx--x, owner mail, group uucp

- 7. ausgesitztest, mode --x-wxr--, owner student, group voice
- 8. angekatzetete, mode ---r-x--x, owner nobody, group fax
- 9. angekatzetete/angehaltst, mode --xr-x-wx, owner news, group proxy
- 10. angehaltung/angewitzkeit, mode rw--w--x, owner student, group voice
- 11. angekatzetete/besinns, mode ---r--, owner nobody, group student
- 12. angehaltung/ausgewarfst, mode rw--wx---, owner news, group tape
- 13. gefahrte/ausfahrtete, mode ---r-xrwx, owner nobody, group student
- 14. angehaltung/angewitzkeit/einfahren, mode rw-rwxr-x, owner mail, group news
- 15. angekatzetete/angehaltst/verrauchst, mode ----wx-w-, owner mail, group student
- 16. angehaltung/angewitzkeit/aufgesinnt, mode --x--xrw-, owner games, group dip
- 17. angekatzetete/angehaltst/enwitzkeit, mode rw-r---x, owner games, group mail
- 18. gefahrte/ausfahrtete/ausgetrautest, mode r-xrwx-w-, owner proxy, group news
- 19. angekatzetete/besinns/angehunden, mode r-----, owner lp, group tape
- 20. angekatzetete/angehaltst/einrauchs, mode rw--w-wx, owner mail, group news

Your work will be **automatically marked** by comparing the contents of the compressed tar file against a template. Therefore it is important that you have every detail correct.

This exercise can be be completed using the cd, mkdir, chown, chmod and sudo shell commands, although you can use other shell commands if you wish.

An unsophisticated script to complete this would be 2425 bytes long, while a compact script would be no larger than 1179.

Grading for this exercise for you is according to the following guide:

Requirement	Percentage
Correctness of solution	60%
Compactness of solution	40%

The compactness scores are according to the following table:

Length of script	Percentage
2426 bytes or more	0%
1803 - 2425 bytes	5%
1180 - 1802 bytes	15%
1003 - 1179 bytes	25%
less than 1003 bytes	40%

To test your solution, use a command like:

```
sudo tar zcf unit1-solution2.tgz unit1exercise2
./unit1-exercise-2-grade.sh unit1-solution2.sh
```

To submit your solution (which you can do as many times as you like), use a command like:

3 Set-user and Set-group ID

Write a shell-script called unit1-solution3.sh that creates directories inside a directory called unit1exercise3 with the following properties, and then creates a compressed tar file called unit1-solution3.tgz

- 1. besinnen, mode rwx--x--, owner lp, group cdrom
- 2. aufrabarbse, mode ----x-wx, owner nobody, group cdrom, setuid
- 3. angerabarbse, mode ---rwxrwx, owner lp, group student
- 4. betrittst, mode r-x-wx-wx, owner lp, group fax
- 5. anrabarbtete, mode rwxr-x-wx, owner proxy, group audio, setuid
- 6. besprachung, mode r--r-rw-, owner news, group audio
- 7. angewitztest, mode -wxr-x---, owner mail, group cdrom
- 8. zerrabarbs, mode rw---xrwx, owner mail, group cdrom, setuid
- 9. besprachung/angekatzete, mode -w---x-x, owner games, group uucp, setuid
- 10. besinnen/ensitzse, mode --xrwxr-x, owner lp, group uucp
- 11. zerrabarbs/getrittung, mode r-x---wx, owner student, group audio, setuid

- 12. angerabarbse/aushunden, mode -wxrw-r--, owner uucp, group cdrom
- 13. angewitztest/aufschmeckung, mode -w----w-, owner mail, group dip, setuid
- 14. besinnen/ensitzse/gesetzen, mode rw---xr-x, owner proxy, group uucp
- 15. besinnen/ensitzse/enschmeckst, mode ----wx-wx, owner uucp, group cdrom, setuid
- 16. besinnen/ensitzse/ensetzst, mode r-x-wx-w-, owner games, group mail
- 17. zerrabarbs/getrittung/zerrauchheit, mode -wxr-xrwx, owner proxy, group uucp
- 18. angerabarbse/aushunden/aufgegehse, mode --xr-x--x, owner mail, group mail
- 19. besprachung/angekatzete/enkrautete, mode rwxr--rwx, owner mail, group floppy, setuid
- 20. besprachung/angekatzete/aufkaeste, mode ---rw---x, owner news, group audio, setuid

Your work will be **automatically marked** by comparing the contents of the compressed tar file against a template. Therefore it is important that you have every detail correct.

This exercise can be be completed using the cd, mkdir, chown, chmod and sudo shell commands, although you can use other shell commands if you wish.

An unsophisticated script to complete this would be 2342 bytes long, while a compact script would be no larger than 1177.

Grading for this exercise for you is according to the following guide:

Requirement	Percentage
Correctness of solution	60%
Compactness of solution	40%

The compactness scores are according to the following table:

Length of script	Percentage
2343 bytes or more	0%
1760 - 2342 bytes	5%
1178 - 1759 bytes	15%
1001 – 1177 bytes	25%
less than 1001 bytes	40%

To test your solution, use a command like:

sudo tar zcf unit1-solution3.tgz unit1exercise3
./unit1-exercise-3-grade.sh unit1-solution3.sh

To submit your solution (which you can do as many times as you like), use a command like:

4 Set-group ID Directories

Write a shell-script called unit1-solution4.sh that creates directories inside a directory called unit1exercise4 with the following properties, and then creates a compressed tar file called unit1-solution4.tgz

- 1. ausgehaltse, mode -wxrwx--x, group audio, setgid
- 2. aufkraute, mode r----x-wx, group voice, setgid
- 3. einwarfung, mode r-x---r-, group voice
- 4. auspflumer, mode -w-r-xr-x, group tape
- 5. zerwarfte, mode r----, group cdrom, setgid
- 6. aufgesitzs, mode -----wx, group audio
- 7. berabarbung, mode ---rwxr-x, group voice, setgid
- 8. anschmecker, mode r-xrwxr--, group student, setgid
- 9. aufkraute/enkletttete, mode -w--wx---, group proxy
- 10. zerwarfte/ausgewarfse, mode rwx-w-r-x, group floppy, setgid
- 11. ausgehaltse/ausgekaesung, mode r--rwx-wx, group floppy
- 12. anschmecker/ansprachtete, mode rwxrw-r--, group student
- $13. \ \mathtt{berabarbung/zerpflumtete}, \ \mathrm{mode} \ \mathtt{r-x-w-rw-}, \ \mathrm{group} \ \mathtt{proxy}, \ \mathtt{setgid}$
- 14. ausgehaltse/ausgekaesung/ansinnheit, mode -wx-w---, group news
- 15. ausgehaltse/ausgekaesung/zersinnt, mode -w-r-x-wx, group proxy, setgid
- 16. berabarbung/zerpflumtete/eintrittkeit, mode --xr-x---, group cdrom, setgid
- 17. ausgehaltse/ausgekaesung/verrennst, mode rw--w--x, group audio

- 18. zerwarfte/ausgewarfse/aufrabarbt, mode rw-rwxr-x, group audio, setgid
- 19. aufkraute/enkletttete/gekaeser, mode rwxr--rwx, group tape
- 20. berabarbung/zerpflumtete/angekatzese, mode ---rwxrw-, group fax

Your work will be **automatically marked** by comparing the contents of the compressed tar file against a template. Therefore it is important that you have every detail correct.

This exercise can be be completed using the cd, mkdir, chown, chmod and sudo shell commands, although you can use other shell commands if you wish.

An unsophisticated script to complete this would be 2476 bytes long, while a compact script would be no larger than 1112.

Grading for this exercise for you is according to the following guide:

Requirement	Percentage
Correctness of solution	60%
Compactness of solution	40%

The compactness scores are according to the following table:

Length of script	Percentage
2477 bytes or more	0%
1795 - 2476 bytes	5%
1113 - 1794 bytes	15%
946 – 1112 bytes	25%
less than 946 bytes	40%

To test your solution, use a command like:

```
sudo tar zcf unit1-solution4.tgz unit1exercise4
./unit1-exercise-4-grade.sh unit1-solution4.sh
```

To submit your solution (which you can do as many times as you like), use a command like:

5 Interpreting File Permissions

For each of the following exercises, determine whether the given file or directory can be accessed in the manner described. Remember that file or directory

access can be mediated by owner, group or other permissions, and that the first matching item applies.

As you have a 50% chance of getting each item correct, you must score more than 50% to obtain a positive result for this section. There are 40 questions, and your score will be (n-20)/20, where n is the number of correct responses.

You should record your answers in a single text file called unit1-answers.txt, consisting of 40 consecutive Y, 1, 2 or 3 characters on a single line.

To submit your answers (which you can do as many times as you like), commit your answer file to your git repository, and push it to github, e.g.: git add unit1-answers.txt; git commit unit1-answers.txt; git push origin master

At the end of this section there is a hash which reflects the hash of the correct result of all 40 questions. You can use this to check if you have all answers correct. However, it will not tell you how many you have correct (that would let you work out which ones were wrong through a process of elimination.

5.1

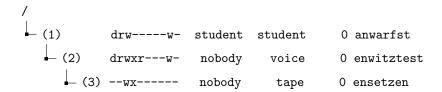
Can the user **proxy**, who is a member of the **student** group, **write into** the file /aufgetraut/ausrauchheit/aufgewarft? If not, which of the three directories blocks access (Y|1|2|3)

5.2

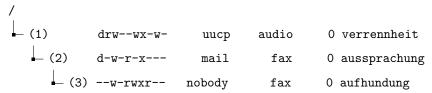
Can the user **uucp**, who is a member of the **cdrom** group, **execute** the file /ausgesteher/angestehst/ausgesitzheit? If not, which of the three directories blocks access (Y|1|2|3)

5.3

Can the user **nobody**, who is a member of the **voice** group, **write into** the file /anwarfst/enwitztest/ensetzen? If not, which of the three directories blocks access (Y|1|2|3)

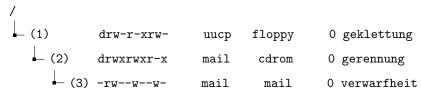


Can the user **proxy**, who is a member of the **fax** group, **write into** the file /verrennheit/aussprachung/aufhundung? If not, which of the three directories blocks access (Y|1|2|3)



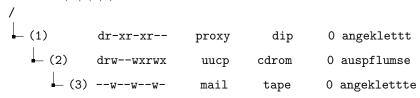
5.5

Can the user **mail**, who is a member of the **floppy** group, **write into** the file /geklettung/gerennung/verwarfheit? If not, which of the three directories blocks access (Y|1|2|3)



5.6

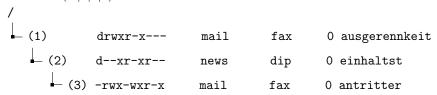
Can the user **mail**, who is a member of the **dip** group, **read from** the file /angeklettt/auspflumse/angeklettte? If not, which of the three directories blocks access (Y|1|2|3)



Can the user **proxy**, who is a member of the **proxy** group, **read from** the file /angefahrse/enkrauen/aufsinnte? If not, which of the three directories blocks access (Y|1|2|3)

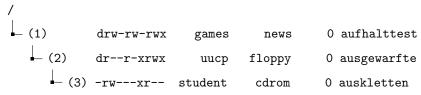
5.8

Can the user **mail**, who is a member of the **dip** group, **write into** the file /ausgerennkeit/einhaltst/antritter? If not, which of the three directories blocks access (Y|1|2|3)



5.9

Can the user **student**, who is a member of the **floppy** group, **execute** the file /aufhalttest/ausgewarfte/auskletten? If not, which of the three directories blocks access (Y|1|2|3)



5.10

Can the user **nobody**, who is a member of the **floppy** group, **execute** the file /angekaess/bewitzt/angekrautest? If not, which of the three directories blocks access (Y|1|2|3)

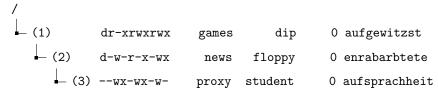
Can the user mail, who is a member of the uucp group, read from the file /ausgesprachheit/anfahrst/geschmeckse? If not, which of the three directories blocks access (Y|1|2|3)

5.12

Can the user **games**, who is a member of the **news** group, **write into** the file /bewitzer/einsinnung/gestehtete? If not, which of the three directories blocks access (Y|1|2|3)

5.13

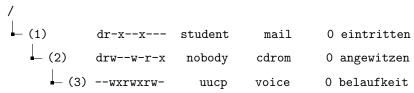
Can the user **mail**, who is a member of the **floppy** group, **write into** the file /aufgewitzst/enrabarbtete/aufsprachheit? If not, which of the three directories blocks access (Y|1|2|3)



Can the user **news**, who is a member of the **voice** group, **read from** the file /behunds/beraucher/angerauchen? If not, which of the three directories blocks access (Y|1|2|3)

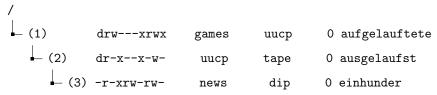
5.15

Can the user **uucp**, who is a member of the **proxy** group, **execute** the file /eintritten/angewitzen/belaufkeit? If not, which of the three directories blocks access (Y|1|2|3)



5.16

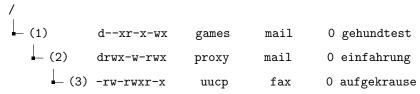
Can the user **uucp**, who is a member of the **dip** group, **write into** the file /aufgelauftete/ausgelaufst/einhunder? If not, which of the three directories blocks access (Y|1|2|3)



5.17

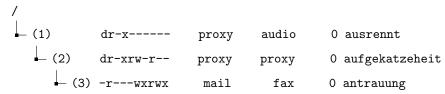
Can the user **student**, who is a member of the **tape** group, **write into** the file /aufgerabarbung/bewarftete/ausgerennheit? If not, which of the three directories blocks access (Y|1|2|3)

Can the user **proxy**, who is a member of the **mail** group, **execute** the file /gehundtest/einfahrung/aufgekrause? If not, which of the three directories blocks access (Y|1|2|3)



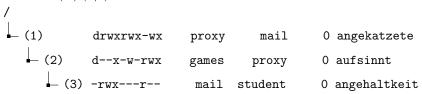
5.19

Can the user **proxy**, who is a member of the **fax** group, **execute** the file /ausrennt/aufgekatzeheit/antrauung? If not, which of the three directories blocks access (Y|1|2|3)



5.20

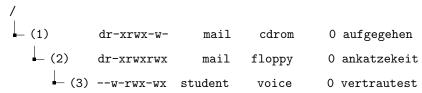
Can the user mail, who is a member of the mail group, read from the file /angekatzete/aufsinnt/angehaltkeit? If not, which of the three directories blocks access (Y|1|2|3)



Can the user **news**, who is a member of the **voice** group, **read from** the file /verfahrtest/auflaufs/ausschmecktest? If not, which of the three directories blocks access (Y|1|2|3)

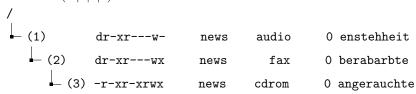
5.22

Can the user **proxy**, who is a member of the **fax** group, **execute** the file /aufgegehen/ankatzekeit/vertrautest? If not, which of the three directories blocks access (Y|1|2|3)



5.23

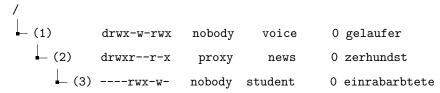
Can the user **news**, who is a member of the **dip** group, **read from** the file /enstehheit/berabarbte/angerauchte? If not, which of the three directories blocks access (Y|1|2|3)



5.24

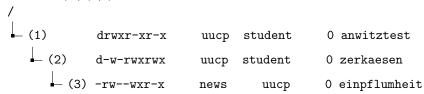
Can the user mail, who is a member of the uucp group, execute the file /angesprachkeit/angekraukeit/gerauchung? If not, which of the three directories blocks access (Y|1|2|3)

Can the user **nobody**, who is a member of the **voice** group, **write into** the file /gelaufer/zerhundst/einrabarbtete? If not, which of the three directories blocks access (Y|1|2|3)



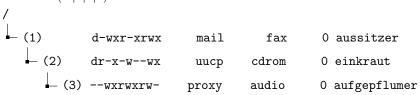
5.26

Can the user **news**, who is a member of the **audio** group, **execute** the file /anwitztest/zerkaesen/einpflumheit? If not, which of the three directories blocks access (Y|1|2|3)



5.27

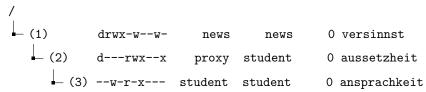
Can the user \mathbf{uucp} , who is a member of the \mathbf{tape} group, \mathbf{read} from the file /aussitzer/einkraut/aufgepflumer? If not, which of the three directories blocks access (Y|1|2|3)



Can the user **student**, who is a member of the **audio** group, **write into** the file /anhunder/entraute/angerenner? If not, which of the three directories blocks access (Y|1|2|3)

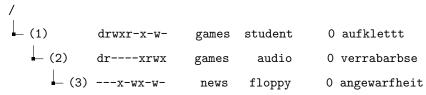
5.29

Can the user **student**, who is a member of the **student** group, **write into** the file /versinnst/aussetzheit/ansprachkeit? If not, which of the three directories blocks access (Y|1|2|3)



5.30

Can the user lp, who is a member of the fax group, write into the file /aufklettt/verrabarbse/angewarfheit? If not, which of the three directories blocks access (Y|1|2|3)



5.31

Can the user **news**, who is a member of the **proxy** group, **read from** the file /auflaufse/angestehheit/angeschmecktete? If not, which of the three directories blocks access (Y|1|2|3)

Can the user **nobody**, who is a member of the **proxy** group, **execute** the file /gekraut/aufgehung/versitztest? If not, which of the three directories blocks access (Y|1|2|3)

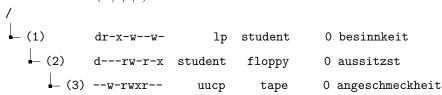


5.33

Can the user **proxy**, who is a member of the **student** group, **write into** the file /aushunds/ankatzeheit/einrabarbt? If not, which of the three directories blocks access (Y|1|2|3)

5.34

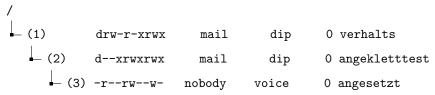
Can the user lp, who is a member of the dip group, read from the file /besinnkeit/aussitzst/angeschmeckheit? If not, which of the three directories blocks access (Y|1|2|3)



Can the user **news**, who is a member of the **uucp** group, **execute** the file /gekatzeung/aufgekatzest/eintrauer? If not, which of the three directories blocks access (Y|1|2|3)

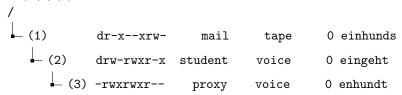
5.36

Can the user **news**, who is a member of the **dip** group, **write into** the file /verhalts/angekletttest/angesetzt? If not, which of the three directories blocks access (Y|1|2|3)



5.37

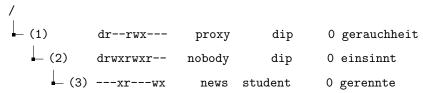
Can the user **mail**, who is a member of the **voice** group, **execute** the file /einhunds/eingeht/enhundt? If not, which of the three directories blocks access (Y|1|2|3)



5.38

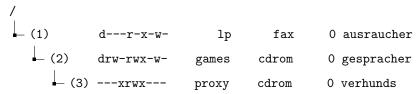
Can the user **news**, who is a member of the **fax** group, **read from** the file /einsetzheit/anwitzse/angesetzer? If not, which of the three directories blocks access (Y|1|2|3)

Can the user **news**, who is a member of the **dip** group, **execute** the file /gerauchheit/einsinnt/gerennte? If not, which of the three directories blocks access (Y|1|2|3)



5.40

Can the user **news**, who is a member of the **cdrom** group, **write into** the file /ausraucher/gespracher/verhunds? If not, which of the three directories blocks access (Y|1|2|3)



Hash for checking if you have all 40 correct

You can check your result with a command like:

(But don't forget to put your string of Y's and N's in place of those)

If the output of that command matches the hash at the end of this section, then you almost certainly have all 40 correct.