

## Linux Essentials with Bash

1. Create script for generate password for users into file for each user.

The screenshot shows a terminal window with a nano editor open, editing a script named `create_user_passwd.sh`. The script contains the following code:

```
#!/bin/bash
while read line;
do
  var1=$(echo $line | cut -f2 -d' ')
  var2=$(openssl rand -base64 8)
  sudo useradd -p $var2 -p $var2 $var1
  echo $var1:$var2 | sudo chpasswd
  touch $var1-login-password.txt
  echo $var2 > $var1-login-password.txt
done < users.txt
```

The terminal output shows the execution of the script, which creates 20 users (user1 to user20) and generates passwords for each. The output is as follows:

```
drwxr-xr-x 2 user1 user1 4096 tpa 13 15:30 user1
drwxr-xr-x 2 user10 user10 4096 tpa 13 15:30 user10
drwxr-xr-x 2 user11 user11 4096 tpa 13 15:30 user11
drwxr-xr-x 2 user12 user12 4096 tpa 13 15:30 user12
drwxr-xr-x 2 user13 user13 4096 tpa 13 15:30 user13
drwxr-xr-x 2 user14 user14 4096 tpa 13 15:30 user14
drwxr-xr-x 2 user15 user15 4096 tpa 13 15:30 user15
drwxr-xr-x 2 user16 user16 4096 tpa 13 15:30 user16
drwxr-xr-x 2 user17 user17 4096 tpa 13 15:30 user17
drwxr-xr-x 2 user18 user18 4096 tpa 13 15:30 user18
drwxr-xr-x 2 user19 user19 4096 tpa 13 15:30 user19
drwxr-xr-x 2 user2 user2 4096 tpa 13 15:30 user2
drwxr-xr-x 2 user20 user20 4096 tpa 13 15:30 user20
drwxr-xr-x 2 user3 user3 4096 tpa 13 15:30 user3
drwxr-xr-x 2 user4 user4 4096 tpa 13 15:30 user4
drwxr-xr-x 2 user5 user5 4096 tpa 13 15:30 user5
drwxr-xr-x 2 user6 user6 4096 tpa 13 15:30 user6
drwxr-xr-x 2 user7 user7 4096 tpa 13 15:30 user7
drwxr-xr-x 2 user8 user8 4096 tpa 13 15:30 user8
drwxr-xr-x 2 user9 user9 4096 tpa 13 15:30 user9
drwxr-xr-x 3 yevhen yevhen 4096 ksl 30 21:57 yevhen
drwxr-xr-x 7 user2 user2 4096 ksl 27 21:44 user2
drwxr-xr-x 28 yevhen yevhen 9632 tpa 13 15:30 yevhen
```

The screenshot shows the terminal window after the script has been executed. The output shows the creation of 20 users (user1 to user20) and the generation of passwords for each. The output is as follows:

```
user2:x:1004:1004::/home/user2:/bin/sh
user3:x:1005:1005::/home/user3:/bin/sh
user4:x:1006:1006::/home/user4:/bin/sh
user5:x:1007:1007::/home/user5:/bin/sh
user6:x:1008:1008::/home/user6:/bin/sh
user7:x:1009:1009::/home/user7:/bin/sh
user8:x:1010:1010::/home/user8:/bin/sh
user9:x:1011:1011::/home/user9:/bin/sh
user10:x:1012:1012::/home/user10:/bin/sh
user11:x:1013:1013::/home/user11:/bin/sh
user12:x:1014:1014::/home/user12:/bin/sh
user13:x:1015:1015::/home/user13:/bin/sh
user14:x:1016:1016::/home/user14:/bin/sh
user15:x:1017:1017::/home/user15:/bin/sh
user16:x:1018:1018::/home/user16:/bin/sh
user17:x:1019:1019::/home/user17:/bin/sh
user18:x:1020:1020::/home/user18:/bin/sh
user19:x:1021:1021::/home/user19:/bin/sh
user20:x:1022:1022::/home/user20:/bin/sh
```

The terminal also shows the execution of the script to generate passwords for users, with the output showing the creation of 20 users (user1 to user20) and the generation of passwords for each. The output is as follows:

```
1. Create script for generate password for users into file for each user.
```

2. Create script for count checksums and archive project. Check it for change with some period. If project have changed put it to the archive and run recompilation.

The image shows a terminal window with a dark background. The title bar at the top reads "Activities" and "Terminal". The terminal content is as follows:

```
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask  
[F] yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask  
GNU nano 4.3 Script backup_of_project.sh  
#!/bin/bash  
  
ATIME=$(find nf/ -type f -exec md5sum {} \; | md5sum  
tar -czvf backup-nf-date +Y-%N-%d_%H-%M-%S .tar.gz nf/  
  
LTIME=$ATIME  
do  
while true  
do  
ATIME=$(find nf/ -type f -exec md5sum {} \; | md5sum  
if [[ "$ATIME" != "$LTIME" ]]  
then  
echo "RUN COMMAND"  
tar -czvf backup-nf-date +Y-%N-%d_%H-%M-%S .tar.gz nf/  
cd nf/$1; make -f Makefile-1 >> ./output)  
LTIME=$ATIME  
fi  
sleep 5  
fi  
Run COMMAND  
nf/hello.cpp  
nf/Makefile-3  
nf/Makefile-1  
nf/functions.h  
nf/factorial.cpp  
nf/hello.cpp.swp  
nf/Makefile-2  
nf/main.cpp  
nf/hello  
Run COMMAND  
nf/  
nf/hello.cpp  
nf/Makefile-3  
nf/Makefile-1  
nf/functions.h  
nf/factorial.cpp  
nf/Makefile-2  
nf/main.cpp  
nf/hello  
Run COMMAND  
nf/hello.cpp  
nf/Makefile-3  
nf/Makefile-1  
nf/functions.h  
Comp/Makefile-4  
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask  
-rw-r--r-- 1 yevhen yevhen 4662 tpa 6:22:56 backup-nf-2020-05-06_22-56-56.tar.gz  
-rw-r--r-- 1 yevhen yevhen 4785 tpa 6:22:56 backup-nf-2020-05-06_22-56-56.tar.gz  
-rw-r--r-- 1 yevhen yevhen 4456 tpa 6:22:57 backup-nf-2020-05-06_22-57-06.tar.gz  
-rw-r--r-- 1 yevhen yevhen 4527 tpa 6:22:58 backup-nf-2020-05-06_22-58-03.tar.gz  
-rw-r--r-- 1 yevhen yevhen 4457 tpa 6:22:58 backup-nf-2020-05-06_22-58-03.tar.gz  
-rw-r--r-- 1 yevhen yevhen 4453 tpa 6:22:58 backup-nf-2020-05-06_22-58-15.tar.gz  
-rwxr-xr-x 2 yevhen yevhen 4096 tpa 6:22:58 nf  
-rw-r--r-- 1 yevhen yevhen 276 tpa 6:22:58 output  
-rwxr-xr-x 1 yevhen yevhen 440 tpa 6:22:55 Script_backup_of_project.sh  
-rw-r--r-- 1 yevhen yevhen 1024 tpa 6:22:55 .Script_backup_of_project.sh.swp  
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask$ cat output  
g++ main.cpp hello.cpp factorial.cpp -o hello  
g++ main.cpp hello.cpp factorial.cpp -o hello  
g++ main.cpp hello.cpp factorial.cpp -o hello  
g++ main.cpp hello.cpp factorial.cpp -o hello  
g++ main.cpp hello.cpp factorial.cpp -o hello  
g++ main.cpp hello.cpp factorial.cpp -o hello  
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask$ ./hello  
./hello: No such file or directory  
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask$ nf/hello  
Hello World!test Hello World!  
The factorial of 5 is 120  
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework_4_12/Script/SecondTask$
```

3. Create schedule script that makes log files, run it with crontab and run script to create archive file from this log.

```
tpa 9 17:58
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework4_12
GNU nano 4.3 Script_generate_log.sh
#!/bin/bash

echo `date +%Y-%m-%d_%H-%M-%S` >> /home/yevhen/memory/stat
cat /proc/meminfo | grep Mem >> /home/yevhen/memory/stat

for (( count=1; count<30; count++ ))
do
var=$((vmswap - s | grep "CPU context switches" | awk '{print $1}'))
my_array[count]=$var
let total+=var
sleep 3
done

echo `date +%Y-%m-%d_%H-%M-%S` >> /home/yevhen/memory/main.log
echo "CPU context switches" >> /home/yevhen/memory/main.log
echo $((total/10)) >> /home/yevhen/memory/main.log

for (( count=1; count<15; count++ ))
do
varCpu=$(top -bn1 | grep "Cpu(s)" | sed 's/.*, *([0-9.]+)% id.*/\1/' | awk '{print 100 - $1}')
let totalCpu+=varCpu
sleep 1
done

echo `date +%Y-%m-%d_%H-%M-%S` >> /home/yevhen/memory/main.log
echo "CPU Load %" >> /home/yevhen/memory/main.log
echo $((totalCpu/15)) >> /home/yevhen/memory/main.log

echo `date +%Y-%m-%d_%H-%M-%S` >> /home/yevhen/memory/main.log
echo "Pages of memory" >> /home/yevhen/memory/main.log
cat /proc/meminfo | grep Pages >> /home/yevhen/memory/main.log

echo `date +%Y-%m-%d_%H-%M-%S` >> /home/yevhen/memory/main.log
echo "disks" >> /home/yevhen/memory/main.log
vmswap >> /home/yevhen/memory/main.log

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework4_12/Script/ThirdTask
# and what command to run for the task

# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
#
# 0 5 * * 1 tar -zcf /var/backups/home.tar.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command
*/5 * * * * /home/yevhen/DevOps_External_Spring2020/Homework4_12/Script/ThirdTask/Script_create_archive.sh & /tmp/errors
*/2 * * * * /home/yevhen/DevOps_External_Spring2020/Homework4_12/Script/ThirdTask/Script_generate_log.sh & /tmp/errors
# * * * * * echo "Hello World"
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Homework4_12/Script/ThirdTask
```

```
Activities Terminal yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~ tpa 9 18:00 yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/memory

-rw-rw-r-- 1 yevhen yevhen 5956 tpa 8 23:10 backup-stat-2020-05-08_23-10-01.tar.gz 0 inprogress IO
-rw-rw-r-- 1 yevhen yevhen 5982 tpa 8 23:15 backup-stat-2020-05-08_23-15-01.tar.gz 32 mllt spent IO
-rw-rw-r-- 1 yevhen yevhen 6020 tpa 8 23:20 backup-stat-2020-05-08_23-20-01.tar.gz 2020-05-09 17:59:29
-rw-rw-r-- 1 yevhen yevhen 6045 tpa 8 23:25 backup-stat-2020-05-08_23-25-01.tar.gz CPU context switches
-rw-rw-r-- 1 yevhen yevhen 6068 tpa 8 23:30 backup-stat-2020-05-08_23-30-01.tar.gz 8360094
-rw-rw-r-- 1 yevhen yevhen 6104 tpa 8 23:35 backup-stat-2020-05-08_23-35-01.tar.gz 2020-05-09 17:59:45
-rw-rw-r-- 1 yevhen yevhen 6130 tpa 8 23:40 backup-stat-2020-05-08_23-40-01.tar.gz CPU load %
-rw-rw-r-- 1 yevhen yevhen 6161 tpa 8 23:45 backup-stat-2020-05-08_23-45-01.tar.gz 89
-rw-rw-r-- 1 yevhen yevhen 6265 tpa 8 23:50 backup-stat-2020-05-08_23-50-01.tar.gz 2020-05-09 17:59:45
-rw-rw-r-- 1 yevhen yevhen 6289 tpa 8 23:55 backup-stat-2020-05-08_23-55-01.tar.gz Pages of memory
-rw-rw-r-- 1 yevhen yevhen 6321 tpa 9 00:00 backup-stat-2020-05-08_00-00-01.tar.gz AnonPages: 1951144 kB
-rw-rw-r-- 1 yevhen yevhen 6355 tpa 9 00:05 backup-stat-2020-05-08_00-05-01.tar.gz ShmemHugePages: 0 kB
-rw-rw-r-- 1 yevhen yevhen 6392 tpa 9 00:10 backup-stat-2020-05-08_00-10-01.tar.gz HugePages_Total: 0
-rw-rw-r-- 1 yevhen yevhen 6416 tpa 9 00:15 backup-stat-2020-05-08_00-15-01.tar.gz HugePages_Free: 0
-rw-rw-r-- 1 yevhen yevhen 6438 tpa 9 17:45 backup-stat-2020-05-08_17-45-01.tar.gz HugePages_Rsvd: 0
-rw-rw-r-- 1 yevhen yevhen 6466 tpa 9 17:50 backup-stat-2020-05-08_17-50-01.tar.gz HugePages_Surp: 0
-rw-rw-r-- 1 yevhen yevhen 6518 tpa 9 17:55 backup-stat-2020-05-08_17-55-01.tar.gz 2020-05-09 17:59:45
-rw-rw-r-- 1 yevhen yevhen 6540 tpa 9 18:00 backup-stat-2020-05-08_18-00-01.tar.gz disks
-rw-rw-r-- 1 yevhen yevhen 42870 tpa 8 14:37 .bash_history 17 disks
-rw-rw-r-- 1 yevhen yevhen 220 kat 3 21:10 .bash_logout 1 partitions
-rw-rw-r-- 1 yevhen yevhen 3771 kat 3 21:16 .bashrc 48827 total reads
-rw-rw-r-- 1 yevhen yevhen 4096 kat 21 23:14 .cache 14884 merged reads
drwxr-xr-x 25 yevhen yevhen 4096 kat 3 21:16 .centos.tar 293422 read sectors
drwxr-xr-x 2 yevhen yevhen 4096 kat 3 21:24 Desktop 31512 mllt reading
drwxr-xr-x 19 yevhen yevhen 4096 tpa 6 20:55 DevOps_External_Spring2020 13659 writes
drwxr-xr-x 4 yevhen yevhen 4096 kat 18 17:01 DevOps_External_Spring_2020_Hometasks 21565 merged writes
-rw-rw-r-- 1 yevhen yevhen 18 kat 5 12:31 Dockerfile 163128 written sectors
drwxr-xr-x 2 yevhen yevhen 4096 kat 7 21:38 Documents 28413 mllt writing
drwxr-xr-x 9 yevhen yevhen 4096 tpa 8 10:36 Downloads 0 inprogress IO
32 mllt spent IO

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/memory$

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/DevOps_External_Spring2020/Hometask_4_12/Script/ThirTask

cron.service - Regular background program processing daemon
Loaded: loaded (/lib/systemd/system/cron.service; enabled; vendor preset: enabled)
Active: active (running) since Sat 2020-05-09 17:42:58 EEST; 17min ago
Docs: man:cron(8)
Main PID: 628 (cron)
Tasks: 3 (limit: 4915)
Memory: 4.0M
CGroup: /system.slice/cron.service
└─628 /usr/sbin/cron -f
    └─749 /bin/bash /home/yevhen/DevOps_External_Spring2020/Hometask_4_12/Script/ThirTask/Script_generate_log.sh
    └─9801 sleep 3

tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9742]: pam_unix(cron:session): session opened for user yevhen by (uid=0)
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9745]: (yevhen) CMD (echo "Hello World")
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9744]: pam_unix(cron:session): session opened for user yevhen by (uid=0)
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9743]: pam_unix(cron:session): session opened for user yevhen by (uid=0)
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9746]: (yevhen) CMD (/home/yevhen/DevOps_External_Spring2020/Hometask_4_12/Script/ThirTask/Script_generate_log.sh & / tnp/
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9747]: (yevhen) CMD (/home/yevhen/DevOps_External_Spring2020/Hometask_4_12/Script/ThirTask/Script_create_archive.sh & / tnp
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9742]: (cron) info (no mta installed, discarding output)
tpa 09 18:00:01 yevhen-Lenovo-Ideapad-320-15ISK CRON[9744]: pam_unix(cron:session): session closed for user yevhen
```

cat ~/memory/stat

```
Activities Terminal tpa 9 18:21 yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/memory

New 2020-05-09_17-58-01
MemTotal: 8059320 kB
MemFree: 3541792 kB
MemAvailable: 5193876 kB
2020-05-09_18-00-01
MemTotal: 8059320 kB
MemFree: 3576556 kB
MemAvailable: 5229424 kB
2020-05-09_18-02-01
MemTotal: 8059320 kB
MemFree: 3285052 kB
MemAvailable: 4972356 kB
2020-05-09_18-04-01
MemTotal: 8059320 kB
MemFree: 3298536 kB
MemAvailable: 5016740 kB
2020-05-09_18-06-01
MemTotal: 8059320 kB
MemFree: 3196924 kB
MemAvailable: 4927244 kB
2020-05-09_18-08-01
MemTotal: 8059320 kB
MemFree: 3289708 kB
MemAvailable: 5019824 kB
2020-05-09_18-10-01
MemTotal: 8059320 kB
MemFree: 3280416 kB
MemAvailable: 5016608 kB
2020-05-09_18-12-01
MemTotal: 8059320 kB
MemFree: 3307832 kB
MemAvailable: 5043928 kB
2020-05-09_18-14-01
MemTotal: 8059320 kB
MemFree: 3400264 kB
MemAvailable: 5143380 kB
2020-05-09_18-16-02
MemTotal: 8059320 kB
MemFree: 3404544 kB
MemAvailable: 5142192 kB
2020-05-09_18-18-01
MemTotal: 8059320 kB
MemFree: 3404292 kB
MemAvailable: 5142044 kB
2020-05-09_18-20-01
MemTotal: 8059320 kB
MemFree: 3394780 kB
MemAvailable: 5132768 kB
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/memory$
```

