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## Computer Architecture and Technology Convergence Assignment

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### Q1: Binary Arithmetic:

**Q1.1. Add 11011 to 1011. Show your work (in particular, show where you get carries, and where you don't). You can check your work by translating the numbers into decimal, but I want to see the addition algorithm in base 2 instead of base ten.**

$$11011_{(2)} = 27_{(10)}$$

$$1011_{(2)} = 11_{(10)}$$

$$100110_{(2)} = 38_{(10)}$$

1	1		1	1		carry
	1	1	0	1	1	
	0	1	0	1	1	
1	0	0	1	1	0	

**Q1.2. Rewrite the following base-10 numbers as 8-bit two's complement integers: -31, & -59**

**“-31”**

**Step 1 :** Convert 31 to binary.

$$31/2 = 15 \text{ (1)}$$

$$15/2 = 7 \text{ (1)}$$

$$7/2 = 3 \text{ (1)}$$

$$3/2 = 1 \text{ (1)}$$

$$\frac{1}{2} = 0 \text{ (1)}$$

$$31_{(10)} = 00011111_{(2)}$$

**Step 2:** Flip the bits  
11100000

**Step 3:** Add 1

$$\begin{array}{r} 11100000 \\ 1 + \\ \hline \end{array}$$

11100001

Therefore  $-31_{(10)} = 11100001_{(2)}$

---

**“-59”**

**Step 1 :** Convert 59 to binary.

$$\begin{aligned}59/2 &= 29(1) \\29/2 &= 14(1) \\14/2 &= 7(0) \\7/2 &= 3(1) \\3/2 &= 1(1) \\\frac{1}{2} &= 0(1)\end{aligned}$$

$59_{(10)} = 00111011_{(2)}$

**Step 2:** Flip the bits

11000100

**Step 3:** Add 1

$$\begin{array}{r}11000100 \\1 + \\\hline11000101\end{array}$$

Therefore  $-59_{(10)} = 11000101_{(2)}$

**Q1.3. What does the bit pattern 11101001 represent if you interpret it as an 8-bit two's complement integer?**

The bit pattern 11101001 represents the negative integer. “1” at the beginning stands for the negative integers and it represents the integers from  $-1$  to  $-128$ .

1.  $11101001_{(2)}$  it's the binary representation of a negative integer, on 8 bits.
2. Change all the bits in binary - replace the bits set on 1 with 0's and the bits on 0 with 1's.

$$\begin{array}{r}00010110 \\1 + \\\hline00010111\end{array}$$

3. Multiply each bit by its corresponding power of 2 and add all the terms up:

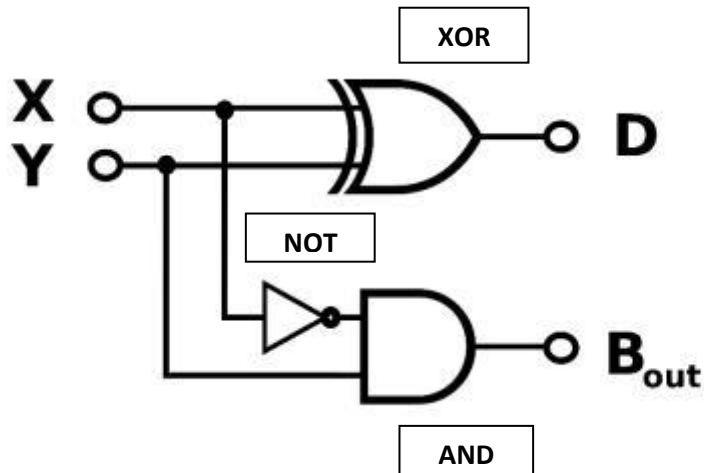
$$\begin{aligned}0 * 2^7 &= 0 \\0 * 2^6 &= 0 \\0 * 2^5 &= 0 \\1 * 2^4 &= 16 \\0 * 2^3 &= 0 \\1 * 2^2 &= 4 \\1 * 2^1 &= 2 \\1 * 2^0 &= 1\end{aligned}$$

---

23<sub>(10)</sub>

4. So, 11101001<sub>(2)</sub> = -23<sub>(10)</sub>

**Q1.4. Draw up the truth table for the circuit below (inputs are X and Y and outputs are B and D). From observing the result, what function do you think this circuit performs?**



$$D = X \oplus Y$$

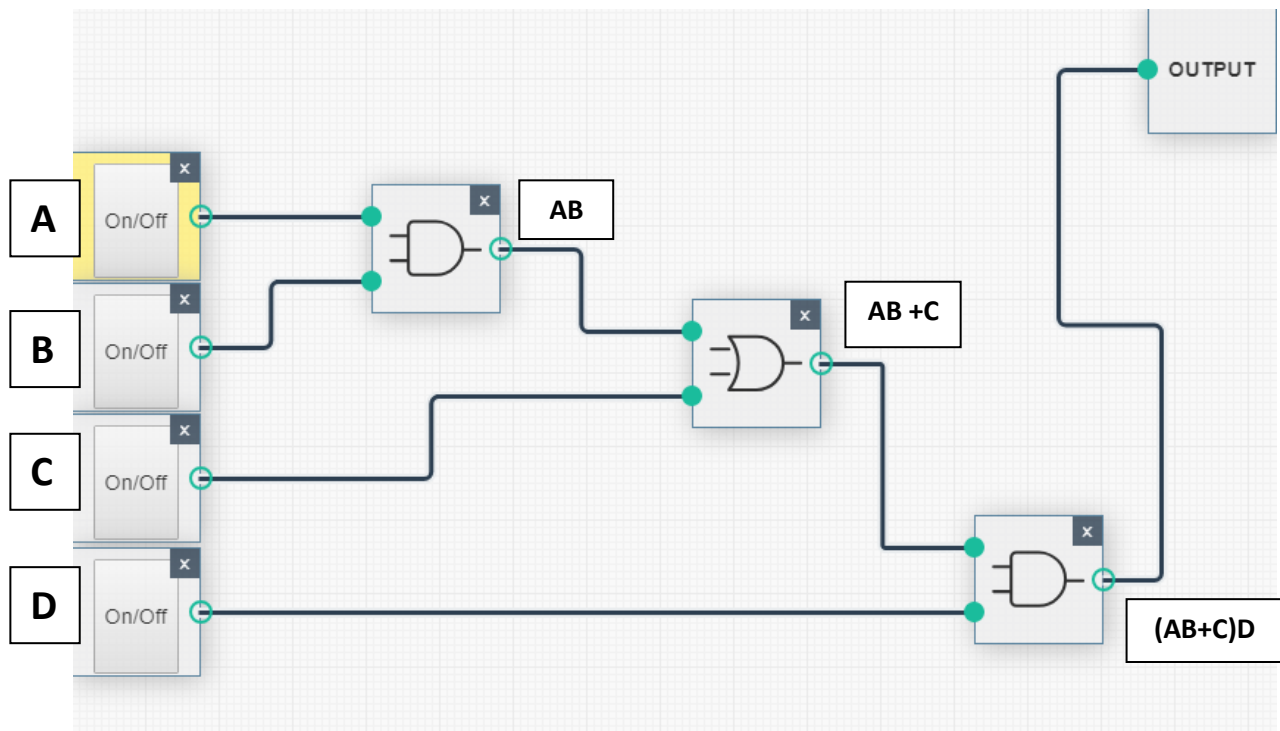
$$B = \overline{X} * Y$$

**The Truth Table:**

X	Y	D	B
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

This Circuit performs a half subtraction operation on two binary digits. It's a combinational circuit. The half subtraction produces a sum and borrows bit for the next stage.

**Q1.5. Draw the circuit diagram for the Boolean logic equation:  $(AB + C)D$**



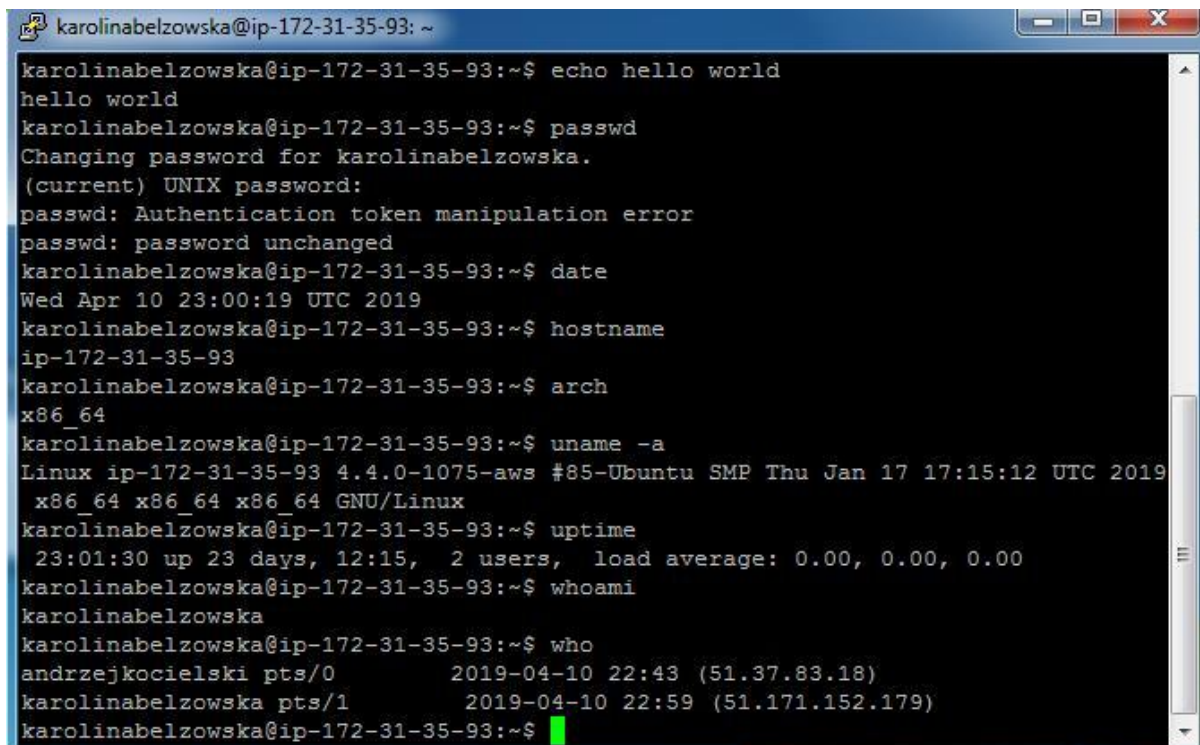
## Q2: Linux Assignment

**Q2.1: Enter the commands below at the Linux terminal on the AWS VM (on which you completed your Linux Homework), and try to interpret the output.**

### Commands:

- echo hello world
- passwd
- date \*
- hostname \*
- arch \*
- uname -a \*
- dmesg | more (you may need to press q to quit)
- uptime \*
- whoami \*
- who \*
- last
- finger \*
- w \*
- top \* (you may need to press q to quit)
- echo \$SHELL

- echo {con,pre}{sent,fer}{s,ed}
- man ls (you may need to press q to quit)
- man who (you may need to press q to quit)
- clear
- cal 2000
- cal 9 1752 (do you notice anything unusual. Why is this the case?)
- yes please (you may need to press Ctrl-c to quit)
- time sleep 5
- history\*



```

karolinabelzowska@ip-172-31-35-93: ~
karolinabelzowska@ip-172-31-35-93:~$ echo hello world
hello world
karolinabelzowska@ip-172-31-35-93:~$ passwd
Changing password for karolinabelzowska.
(current) UNIX password:
passwd: Authentication token manipulation error
passwd: password unchanged
karolinabelzowska@ip-172-31-35-93:~$ date
Wed Apr 10 23:00:19 UTC 2019
karolinabelzowska@ip-172-31-35-93:~$ hostname
ip-172-31-35-93
karolinabelzowska@ip-172-31-35-93:~$ arch
x86_64
karolinabelzowska@ip-172-31-35-93:~$ uname -a
Linux ip-172-31-35-93 4.4.0-1075-aws #85-Ubuntu SMP Thu Jan 17 17:15:12 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux
karolinabelzowska@ip-172-31-35-93:~$ uptime
23:01:30 up 23 days, 12:15, 2 users, load average: 0.00, 0.00, 0.00
karolinabelzowska@ip-172-31-35-93:~$ whoami
karolinabelzowska
karolinabelzowska@ip-172-31-35-93:~$ who
andrzejkocielski pts/0      2019-04-10 22:43 (51.37.83.18)
karolinabelzowska pts/1      2019-04-10 22:59 (51.171.152.179)
karolinabelzowska@ip-172-31-35-93:~$

```

### 1. Command “echo hello world”

Displays a line of text : “hello world”

### 2. Command “passwd”

Displays a command to change the user’s password.

### 3. Command “date”

Shows the current date and time.

### 4. Command “hostname”

Shows IP, (system’s DNS name).

### 5. Command “arch”

Displays the architecture of the current host (machine hardware name).

X86\_64 – for x86 64-bit architecture.

#### 6. Command “uname -a”

It shows us kernel's name, hostname, Kernel's release, Kernel's Version, machine hardware name and Operating System's name.

Here: Linux ip-172-31-35-93 4.4.0-1075-aws #85-Ubuntu SMP Thu Jan 17 17:15:12 UTC 2019 x86\_64 x86\_64 x86\_64 GNU/Linux

#### 7. Command “uptime”

Displays how long the system has been running, how many users are currently logged on and the system load averages for the past 1, 5 and 15 minutes.

#### 8. Command “whoami”

Shows current user.

Here: karolinabelzowska

#### 9. Command “who”

Lists all users. It also shows date, time and terminal they are logged in.

```
karolinabelzowska@ip-172-31-35-93: ~  
karolinabelzowska@ip-172-31-35-93:~$ last  
karolina pts/1 51.171.152.179 Wed Apr 10 22:59 still logged in  
andrzejk pts/0 51.37.83.18 Wed Apr 10 22:43 still logged in  
andrzejk pts/1 51.37.83.18 Wed Apr 10 21:02 - 22:41 (01:38)  
thomasro pts/0 89.100.19.126 Wed Apr 10 20:58 - 21:23 (00:24)  
johndunn pts/0 37.228.250.127 Wed Apr 10 20:54 - 20:56 (00:02)  
eoinstan pts/0 78.16.76.109 Wed Apr 10 19:16 - 20:07 (00:51)  
maurahur pts/1 212.129.75.90 Wed Apr 10 18:22 - 19:53 (01:31)  
eoinstan pts/0 78.16.76.109 Wed Apr 10 18:17 - 19:15 (00:57)  
tomhealy pts/4 77.107.218.234 Wed Apr 10 17:41 - 18:14 (00:33)  
thomasro pts/0 89.19.67.197 Wed Apr 10 17:15 - 17:52 (00:36)  
thomasro pts/4 89.19.67.207 Wed Apr 10 17:05 - 17:11 (00:05)  
tomhealy pts/0 77.107.218.234 Wed Apr 10 16:48 - 17:13 (00:24)  
tomhealy pts/0 77.107.218.234 Wed Apr 10 16:38 - 16:45 (00:06)  
rebeccat pts/3 93.89.244.126 Wed Apr 10 16:30 - 21:23 (04:52)  
rebeccat pts/2 93.89.244.126 Wed Apr 10 16:13 - 21:23 (05:09)  
jennifer pts/1 37.228.232.103 Wed Apr 10 16:11 - 17:49 (01:38)  
tomhealy pts/0 77.107.218.234 Wed Apr 10 16:06 - 16:31 (00:24)  
eoindowl pts/1 158.117.33.68 Wed Apr 10 13:08 - 14:59 (01:50)  
rosshunt pts/3 95.45.35.132 Wed Apr 10 12:52 - 13:03 (00:11)  
rebeccat pts/2 93.89.244.126 Wed Apr 10 11:21 - 15:33 (04:11)  
rosshunt pts/2 95.45.35.132 Wed Apr 10 09:38 - 10:05 (00:27)  
jennifer pts/1 37.228.232.103 Wed Apr 10 09:22 - 13:04 (03:41)  
rosshunt pts/1 95.45.35.132 Wed Apr 10 08:35 - 09:21 (00:45)  
eoindowl pts/0 158.117.33.68 Wed Apr 10 08:00 - 14:17 (06:17)  
eoindowl pts/0 158.117.33.68 Wed Apr 10 07:54 - 08:00 (00:06)  
sineadfr pts/1 37.228.238.71 Wed Apr 10 06:36 - 06:38 (00:01)  
markcott pts/0 86.41.166.198 Wed Apr 10 06:26 - 07:04 (00:37)  
frehasal pts/0 86.44.245.150 Wed Apr 10 01:29 - 01:48 (00:18)  
ritavalc pts/4 37.228.228.30 Tue Apr 9 22:46 - 01:57 (03:11)  
eoindowl pts/2 80.233.35.88 Tue Apr 9 22:37 - 00:48 (02:11)  
ubuntu pts/2 80.233.35.88 Tue Apr 9 22:33 - 22:35 (00:02)  
frehasal pts/1 86.44.245.150 Tue Apr 9 22:00 - 01:28 (03:27)  
markcott pts/1 86.41.166.198 Tue Apr 9 21:45 - 21:59 (00:14)  
markcott pts/0 86.41.166.198 Tue Apr 9 21:41 - 23:55 (02:13)  
markcott pts/0 86.41.166.198 Tue Apr 9 21:25 - 21:41 (00:15)  
johndunn pts/0 37.228.250.74 Tue Apr 9 20:34 - 20:59 (00:25)  
johndunn pts/0 37.228.250.74 Tue Apr 9 20:32 - 20:33 (00:01)  
johndunn pts/8 37.228.250.74 Tue Apr 9 20:24 - 20:31 (00:06)  
eoghande pts/7 37.228.232.156 Tue Apr 9 20:16 - 20:42 (00:25)  
markcott pts/6 86.41.166.198 Tue Apr 9 20:09 - 23:35 (03:26)  
markcott pts/2 86.41.166.198 Tue Apr 9 19:59 - 22:19 (02:20)  
eoinstan pts/1 78.16.76.109 Tue Apr 9 19:57 - 21:13 (01:16)  
jennifer pts/2 37.228.232.103 Tue Apr 9 19:29 - 19:30 (00:01)  
slawomir pts/4 80.233.33.125 Tue Apr 9 19:16 - 21:28 (02:11)  
doriszdr pts/5 37.228.234.121 Tue Apr 9 19:01 - 01:12 (06:11)  
slawomir pts/4 80.233.33.125 Tue Apr 9 18:47 - 19:12 (00:25)  
slawomir pts/2 80.233.33.125 Tue Apr 9 18:39 - 19:17 (00:38)  
andrzejk pts/3 109.79.240.222 Tue Apr 9 18:33 - 00:37 (06:04)  
slawomir pts/2 80.233.33.125 Tue Apr 9 18:18 - 18:38 (00:19)  
maurahur pts/1 212.129.76.156 Tue Apr 9 18:06 - 19:55 (01:48)  
slawomir pts/0 80.233.33.125 Tue Apr 9 18:04 - 20:25 (02:20)  
doriszdr pts/0 37.228.234.181 Tue Apr 9 12:23 - 12:54 (00:30)  
frehasal pts/1 86.44.245.150 Tue Apr 9 12:05 - 12:22 (00:17)  
eoindowl pts/1 212.129.84.212 Tue Apr 9 10:38 - 10:39 (00:00)  
doriszdr pts/0 37.228.234.181 Tue Apr 9 09:52 - 12:16 (02:23)  
markcott pts/2 86.41.166.198 Tue Apr 9 05:05 - 06:00 (00:54)  
markcott pts/1 86.41.166.198 Tue Apr 9 04:35 - 07:15 (02:39)
```

## 10. Command "last"

Displays the list of last logged in users. The very last ones appear on the top.



```

wtmp begins Mon Apr  1 10:22:28 2019
karolinabelzowska@ip-172-31-35-93:~$ finger
Login          Name          Tty          Idle          Login Time    Office          Office Phon
e
andrzejkocielski          pts/0          Apr 10 22:43 (51.37.83.18)
karolinabelzowska          pts/1          Apr 10 22:59 (51.171.152.179)
karolinabelzowska@ip-172-31-35-93:~$ w
 23:07:19 up 23 days, 12:21,  2 users,  load average: 0.00, 0.00, 0.00
USER          TTY          FROM          LOGIN@        IDLE          JCPU          PCPU          WHAT
andrzejk pts/0          51.37.83.18          22:43          6.00s          0.05s          0.05s -bash
karolina pts/1          51.171.152.179          22:59          6.00s          0.04s          0.00s w
karolinabelzowska@ip-172-31-35-93:~$ echo $SHELL
/bin/bash
karolinabelzowska@ip-172-31-35-93:~$ echo {con,pre}{sent,fer}{s,ed}
consents consented confers conferred presents presented prefers preferred
karolinabelzowska@ip-172-31-35-93:~$ cal 2000

                2000
    January          February          March
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
                1          1 2 3 4 5          1 2 3 4
 2 3 4 5 6 7 8  6 7 8 9 10 11 12  5 6 7 8 9 10 11
 9 10 11 12 13 14 15 13 14 15 16 17 18 19 12 13 14 15 16 17 18
16 17 18 19 20 21 22 20 21 22 23 24 25 26 19 20 21 22 23 24 25
23 24 25 26 27 28 29 27 28 29          26 27 28 29 30 31
30 31

    April          May          June
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
                1          1 2 3 4 5 6          1 2 3
 2 3 4 5 6 7 8  7 8 9 10 11 12 13  4 5 6 7 8 9 10
 9 10 11 12 13 14 15 14 15 16 17 18 19 20 11 12 13 14 15 16 17
16 17 18 19 20 21 22 21 22 23 24 25 26 27 18 19 20 21 22 23 24
23 24 25 26 27 28 29 28 29 30 31          25 26 27 28 29 30
30

    July          August          September
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
                1          1 2 3 4 5          1 2
 2 3 4 5 6 7 8  6 7 8 9 10 11 12  3 4 5 6 7 8 9
 9 10 11 12 13 14 15 13 14 15 16 17 18 19 10 11 12 13 14 15 16
16 17 18 19 20 21 22 20 21 22 23 24 25 26 17 18 19 20 21 22 23
23 24 25 26 27 28 29 27 28 29 30 31          24 25 26 27 28 29 30
30 31

    October          November          December
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
 1 2 3 4 5 6 7          1 2 3 4          1 2
 8 9 10 11 12 13 14  5 6 7 8 9 10 11  3 4 5 6 7 8 9
15 16 17 18 19 20 21 12 13 14 15 16 17 18 10 11 12 13 14 15 16
22 23 24 25 26 27 28 19 20 21 22 23 24 25 17 18 19 20 21 22 23
29 30 31          26 27 28 29 30          24 25 26 27 28 29 30
31

karolinabelzowska@ip-172-31-35-93:~$ cal 9 1752
    September 1752
Su Mo Tu We Th Fr Sa
    1  2 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30

```

## 11. Command “finger”

Displays informations about users and it’s just an entry for each user

currently logged into the system.

## 12. Command “w”

Shows who is logged on and what they are doing.

Here: andrzej and me – karolinabelzowska

### **13. Command “echo \$SHELL”**

Shows current shell that is being used.

### **14. Command “echo {con,,pre}{sent,fer}{s,ed}”**

Shows the combination of all possible words.

### **15. Command “cal 2000”**

Shows the calendar of year 2000.

### **16. Command “cal 9 1752”**

Shows the calendar of September 1752.

```

karolinabelzowska@ip-172-31-35-93:~$ dmesg | more
[    0.000000] Initializing cgroup subsys cpuset
[    0.000000] Initializing cgroup subsys cpu
[    0.000000] Initializing cgroup subsys cpuacct
[    0.000000] Linux version 4.4.0-1075-aws (builddd@lgw01-amd64-035) (gcc versio
n 5.4.0 20160609 (Ubuntu 5.4.0-6ubuntu1~16.04.10) ) #85-Ubuntu SMP Thu Jan 17 17
:15:12 UTC 2019 (Ubuntu 4.4.0-1075.85-aws 4.4.167)
[    0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-4.4.0-1075-aws root=LABEL=
cloudimg-rootfs ro console=tty1 console=ttyS0 nvme.io_timeout=4294967295 nvme_co
re.io_timeout=4294967295
[    0.000000] KERNEL supported cpus:
[    0.000000]   Intel GenuineIntel
[    0.000000]   AMD AuthenticAMD
[    0.000000]   Centaur CentaurHauls
[    0.000000] x86/fpu: xstate_offset[2]:  576, xstate_sizes[2]:  256
[    0.000000] x86/fpu: Supporting XSAVE feature 0x01: 'x87 floating point regis
ters'
[    0.000000] x86/fpu: Supporting XSAVE feature 0x02: 'SSE registers'
[    0.000000] x86/fpu: Supporting XSAVE feature 0x04: 'AVX registers'
[    0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes,
using 'standard' format.
[    0.000000] e820: BIOS-provided physical RAM map:
[    0.000000] BIOS-e820: [mem 0x0000000000000000-0x00000000000009dfff] usable
[    0.000000] BIOS-e820: [mem 0x00000000000009e000-0x00000000000009ffff] reserved
[    0.000000] BIOS-e820: [mem 0x0000000000000e0000-0x0000000000000fffff] reserved
[    0.000000] BIOS-e820: [mem 0x00000000000100000-0x0000000000003fffff] usable
[    0.000000] BIOS-e820: [mem 0x000000000fc000000-0x000000000fffffffff] reserved
[    0.000000] NX (Execute Disable) protection: active
[    0.000000] SMBIOS 2.7 present.
[    0.000000] DMI: Xen HVM domU, BIOS 4.2.amazon 08/24/2006
[    0.000000] Hypervisor detected: Xen
[    0.000000] Xen version 4.2.
[    0.000000] Xen Platform PCI: I/O protocol version 1
[    0.000000] Netfront and the Xen platform PCI driver have been compiled for t
his kernel: unplug emulated NICs.
[    0.000000] Blkfront and the Xen platform PCI driver have been compiled for t
his kernel: unplug emulated disks.
                You might have to change the root device
                from /dev/hd[a-d] to /dev/xvd[a-d]
                in your root= kernel command line option
[    0.000000] HVMOP_pagetable_dying not supported
[    0.000000] e820: update [mem 0x00000000-0x00000fff] usable ==> reserved
[    0.000000] e820: remove [mem 0x000a0000-0x000fffff] usable
[    0.000000] e820: last_pfn = 0x40000 max_arch_pfn = 0x400000000
[    0.000000] MTRR default type: write-back
[    0.000000] MTRR fixed ranges enabled:
[    0.000000]   00000-9FFFF write-back
[    0.000000]   A0000-BFFFF write-combining
[    0.000000]   C0000-FFFFFF write-back
[    0.000000] MTRR variable ranges enabled:
[    0.000000]   0 base 0000F0000000 mask 3FFFF8000000 uncachable
[    0.000000]   1 base 0000F8000000 mask 3FFFFC000000 uncachable
[    0.000000]   2 disabled
[    0.000000]   3 disabled
[    0.000000]   4 disabled
[    0.000000]   5 disabled
[    0.000000]   6 disabled
[    0.000000]   7 disabled
[    0.000000] x86/PAT: Configuration [0-7]: WB  WC  UC- UC  WB  WC  UC- WT
--More--

```

## 17. Command “dmesg | more”

Shows the message buffer of the kernel.



```

top - 23:16:39 up 23 days, 12:30, 2 users, load average: 0.00, 0.00, 0.00
Tasks: 118 total, 1 running, 117 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.3 sy, 0.0 ni, 99.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem : 1014436 total, 191492 free, 78688 used, 744256 buff/cache
KiB Swap: 0 total, 0 free, 0 used. 703952 avail Mem

```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
16620	karolin+	20	0	40688	3740	3112	R	0.3	0.4	0:00.10	top
1	root	20	0	185152	5776	4004	S	0.0	0.6	0:21.67	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	20	0	0	0	0	S	0.0	0.0	0:07.00	ksoftirqd/0
5	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kworker/0:0H
7	root	20	0	0	0	0	S	0.0	0.0	0:09.49	rcu_sched
8	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_bh
9	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	migration/0
10	root	rt	0	0	0	0	S	0.0	0.0	0:10.57	watchdog/0
11	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmpfs
12	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	netns
13	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	perf
14	root	20	0	0	0	0	S	0.0	0.0	0:00.01	xenwatch
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	xenbus
17	root	20	0	0	0	0	S	0.0	0.0	0:00.49	khungtaskd
18	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	writeback
19	root	25	5	0	0	0	S	0.0	0.0	0:00.00	ksmd
20	root	39	19	0	0	0	S	0.0	0.0	0:04.34	khugepaged
21	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	crypto
22	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kintegrityd
23	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
24	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kblockd
25	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	ata_sff
26	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	md
27	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	devfreq_wq
30	root	20	0	0	0	0	S	0.0	0.0	0:00.64	kswapd0
31	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	vmstat
32	root	20	0	0	0	0	S	0.0	0.0	0:00.00	fsnotify_ma+
33	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ecryptfs-kt+
49	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kthrotld
50	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
51	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
52	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
53	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
54	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
55	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
56	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
57	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
58	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
59	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
60	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
61	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
62	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
63	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
64	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
65	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
66	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
67	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
68	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
69	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
70	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
71	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
72	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset
73	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioaset

## 18. Command "top"

Shows linux tasks.

```

karolinabelzowska@ip-172-31-35-93:~$ man ls
LS(1)                                User Commands                                LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILES (the current directory by default).
    Sort entries alphabetically if none of -cftuvSUX nor --sort is speci-
    fied.

    Mandatory arguments to long options are mandatory for short options
    too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..

    --author
        with -l, print the author of each file

    -b, --escape
        print C-style escapes for nongraphic characters

    --block-size=SIZE
        scale sizes by SIZE before printing them; e.g., '--block-size=M'
        prints sizes in units of 1,048,576 bytes; see SIZE format below

    -B, --ignore-backups
        do not list implied entries ending with ~

    -c
        with -lt: sort by, and show, ctime (time of last modification of
        file status information); with -l: show ctime and sort by name;
        otherwise: sort by ctime, newest first

    -C
        list entries by columns

    --color[=WHEN]
        colorize the output; WHEN can be 'always' (default if omitted),
        'auto', or 'never'; more info below

    -d, --directory
        list directories themselves, not their contents

    -D, --dired
        generate output designed for Emacs' dired mode

    -f
        do not sort, enable -aU, disable -ls --color

    -F, --classify
        append indicator (one of */=>@|) to entries

    --file-type
        likewise, except do not append '*'

    --format=WORD

```

## 19. Command “man ls”

Displays manual page of ls command. Ls command give a list of directory contents.

```

karolinabelzowska@ip-172-31-35-93:~$ man who
WHO(1)                                User Commands                                WHO(1)

NAME
    who - show who is logged on

SYNOPSIS
    who [OPTION]... [ FILE | ARG1 ARG2 ]

DESCRIPTION
    Print information about users who are currently logged in.

    -a, --all
        same as -b -d --login -p -r -t -T -u

    -b, --boot
        time of last system boot

    -d, --dead
        print dead processes

    -H, --heading
        print line of column headings

    --ips
        print ips instead of hostnames. with --lookup, canonicalizes
        based on stored IP, if available, rather than stored hostname

    -l, --login
        print system login processes

    --lookup
        attempt to canonicalize hostnames via DNS

    -m
        only hostname and user associated with stdin

    -p, --process
        print active processes spawned by init

    -q, --count
        all login names and number of users logged on

    -r, --runlevel
        print current runlevel

    -s, --short
        print only name, line, and time (default)

    -t, --time
        print last system clock change

    -T, -w, --mesg
        add user's message status as +, - or ?

    -u, --users
        list users logged in

    --message
        same as -T

    --writable
        same as -T

```

## 20. Command “man who”

Shows a manual page of who command (who is logged on)

```

karolinabelzowska@ip-172-31-35-93:~$ man who
karolinabelzowska@ip-172-31-35-93:~$ time sleep 5

real    0m5.001s
user    0m0.000s
sys     0m0.000s
karolinabelzowska@ip-172-31-35-93:~$ history
 1  ls
 2  mkdir Music
 3  ls
 4  cd Music
 5  mkdir Madonna/
 6  ls
 7  cd Madonna
 8  mkdir "The Confession"
 9  mkdir "Music"
10  ls
11  cd ..
12  mkdir Dawid\ Podsiadlo/
13  ls
14  cd Dawid Podsiadlo
15  Dawid\ Podsiadlo
16  ls
17  cd Dawid Podsiadlo
18  ls
19  cd Dawid\Podsiadlo
20  cd Dawid Podsiadlo
21  DawidPodsiadlo
22  cd Madonna
23  cd ..
24  cd Dawid Podsiadlo
25  cd Dawid Podsiadlo
26  cd Dawid Podsiadlo
27  pwd
28  cd Dawid\ Podsiadlo/
29  ls
30  cwd
31  pwd
32  mkdir "Malomiasteczkowy"
33  mkdir "Mokotow"
34  ls
35  cd ..
36  mkdir Maanam/
37  ls
38  cd Maanam
39  mkdir "Nocny patrol"
40  mkdir "Roza"
41  ls
42  pwd
43  cd ..
44  tree
45  echo hello world
46  passwd
47  date
48  hostname
49  arch
50  uname -a
51  uptime
52  whoami
53  who
54  Last
55  last

```

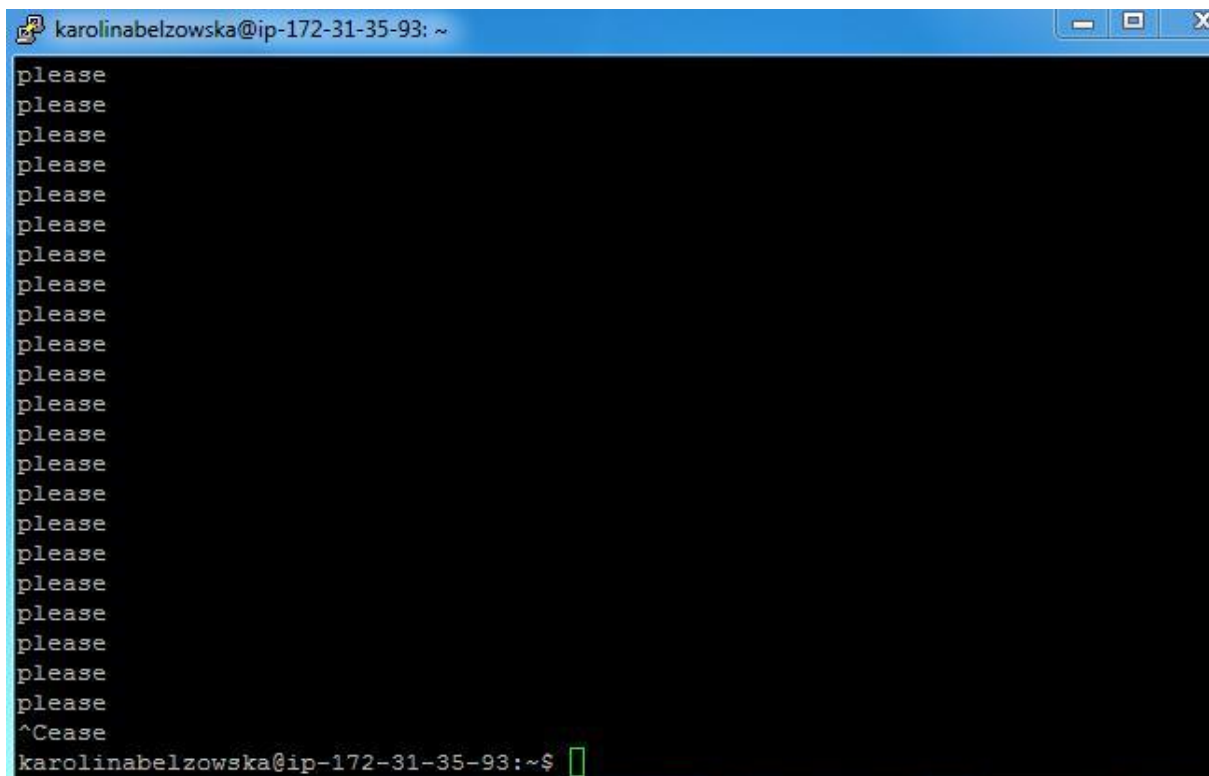
## 21. Command "time sleep 5"

Shows that the command will make my terminal pause for 5 seconds before returning to the command line.

## 22. Command "history"

Shows the history of all commands which were typed in terminal.



A terminal window with a blue title bar. The title bar text is 'karolinabelzowska@ip-172-31-35-93: ~'. The terminal content shows the word 'please' printed repeatedly on multiple lines. At the bottom, the prompt 'karolinabelzowska@ip-172-31-35-93:~\$' is followed by a green cursor. The text '^Cease' is visible just above the prompt, indicating the command was interrupted.

```
karolinabelzowska@ip-172-31-35-93: ~  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
please  
^Cease  
karolinabelzowska@ip-172-31-35-93:~$
```

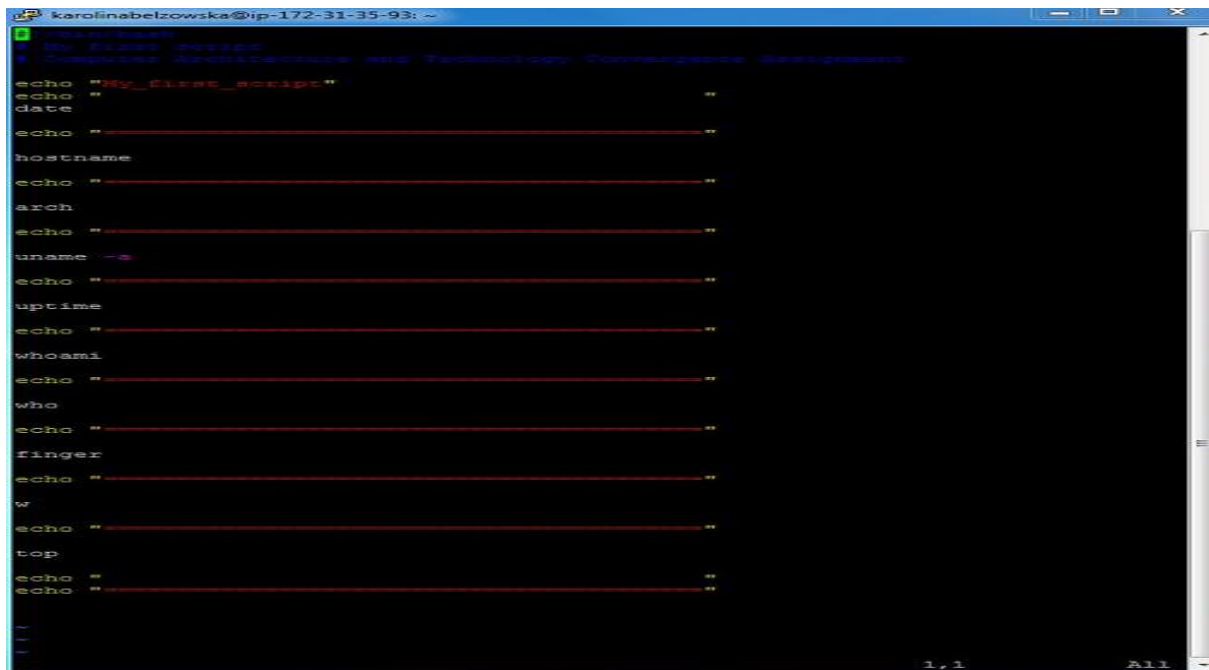
### 23. Command “yes please”

It continuously prints “please”.

Ctrl C clears terminal.

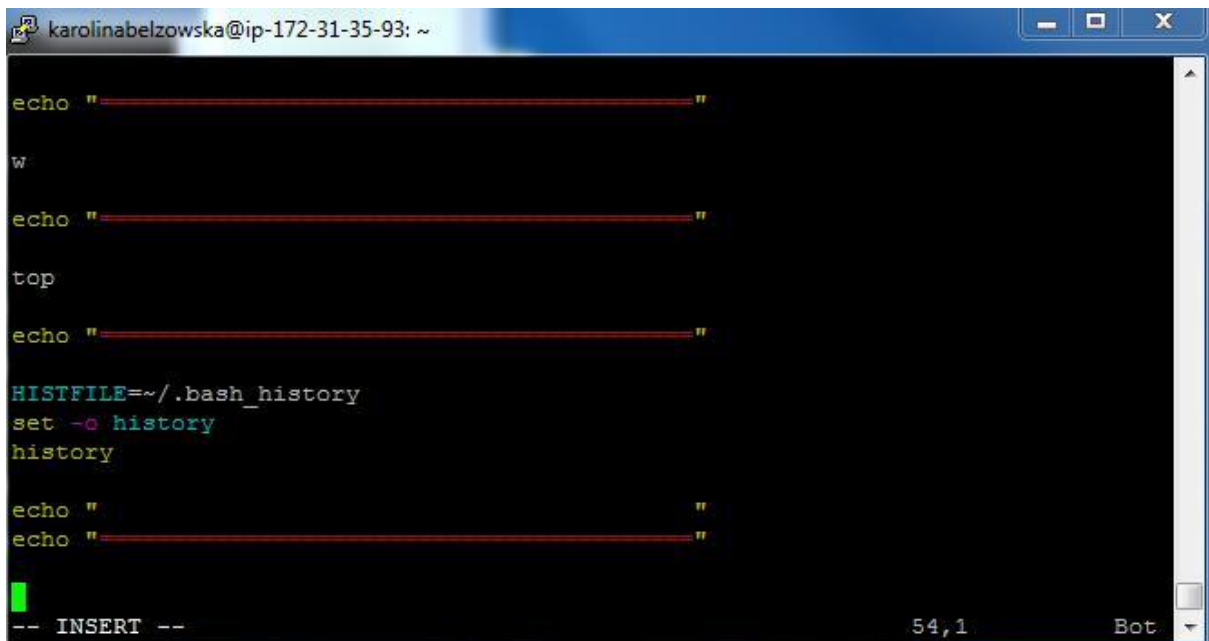


## Q2.2: Write the shell script using the Vim text editor



```
karolinabelzowska@ip-172-31-35-93: ~  
# vim script  
# Computer Architecture and Technology Management Assignment  
echo "My_Script_script"  
echo "  
date  
echo "  
hostname  
echo "  
arch  
echo "  
uname -a  
echo "  
uptime  
echo "  
whoami  
echo "  
who  
echo "  
finger  
echo "  
w  
echo "  
top  
echo "  
echo "  
_  
_  
_  
1,1 All
```

And History:



```
karolinabelzowska@ip-172-31-35-93: ~  
echo "  
w  
echo "  
top  
echo "  
HISTFILE=~/.bash_history  
set -o history  
history  
echo "  
echo "  
-- INSERT --  
54,1 Bot
```

```
karolinabelzowska@ip-172-31-35-93: ~  
=====br/>karolinabelzowska@ip-172-31-35-93:~$ uit  
No command 'uit' found, did you mean:  
Command 'vit' from package 'vit' (universe)  
Command 'uif' from package 'uif' (universe)  
Command 'ui' from package 'userinfo' (universe)  
Command 'uic' from package 'qtchooser' (main)  
Command 'wit' from package 'wit' (universe)  
Command 'nit' from package 'python-nevow' (universe)  
Command 'umit' from package 'umit' (universe)  
Command 'luit' from package 'x11-utils' (main)  
Command 'uil' from package 'uil' (universe)  
Command 'git' from package 'git' (main)  
uit: command not found  
karolinabelzowska@ip-172-31-35-93:~$ vim myscript.sh  
Music myscript.sh  
Press ENTER or type command to continue  
Music myscript.sh  
Press ENTER or type command to continue  
karolinabelzowska@ip-172-31-35-93:~$ pwd  
/home/karolinabelzowska  
karolinabelzowska@ip-172-31-35-93:~$ tree  
.  
├── Music  
│   ├── Dawid Podsiadlo  
│   │   ├── Malomiasteczkowy  
│   │   └── Mokotow  
│   ├── Maanam  
│   │   ├── Nocny patrol  
│   │   └── Roza  
│   ├── Madonna  
│   │   ├── Music  
│   │   └── The Confession  
└── myscript.sh  
10 directories, 1 file  
karolinabelzowska@ip-172-31-35-93:~$
```

Then I created ".txt" fie:

```
karolinabelzowska@ip-172-31-35-93: ~  
New release '18.04.2 LTS' available.  
Run 'do-release-upgrade' to upgrade to it.  
  
*** System restart required ***  
Last login: Tue Apr 23 21:53:18 2019 from 51.171.152.179  
karolinabelzowska@ip-172-31-35-93:~$ tree  
.  
├── karolinabelzowska.txt  
├── Music  
│   ├── Dawid Podsiadlo  
│   │   ├── Malomiasteczkowy  
│   │   └── Mokotow  
│   ├── Maanam  
│   │   ├── Nocny patrol  
│   │   └── Roza  
│   ├── Madonna  
│   │   ├── Music  
│   │   └── The Confession  
└── myscript.sh  
10 directories, 2 files  
karolinabelzowska@ip-172-31-35-93:~$
```

The contest of karolinabelzowska.txt file:

```
karolinabelzowska@ip-172-31-35-93: ~
New release '18.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***
Last login: Tue Apr 23 21:53:18 2019 from 51.171.152.179
karolinabelzowska@ip-172-31-35-93:~$ tree
.
├── karolinabelzowska.txt
├── Music
│   ├── Dawid Podsiadlo
│   │   └── Malomiasteczkowy
│   │       └── Mokotow
│   ├── Maanam
│   │   ├── Nocny patrol
│   │   └── Roza
│   └── Madonna
│       ├── Music
│       └── The Confession
└── myscript.sh

10 directories, 2 files
karolinabelzowska@ip-172-31-35-93:~$ clear
karolinabelzowska@ip-172-31-35-93:~$ cat karolinabelzowska.txt
My_first_script
Tue Apr 23 21:54:27 UTC 2019
=====

My_first_script
ip-172-31-35-93

=====

My_first_script
x86_64

=====

My_first_script
Linux ip-172-31-35-93 4.4.0-1075-aws #85-Ubuntu SMP Thu Jan 17 17:15:12 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux
=====
```

```
karolinabelzowska@ip-172-31-35-93: ~  
  
My_first_script  
My_first_script 22:31:11 up 36 days, 11:44, 5 users, load average: 0.00, 0.00, 0.00  
22:31:11 up 36 days, 11:44, 5 users, load average: 0.00, 0.00, 0.00  
=====
```

Login	Name	Tty	Idle	Login Time	Office	Office Phone
celestequinlan	pts/2	7:11	Apr 22 10:50	(109.77.128.137)		
eoinstankard	pts/0	2:08	Apr 23 20:13	(78.16.118.213)		
karolinabelzowska	pts/1	Apr 23 21:53	(51.171.152.179)			
seamuskeating	pts/8	1:31	Apr 23 19:37	(146.90.238.252)		

```
=====
```

USER	TTY	FROM	LOGIN@	IDLE	JCPU	PCPU	WHAT
karolina	pts/1	51.171.152.179	21:53	5.00s	0.50s	0.00s	w
celesteq	pts/2	109.77.128.137	Mon10	7:19m	0.53s	0.06s	sshd: celestequinlan [priv]
seamuske	pts/8	146.90.238.252	19:37	21.00s	0.10s	0.10s	-bash

```
=====
```

top - 23:01:48 up 36 days, 12:15, 3 users, load average: 0.00, 0.00, 0.00  
Tasks: 124 total, 1 running, 123 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0.0 us, 0.3 sy, 0.0 ni, 99.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.3 st  
KiB Mem : 1014436 total, 126488 free, 90644 used, 797304 buff/cache  
KiB Swap: 0 total, 0 free, 0 used. 688964 avail Mem

```
=====
```

karolinabelzowska@ip-172-31-35-93:~\$

```
karolinabelzowska@ip-172-31-35-93: ~  
nlan [priv]  
seamuske pts/8 146.90.238.252 19:37 21.00s 0.10s 0.10s -bash  
=====
```

top - 23:01:48 up 36 days, 12:15, 3 users, load average: 0.00, 0.00, 0.00  
Tasks: 124 total, 1 running, 123 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0.0 us, 0.3 sy, 0.0 ni, 99.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.3 st  
KiB Mem : 1014436 total, 126488 free, 90644 used, 797304 buff/cache  
KiB Swap: 0 total, 0 free, 0 used. 688964 avail Mem

```
=====
```

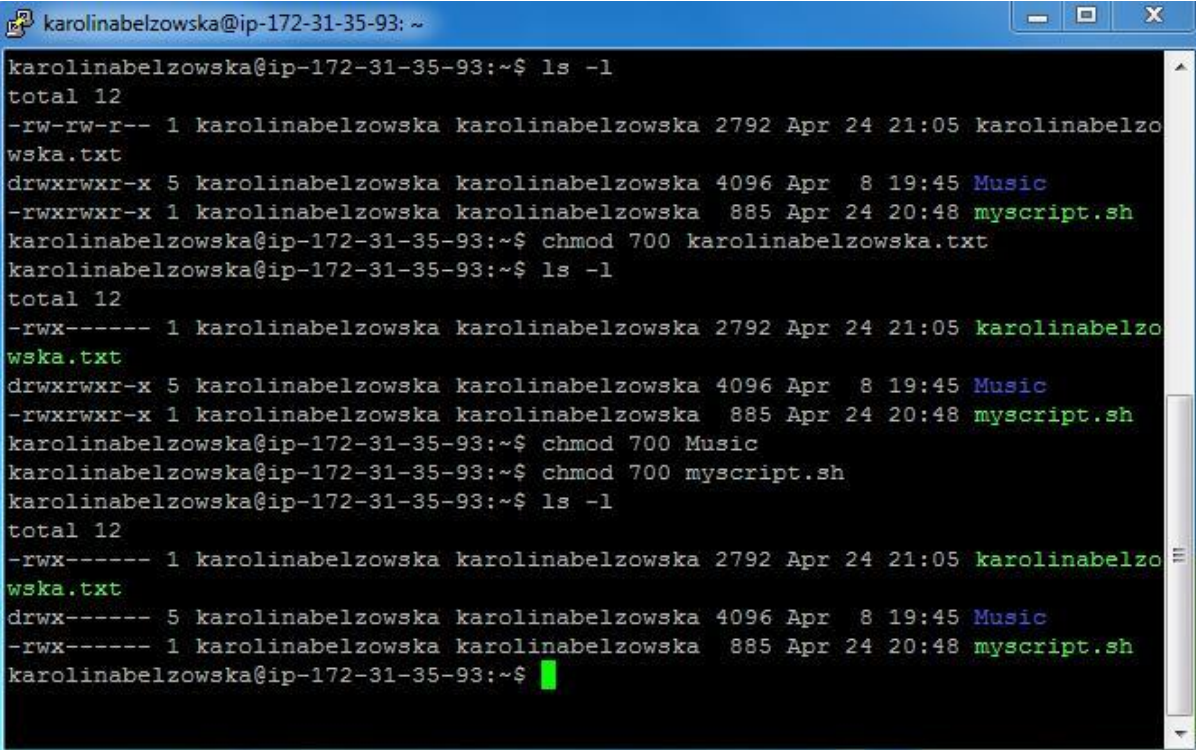
292 cat karolinabelzowska.txt  
293 vim myscript.sh  
294 ./myscript.sh  
293 vim myscript.sh  
292 cat karolinabelzowska.txt  
.  
.  
.  
348 cat karolinabelzowska.txt  
349 history

```
=====
```

karolinabelzowska@ip-172-31-35-93:~\$

## Q2.3

### Q2.3.1: Change the access permissions using the “chmod” command

A terminal window titled 'karolinabelzowska@ip-172-31-35-93: ~' with standard window controls. The terminal shows a series of commands and their outputs. First, 'ls -l' is run, showing permissions for 'karolinabelzowska.txt', 'Music', and 'myscript.sh'. Then, 'chmod 700 karolinabelzowska.txt' is executed. Next, 'ls -l' is run again, showing the updated permissions for 'karolinabelzowska.txt'. Then, 'chmod 700 Music' and 'chmod 700 myscript.sh' are executed. Finally, 'ls -l' is run a third time, showing the updated permissions for all three files. The prompt is currently at the end of the last 'ls -l' command.

```
karolinabelzowska@ip-172-31-35-93: ~  
karolinabelzowska@ip-172-31-35-93:~$ ls -l  
total 12  
-rw-rw-r-- 1 karolinabelzowska karolinabelzowska 2792 Apr 24 21:05 karolinabelzo  
wska.txt  
drwxrwxr-x 5 karolinabelzowska karolinabelzowska 4096 Apr  8 19:45 Music  
-rwxrwxr-x 1 karolinabelzowska karolinabelzowska  885 Apr 24 20:48 myscript.sh  
karolinabelzowska@ip-172-31-35-93:~$ chmod 700 karolinabelzowska.txt  
karolinabelzowska@ip-172-31-35-93:~$ ls -l  
total 12  
-rwx----- 1 karolinabelzowska karolinabelzowska 2792 Apr 24 21:05 karolinabelzo  
wska.txt  
drwxrwxr-x 5 karolinabelzowska karolinabelzowska 4096 Apr  8 19:45 Music  
-rwxrwxr-x 1 karolinabelzowska karolinabelzowska  885 Apr 24 20:48 myscript.sh  
karolinabelzowska@ip-172-31-35-93:~$ chmod 700 Music  
karolinabelzowska@ip-172-31-35-93:~$ chmod 700 myscript.sh  
karolinabelzowska@ip-172-31-35-93:~$ ls -l  
total 12  
-rwx----- 1 karolinabelzowska karolinabelzowska 2792 Apr 24 21:05 karolinabelzo  
wska.txt  
drwx----- 5 karolinabelzowska karolinabelzowska 4096 Apr  8 19:45 Music  
-rwx----- 1 karolinabelzowska karolinabelzowska  885 Apr 24 20:48 myscript.sh  
karolinabelzowska@ip-172-31-35-93:~$
```

### Q2.3.2: An online IP location service to determine the city and country where the VM is located



```
karolinabelzowska@ip-172-31-35-93: ~  
[logo.svg] IP Location (p1 of 2)  
IP Location  
Instantly Locate Any IP Address  
  
This free online tool allows you to see the geographical location of  
any IP address. Just input the IP address and you will be shown the  
position on a map, coordinates, country, region, city and organization.  
[INS: :INS]  
34.243.115.201 (BUTTON) Find  
- NOT FOUND  
Your IP address 34.243.115.201  
Latitude 53.3331  
Longitude -6.2489  
Country Ireland  
Region Leinster  
City Dublin  
Organization Amazon.com  
  
Enter text. Use arrows or tab to move off of field.  
Enter text into the field by typing on the keyboard  
Ctrl-U to delete all text in field, [Backspace] to delete a character
```

Q2.4: Write a shell script program that behaves like an Irish person offering a cup of tea.

```
karolinabelzowska@ip-172-31-35-93: ~  
#!/bin/bash  
# This shell script program will behave like an Irish person offering a cup of tea.  
# Carolina Brafran-Belzowska  
  
echo "  
echo "  
  
echo -n "Would you like a cup of tea?"  
read answer  
  
if [ "$answer" = "yes" ]  
then  
    echo "Great, I will make a tea now!"  
else  
    echo "Are you sure?"  
fi  
  
echo "  
echo "  
-- INSERT -- 1,1 Top
```

```
karolinabelzowska@ip-172-31-35-93: ~  
karolinabelzowska@ip-172-31-35-93:~$ ./irishtea.sh  
  
=====
```

Would you like a cup of tea?yes  
Great, I will make a tea now!

```
=====
```

Would you like a cup of tea?  
yes  
Great, I will make a tea now!

```
karolinabelzowska@ip-172-31-35-93:~$
```

```
karolinabelzowska@ip-172-31-35-93: ~  
karolinabelzowska@ip-172-31-35-93:~$ ./irishtea.sh  
  
=====
```

Would you like a cup of tea?no  
Are you sure?

```
=====
```

Would you like a cup of tea?  
no  
Are you sure?  
no  
Are you sure?  
no  
Are you sure?  
no  
Are you sure?

```
=====
```

karolinabelzowska@ip-172-31-35-93:~\$

```
karolinabelzowska@ip-172-31-35-93: ~  
  
echo "  
echo "-----"  
  
echo -e "Would you like a cup of tea?"  
read answer  
if [ "$answer" == "yes" ]  
then  
    echo "Great, I will make a tea now!"  
    exit  
fi  
while [ "$answer" = "yes" ]  
do  
    echo "Great, I will make a tea now!"  
    sleep 1  
done  
while [ "$answer" != "yes" ]  
do  
  
    echo "Are you sure?"  
    read answer  
    echo "Are you sure?"  
    read answer  
    echo "Are you sure?"  
    read answer  
    echo "Are you sure?"  
  
break  
  
done  
-- INSERT --
```

## Tree

```
karolinabelzowska@ip-172-31-35-93: ~  
karolinabelzowska@ip-172-31-35-93:~$ tree  
.  
├── irishtea.sh  
├── karolinabelzowska.txt  
├── Music  
│   ├── Dawid Podsiadlo  
│   │   ├── Malomiasteczkowy  
│   │   └── Mokotow  
│   ├── Maanam  
│   │   ├── Nocny patrol  
│   │   └── Roza  
│   ├── Madonna  
│   │   ├── Music  
│   │   └── The Confession  
└── myscrip.sh  
  
10 directories, 3 files  
karolinabelzowska@ip-172-31-35-93:~$
```



## References:

<https://www.cyberciti.biz/faq/save-file-in-vi-vim-linux-apple-macos-unix-bsd/>

[http://linuxcommand.org/lc3\\_wss0010.php](http://linuxcommand.org/lc3_wss0010.php)

<https://unix.stackexchange.com/questions/47584/in-a-bash-script-using-the-conditional-or-in-an-if-statement>

<https://stackoverflow.com/questions/13593771/repeat-command-automatically-in-linux>

<https://linuxhint.com/bash-while-loop-examples/>

<https://stackoverflow.com/questions/18488651/how-to-break-out-of-a-loop-in-bash>

<https://unix.stackexchange.com/questions/184631/bash-ubuntu-strings-in-while-loops>

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