

CSIL Assessment

CSIL Task

1:

a) $numberA = 69 = 1000101$
 $numberB = 100 = 1100100$

Using 2's complement on numberB:

1) Switch bits = 10011011 2) Add 1 to the switched bits:

$$\begin{array}{r} 10011011 \\ + \quad \quad 1 \\ \hline (10011100)_2 \end{array}$$

3) Finally, Add numberA to the new number:

$$\begin{array}{r} + 1000101 \\ 10011100 \\ \hline (11100001)_2 \\ = (-31)_{10} \end{array}$$

b) $numberC = 3 = 100011$
 $numberD = 3 = \quad \quad 11$

$$\begin{array}{r}
 100011 \\
 * \quad 11 \\
 \hline
 100011 \\
 + 100011 \\
 \hline
 (1101001)_2 \\
 = (105)_{10}
 \end{array}$$

c) $numberC = 125 = 1111101$
 $numberD = 375 = 101110111$

$$\begin{array}{r}
 1111111 \\
 + 1111101 \\
 101110111 \\
 \hline
 (111110100)_2 \\
 = (500)_{10}
 \end{array}$$

Converting 125 into IEEE-754 format:

1) Convert 125 to binary:

$$(125)_{10} = (1111101)_2$$

2) Normalize the binary representation:

$$1.111101 \times 2^6$$

3) Determine the sign bit:

Since 125 is positive, the sign bit is 0.

4) Determine the exponent:

The exponent is $6 + 127$, where 127 is the bias for singleprecision floating-point numbers in IEEE-754.

$$6 + 127 = (133)_{10} = (10000101)_2$$

The exponent field in IEEE-754 is 8 bits, so we need to represent 133 in 8 bits.

$$(133)_{10} = (10000101)_2$$

5) Determine the fraction:

The fraction part is the binary representation of the normalized fraction without the leading 1.

For 125, the fraction is 111101000000000000000000.

6) Put it all together:

- Sign bit: 0 (positive)
- Exponent: 10000101
- Fraction: 111101000000000000000000

The IEEE-754 representation for 125 is:
0 10000101 111101000000000000000000

d) *numberE* = 150
numberF = 200

Convert 150 into a hexadecimal number:

1) Divide 150 by 16:

$$150 \div 16 = 9$$
$$\text{Remainder} = 6$$

2) Write down the remainder as the least significant digit (rightmost):

The remainder is 6, so the rightmost digit is 6.

3) Continue dividing the quotient by 16:

$$9 \div 16 = 0$$
$$\text{Remainder} = 9$$

4) Write down the new remainder as the next digit to the left:

The next digit to the left is 9.

5) Combine the remainders:

The hexadecimal representation of 150 is 96.

$$(150)_{10} = (96)_{16}$$

Convert 200 into an octal number:

1. Divide 150 by 8:

$$150 \div 8 = 18$$
$$\text{Remainder} = 6$$

2. **Write down the remainder as the least significant digit (rightmost):**

The remainder is 6, so the rightmost digit is 6.

3. **Continue dividing the quotient by 8:**

$$18 \div 8 = 2$$
$$\text{Remainder} = 2$$

4. **Write down the new remainder as the next digit to the left:**

The next digit to the left is 2.

5. **Continue dividing the quotient by 8 again:**

$$2 \div 8 = 0$$
$$\text{Remainder} = 2$$

6. **Write down the last remainder as the most significant digit (leftmost):**

The most significant digit is 2.

7. **Combine the remainders:**

the octal representation of 150 is 226.

$$(150)_{10} = (226)_8$$

Task 2:

a) Caesar Shift Encryption:

Carry out a cryptanalytic attack on this encrypted sentence:

“Xbnrrnsl Uttqx lwfsp ltti pni rFFi hnyd Pjsiwnhp Qfrfw”

(Shift = 5)

Unshifted	Shifted
X	S
b	w
n	i
r	m
r	m
n	i
s	n
l	g

Result = Kenc

Unshifted	Shifted
U	P
t	o
t	o
q	l
x	s

Result = Po

Unshifted	Shifted
l (Capital i)	D
w	r
f	a
s	n
p	k

Result = Dra

Unshifted	Shifted
l	g
t	o
t	o
i	d

Result = good

Unshifted	Shifted
p	k
n	i
i	d

Result = kid

Unshifted	Shifted
r	m
F	A
F	A
i	d

Result = mAAAd

Unshifted	Shifted
h	c
n	i
y	t
d	y

Result = city

Unshifted	Shifted
P	K
j	e
s	n
i	d
w	r
n	i
h	c
p	k
Result = Kendrick	

Unshifted	Shifted
Q	L
f	a
r	m
f	a
w	r
Result = Lamar	

Result:

“Swimming Pools Drank good kid mAAAd city Kendrick Lamar”

Explanation: Caesar Encryption has a fixed system of shifting each character to a specified number of characters in the English language (usually using all the characters [A-Z], but characters of choice can be excluded). In this case, the specified shift is 5, which turns an A to an F.

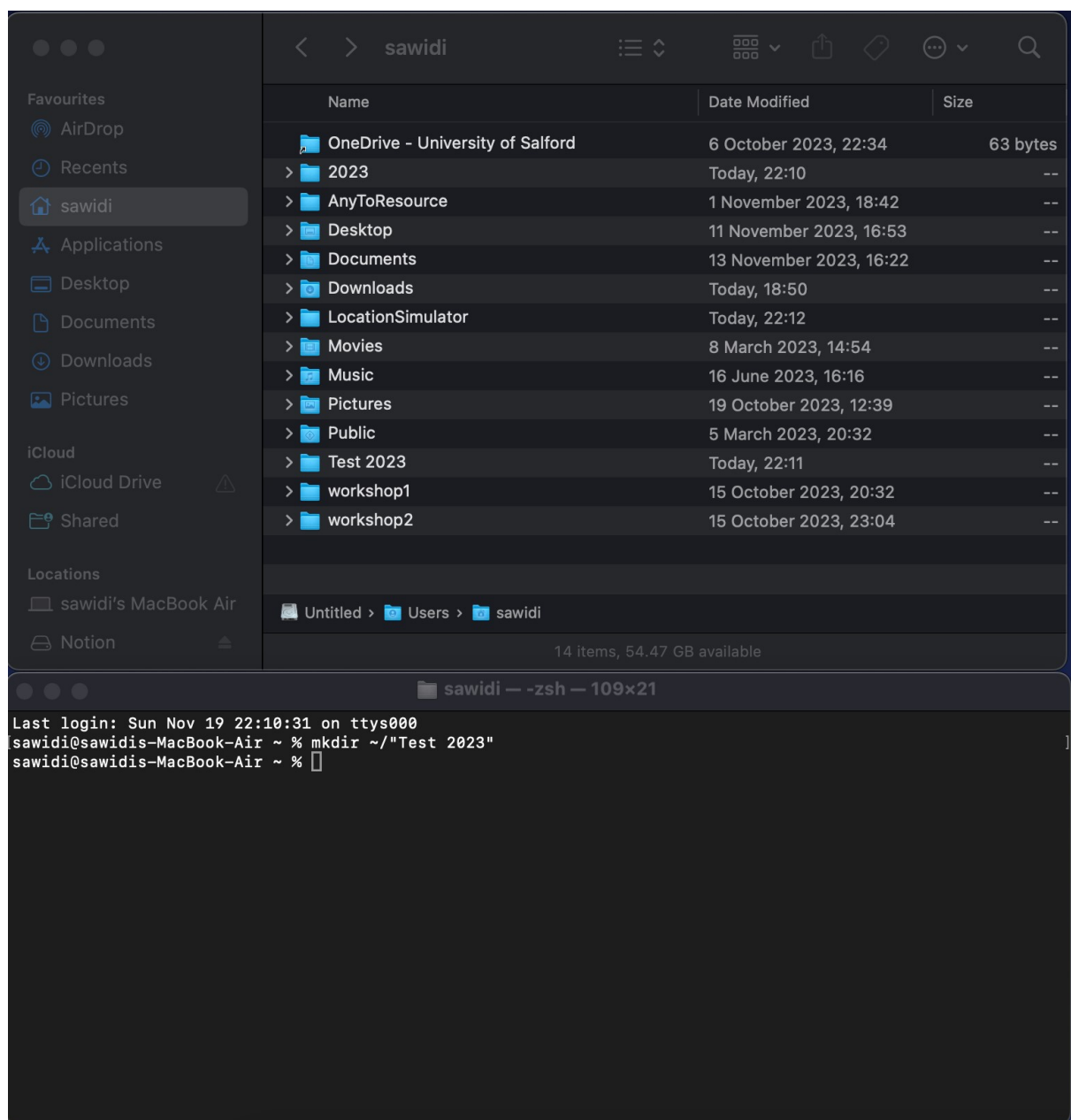
b) Sliding Windows Flow Control:

Time														Sender	In transit (A→B)	In transit (A←B)	Recipient
1	0	1												Sending			Idle
2	0	1												Blocked	0		Process 1, send ACK1
3	0	1												Idle	0,1	ACK1	Process 2, send ACK2
4	0	1												Sending	1	ACK1,ACK2	Process 2
5	0	1	2											Blocked	1,2	ACK2	Idle
6	0	1	2	3										Idle	2,3		Process 3,Send ACK3
7	0	1	2	3										Idle	3	ACK3	Idle
8	0	1	2	3										Sending			Process 3, send ACK4
9	0	1	2	3	4									Idle	3,4	ACK4	Process 4
10	0	1	2	3	4									Idle	4		Process 4, send ACK5
11	0	1	2	3	4									Idle		ACK5	Idle

Linux

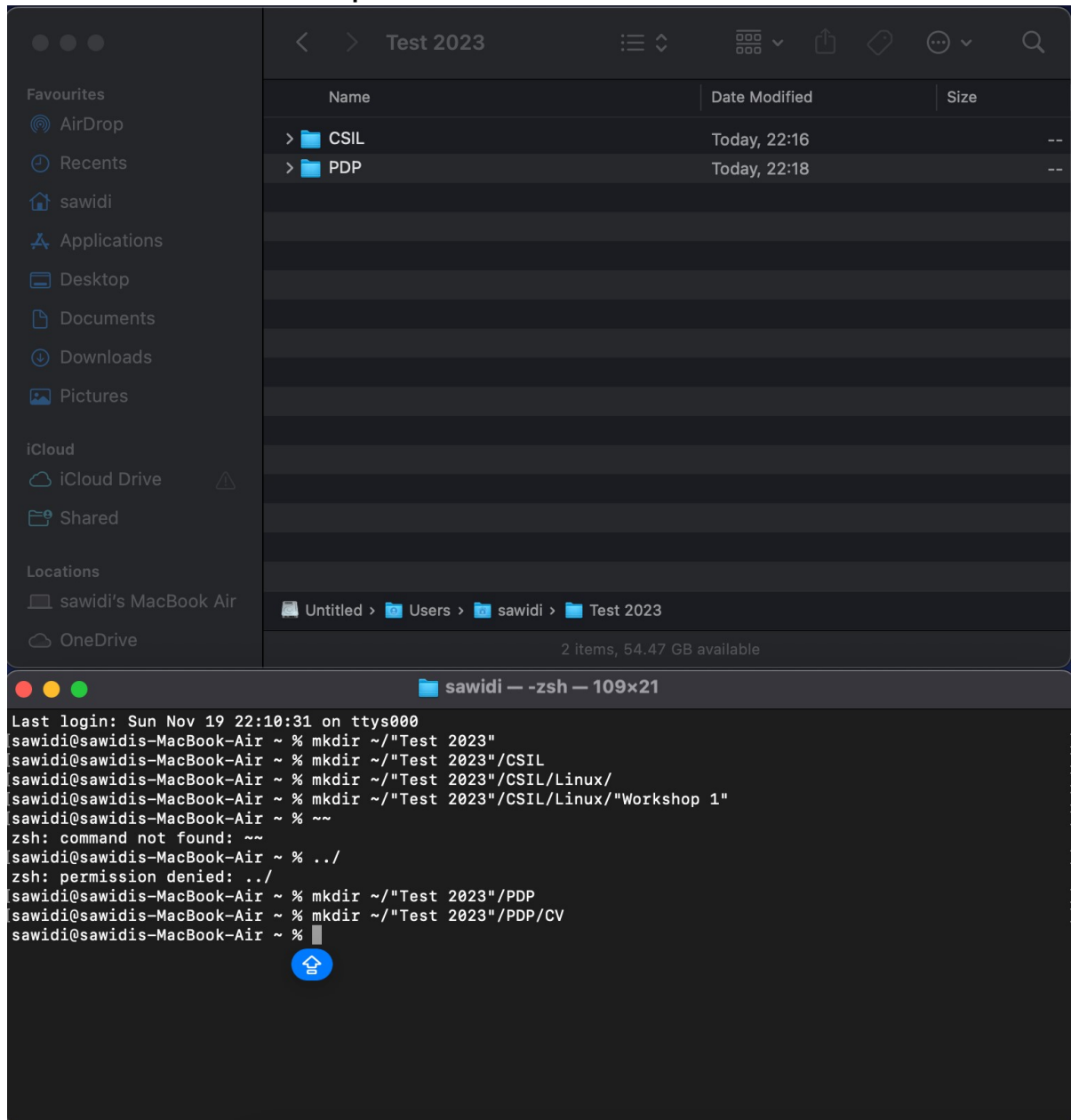
Task 1:

First, I created a folder called “Test 2023” located in the home directory (~):

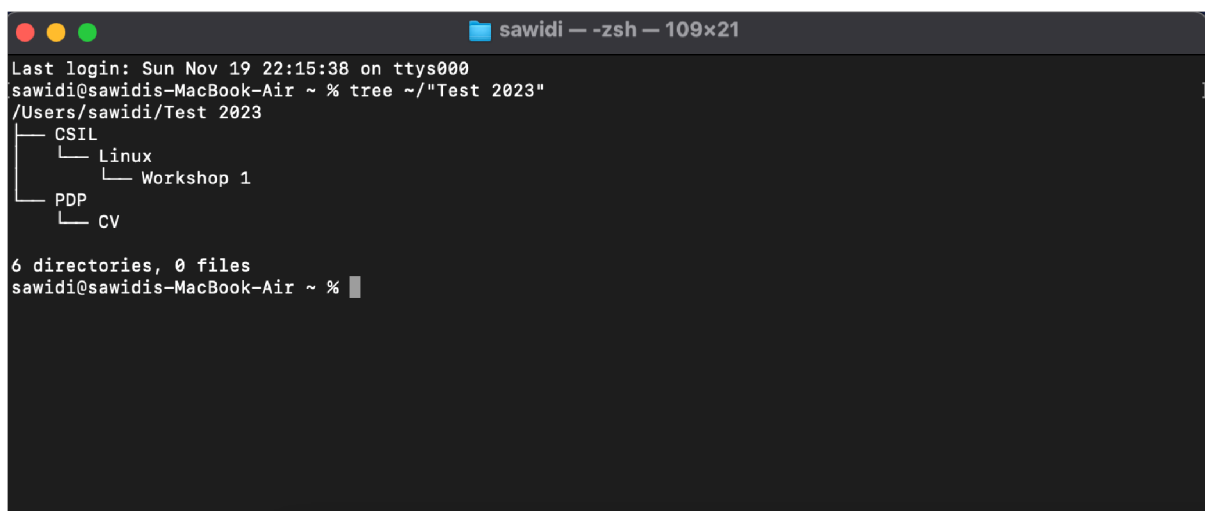


Task 1.1:

Create folders as requested:

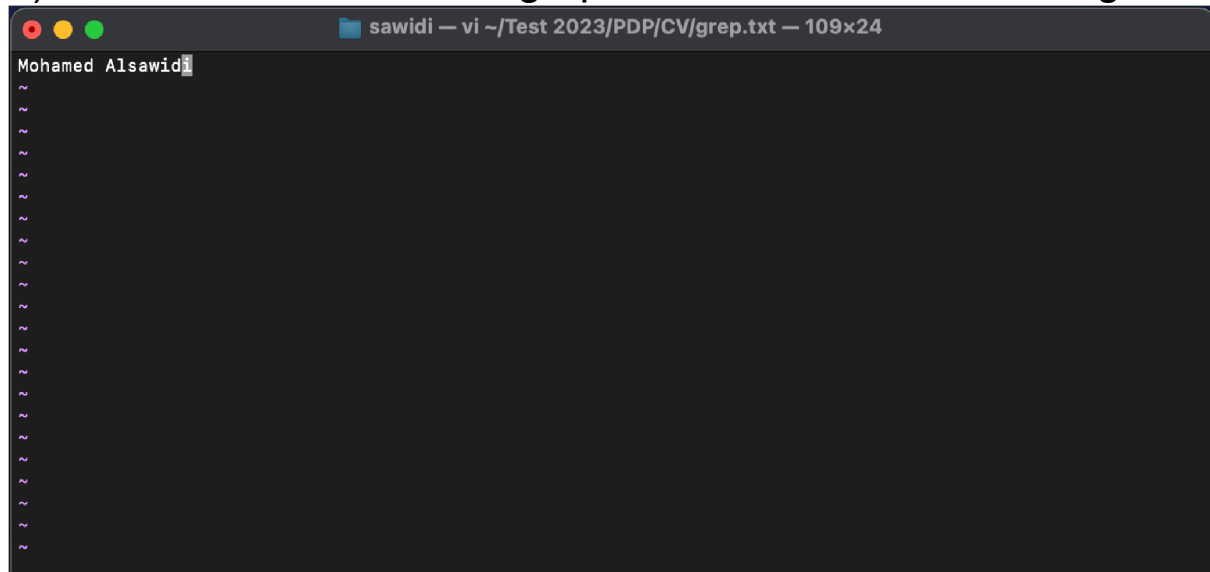


“tree” command:

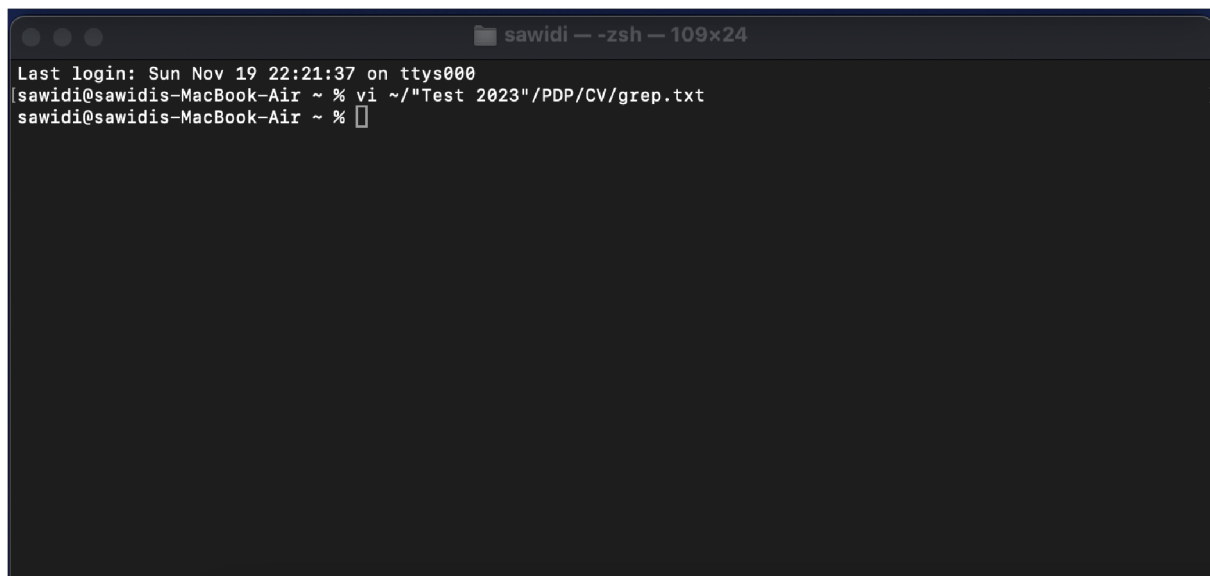


Task 1.2:

a) Create a text file called “grep.txt” inside the CV file using “vi”:

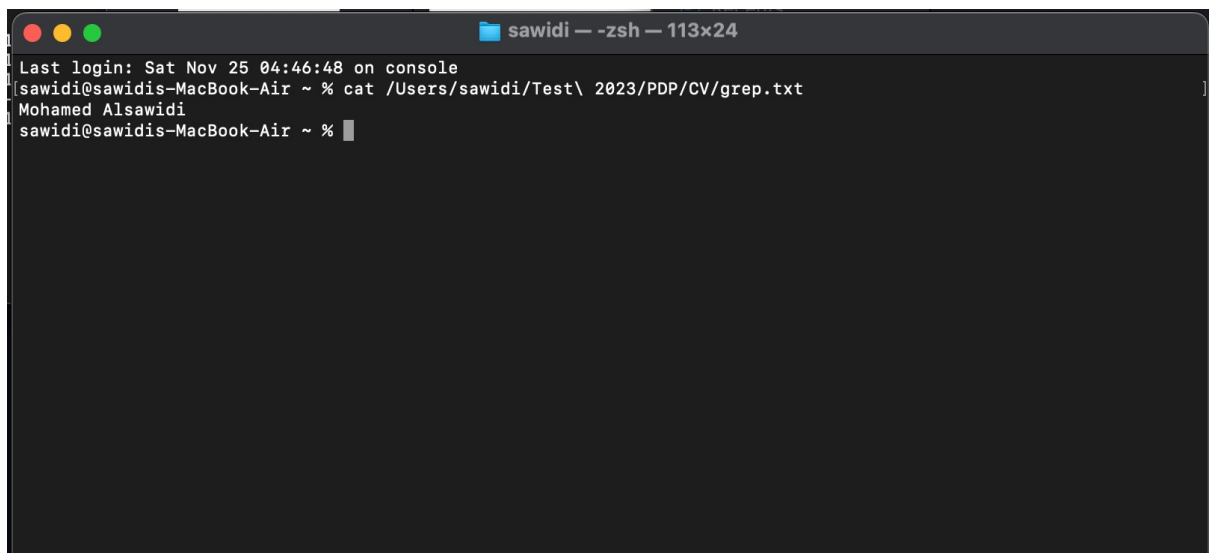


```
sawidi — vi ~/Test 2023/PDP/CV/grep.txt — 109x24
Mohamed Alsawidi
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```



```
sawidi — -zsh — 109x24
Last login: Sun Nov 19 22:21:37 on ttys000
sawidi@sawidis-MacBook-Air ~ % vi ~/Test 2023/PDP/CV/grep.txt
sawidi@sawidis-MacBook-Air ~ %
```

“cat” command for “grep.txt”:



```
sawidi — -zsh — 113x24
Last login: Sat Nov 25 04:46:48 on console
sawidi@sawidis-MacBook-Air ~ % cat /Users/sawidi/Test\ 2023/PDP/CV/grep.txt
Mohamed Alsawidi
sawidi@sawidis-MacBook-Air ~ %
```

b) Create a text file called “cv.txt” in the folder “Linux” using “nano (with “cat” command):

```
sawidi — zsh — 109x24
Last login: Sun Nov 19 22:21:37 on ttys000
[sawidi@sawidis-MacBook-Air ~ % vi ~/Test 2023/PDP/CV/grep.txt
[sawidi@sawidis-MacBook-Air ~ % nano ~/Test 2023/CSIL/Linux/cv.txt
[sawidi@sawidis-MacBook-Air ~ % cat ~/Test 2023/CSIL/Linux/cv.txt
Linux lol
[sawidi@sawidis-MacBook-Air ~ % ]
```

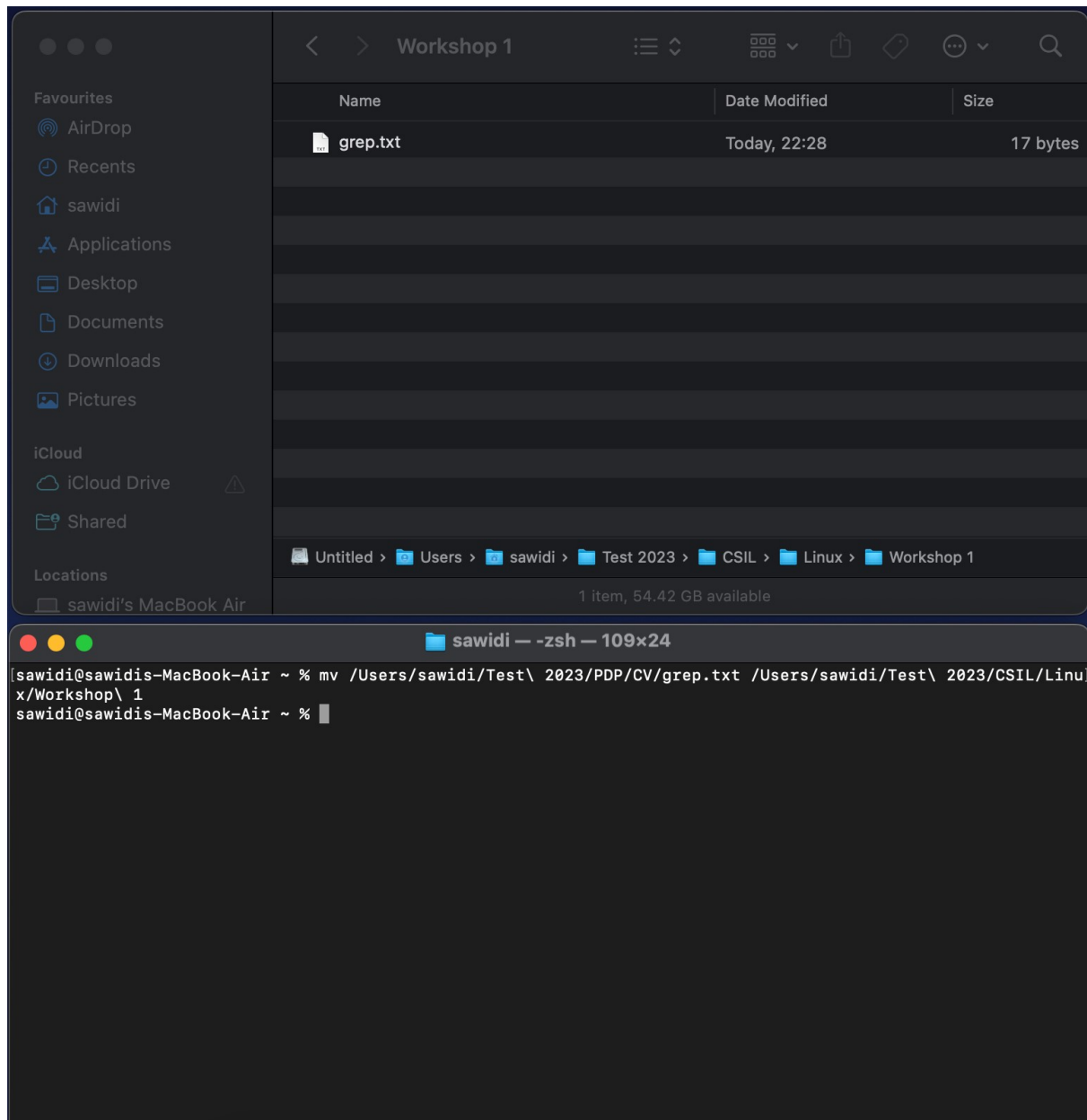
```
sawidi — nano ~/Test 2023/CSIL/Linux/cv.txt — 109x24
UW PICD 5.09 File: /Users/sawidi/Test 2023/CSIL/Linux/cv.txt Modified
Linux lol
^G Get Help ^O WriteOut ^R Read File ^Y Prev Pg ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where is ^V Next Pg ^U UnCut Text ^T To Spell
```

“tree” command:

```
sawidi — zsh — 109x24
Last login: Sun Nov 19 22:21:37 on ttys000
[sawidi@sawidis-MacBook-Air ~ % vi ~/Test 2023/PDP/CV/grep.txt
[sawidi@sawidis-MacBook-Air ~ % nano ~/Test 2023/CSIL/Linux/cv.txt
[sawidi@sawidis-MacBook-Air ~ % cat ~/Test 2023/CSIL/Linux/cv.txt
Linux lol
[sawidi@sawidis-MacBook-Air ~ % tree ~/Test 2023
/Users/sawidi/Test 2023
├── CSIL
│   ├── Linux
│   │   ├── Workshop 1
│   │   └── cv.txt
│   └── PDP
│       └── CV
│           └── grep.txt
└── 6 directories, 2 files
[sawidi@sawidis-MacBook-Air ~ % ]
```

Task 1.3:

a) Move the file “grep.txt” into the “Workshop 1” folder:



b) Copy the file “cv.txt” into the folder “CV”:

```
PDP — -zsh — 114x24

Last login: Sun Nov 26 01:38:27 on ttys000
sawidi@sawidis-MacBook-Air ~ % cd /Users/sawidi/Test\ 2023/PDP
sawidi@sawidis-MacBook-Air PDP % cp /Users/sawidi/Test\ 2023/CSIL/Linux/cv.txt CV
sawidi@sawidis-MacBook-Air PDP %
```

c) Rename the folder “Workshop 1” to “Tutorial 1”:

The image shows two windows from a macOS system. The top window is a Finder window titled "Linux" showing the contents of a folder named "Linux". It contains a folder named "Tutorial 1" and a file named "cv.txt". The bottom window is a Terminal window titled "CSIL — -zsh — 109x24" showing the execution of several commands to navigate the file system and rename a folder.

Finder Window: Linux

Name	Date Modified	Size
> Tutorial 1	Today, 23:42	--
cv.txt	Today, 22:32	10 bytes

Terminal Window: CSIL — -zsh — 109x24

```
sawidi@sawidis-MacBook-Air pdp % cd ..
sawidi@sawidis-MacBook-Air Test 2023 % cd csil
sawidi@sawidis-MacBook-Air csil % mv Linux/Workshop\ 1 Linux/Tutorial\ 1
sawidi@sawidis-MacBook-Air csil %
```

d) Finally: the “tree” command:

```
Test 2023 — -zsh — 109x24
sawidi@sawidis-MacBook-Air csil % mv Linux/Workshop\ 1 Linux/Tutorial\ 1

sawidi@sawidis-MacBook-Air csil % tree
.
├── Linux
│   └── Tutorial 1
│       ├── grep.txt
│       └── cv.txt
└── 3 directories, 2 files

sawidi@sawidis-MacBook-Air csil % cd ..
sawidi@sawidis-MacBook-Air Test 2023 % tree
.
├── CSIL
│   ├── Linux
│   │   └── Tutorial 1
│   │       ├── grep.txt
│   │       └── cv.txt
│   ├── PDP
│   │   └── CV
│   │       └── cv.txt
└── 6 directories, 3 files

sawidi@sawidis-MacBook-Air Test 2023 %
```

Task 2:

Task 2.1:

Find 'famiclone' consoles:

```
dATA — -zsh — 107x24
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -E "famiclone"
Dendy famiclone,Home,Micro Genius,1992,6
Pegasus famiclone,Home,Micro Genius,1991,1
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.2:

Find all lines with words with 4 consecutive consonants:

```
dATA — -zsh — 113x56
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -E "[BCDFGHJKLMNPQRSTVXZWYbcdfghjklmnpqrstvxyz]{4}"
Nintendo Switch,Hybrid,Nintendo,2017,129
Master System,Home,Sega,1986,12
Master System Brazil,Home,Tectoy,1989,8
Famicom Disk System,Home console add-on,Nintendo,1986,4
Magnavox Odyssey,Home,Magnavox Philips,1978,2
Atari Lynx,Handheld,Atari,1989,1
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.3:

How many Hybrid consoles have been released:

```
dATA --zsh-- 113x24
sawidi@sawidis-MacBook-Air data % cat consoles.csv | grep -c "Hybrid"
1
sawidi@sawidis-MacBook-Air data % cat consoles.csv | grep -E "Hybrid"
Nintendo Switch,Hybrid,Nintendo,2017,129
sawidi@sawidis-MacBook-Air data %
```

Task 2.4:

Find all consoles with one-word names:

```
dATA --zsh-- 107x56
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -v "[ ]"
PlayStation,Home,Sony,1994,102
Wii,Home,Nintendo,2006,101
Xbox,Home,Microsoft,2001,24
GameCube,Home,Nintendo,2001,21
Dreamcast,Home,Sega,1998,9
WonderSwan,Handheld,Bandai,1999,3
Intellivision,Home,Mattel,1980,3
N-Gage,Handheld,Nokia,2003,3
ColecoVision,Home,Coleco,1982,2
Telstar,Dedicated,Coleco,1976,1
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.5:

Find all consoles whose name is at least 25 characters:

```
dATA --zsh-- 113x46
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -E "[A-Z][a-z]{25},[A-Z]"
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.6:

Find all console names that end with a number:


```
dATA — -zsh — 113x56
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -E "[0-9],[A-Z]"
PlayStation 2,Home,Sony,2000,155
PlayStation 4,Home,Sony,2013,117
PlayStation 3,Home,Sony,2006,87
Xbox 360,Home,Microsoft,2005,84
PlayStation 5,Home,Sony,2020,41
Nintendo 64,Home,Nintendo,1996,32
Atari 2600,Home,Atari,1977,30
Quest 2,VR headset,Reality Labs Meta,2020,20
PC Engine TurboGrafx-16,Home,NEC Hudson Soft,1987,10
Sega SG-1000,Home,Sega,1983,2
Atari 7800,Home,Atari,1986,1
Atari 5200,Home,Atari,1982,1
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.7:

Find all consoles that have sold been 100M or more times:

```
dATA — -zsh — 113x56
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -E "[0-9],[0-9]{3}"
PlayStation 2,Home,Sony,2000,155
Nintendo DS,Handheld,Nintendo,2004,154
Nintendo Switch,Hybrid,Nintendo,2017,129
Game Boy and Game Boy Color,Handheld,Nintendo,1989,118
PlayStation 4,Home,Sony,2013,117
PlayStation,Home,Sony,1994,102
Wii,Home,Nintendo,2006,101
sawidi@sawidis-MacBook-Air dATA %
```

Task 2.8:

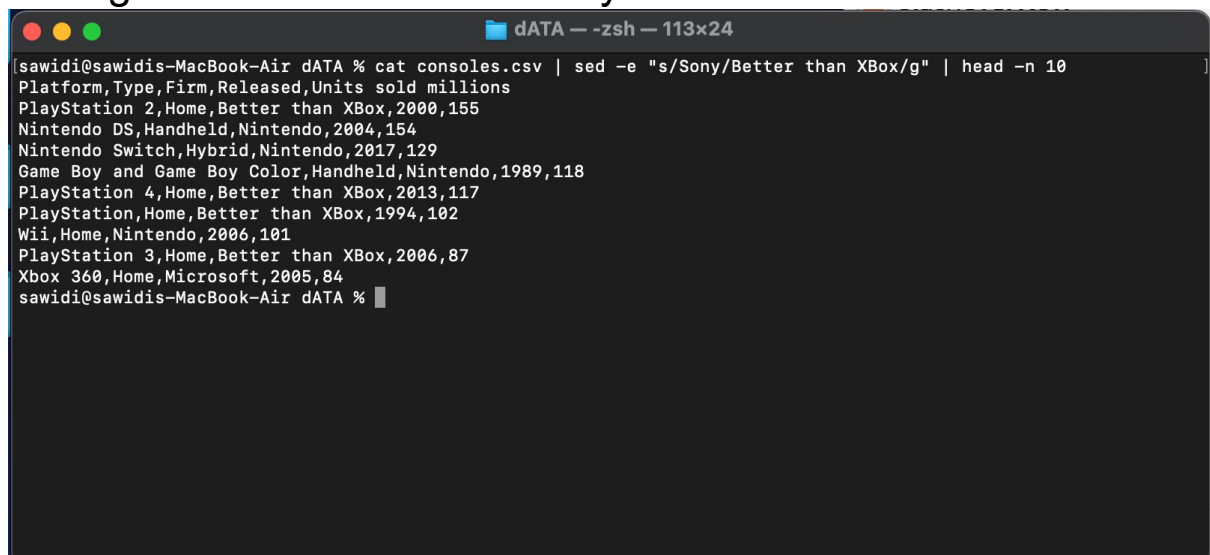
What year had the most consoles released in?

```
dATA — -zsh — 113x24
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | grep -Eo "[0-9]{4},[0-9]{3}" | sort -t, -k2 | tail -1
2000,155
sawidi@sawidis-MacBook-Air dATA %
```

Task 3:

Task 3.1:

Change all occurrences of 'Sony' to 'Better than Xbox':



```
dATA — zsh — 113x24
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | sed -e "s/Sony/Better than Xbox/g" | head -n 10
Platform,Type,Firm,Released,Units sold millions
PlayStation 2,Home,Better than Xbox,2000,155
Nintendo DS,Handheld,Nintendo,2004,154
Nintendo Switch,Hybrid,Nintendo,2017,129
Game Boy and Game Boy Color,Handheld,Nintendo,1989,118
PlayStation 4,Home,Better than Xbox,2013,117
PlayStation,Home,Better than Xbox,1994,102
Wii,Home,Nintendo,2006,101
PlayStation 3,Home,Better than Xbox,2006,87
Xbox 360,Home,Microsoft,2005,84
sawidi@sawidis-MacBook-Air dATA %
```

Task 3.2:

Change all occurrences of ',' to ':'

```
dATA — -zsh — 113x24
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | sed -e "s/,/:/g" | head -n 10
Platform:Type:Firm:Released:Units sold millions
PlayStation 2:Home:Sony:2000:155
Nintendo DS:Handheld:Nintendo:2004:154
Nintendo Switch:Hybrid:Nintendo:2017:129
Game Boy and Game Boy Color:Handheld:Nintendo:1989:118
PlayStation 4:Home:Sony:2013:117
PlayStation:Home:Sony:1994:102
Wii:Home:Nintendo:2006:101
PlayStation 3:Home:Sony:2006:87
Xbox 360:Home:Microsoft:2005:84
sawidi@sawidis-MacBook-Air dATA %
```

Task 3.3:

Change all years from the 20th century to 'antique':

```
dATA — -zsh — 113x22
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | sed -e 's/\(19\)\.\{2\}/antique/' | head -n 10
Platform,Type,Firm,Released,Units sold millions
PlayStation 2,Home,Sony,2000,155
Nintendo DS,Handheld,Nintendo,2004,154
Nintendo Switch,Hybrid,Nintendo,2017,129
Game Boy and Game Boy Color,Handheld,Nintendo,antique,118
PlayStation 4,Home,Sony,2013,117
PlayStation,Home,Sony,antique,102
Wii,Home,Nintendo,2006,101
PlayStation 3,Home,Sony,2006,87
Xbox 360,Home,Microsoft,2005,84
sawidi@sawidis-MacBook-Air dATA %
```

Task 3.4:

With lines that contain "Hybrid" append the line "Runs better when plugged into a TV.":

```
dATA — -zsh — 113x22
sawidi@sawidis-MacBook-Air dATA % cat consoles.csv | sed 's/Hybrid/&\ (Runs better when plugged into a TV)/g' | head -n 10
Platform,Type,Firm,Released,Units sold millions
PlayStation 2,Home,Sony,2000,155
Nintendo DS,Handheld,Nintendo,2004,154
Nintendo Switch,Hybrid (Runs better when plugged into a TV),Nintendo,2017,129
Game Boy and Game Boy Color,Handheld,Nintendo,1989,118
PlayStation 4,Home,Sony,2013,117
PlayStation,Home,Sony,1994,102
Wii,Home,Nintendo,2006,101
PlayStation 3,Home,Sony,2006,87
Xbox 360,Home,Microsoft,2005,84
sawidi@sawidis-MacBook-Air dATA %
```

Thank you!