

Screenshot 11.1

```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~$ cd linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ pwd
/home/ldolce/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al
total 24
drwxr-xr-x 2 ldolce ldolce 4096 Feb 25 11:11 .
drwxr-x--- 3 ldolce ldolce 4096 Feb 25 11:11 ..
-rw-r--r-- 1 ldolce ldolce  134 Feb 25 11:10 names.txt
-rw-r--r-- 1 ldolce ldolce   46 Feb 25 11:11 numbers.txt
-rw-r--r-- 1 ldolce ldolce 7670 Feb 25 11:08 science.txt
-rw-r--r-- 1 ldolce ldolce    0 Feb 17 12:37 tempfile
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ cp science.txt science.bak
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al
total 32
drwxr-xr-x 2 ldolce ldolce 4096 Feb 25 11:16 .
drwxr-x--- 3 ldolce ldolce 4096 Feb 25 11:11 ..
-rw-r--r-- 1 ldolce ldolce  134 Feb 25 11:10 names.txt
-rw-r--r-- 1 ldolce ldolce   46 Feb 25 11:11 numbers.txt
-rw-r--r-- 1 ldolce ldolce 7670 Feb 25 11:16 science.bak
-rw-r--r-- 1 ldolce ldolce 7670 Feb 25 11:08 science.txt
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ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

Screenshot 11.2

```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ mv science.bak backups/
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al
ls-al: command not found
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al
total 28
drwxr-xr-x 3 ldolce ldolce 4096 Feb 25 11:20 .
drwxr-x--- 3 ldolce ldolce 4096 Feb 25 11:11 ..
drwxr-xr-x 2 ldolce ldolce 4096 Feb 25 11:20 backups
-rw-r--r-- 1 ldolce ldolce  134 Feb 25 11:10 names.txt
-rw-r--r-- 1 ldolce ldolce   46 Feb 25 11:11 numbers.txt
-rw-r--r-- 1 ldolce ldolce 7670 Feb 25 11:08 science.txt
-rw-r--r-- 1 ldolce ldolce    0 Feb 17 12:37 tempfile
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al backups/
total 16
drwxr-xr-x 2 ldolce ldolce 4096 Feb 25 11:20 .
drwxr-xr-x 3 ldolce ldolce 4096 Feb 25 11:20 ..
-rw-r--r-- 1 ldolce ldolce 7670 Feb 25 11:16 science.bak
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```

Screenshot 11.3

```

ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ cp science.txt tempfile.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls
backups  names.txt  numbers.txt  science.txt  tempfile  tempfile.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ rm tempfile.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls
backups  names.txt  numbers.txt  science.txt  tempfile
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ rmdir backups
rmdir: failed to remove 'backups': Directory not empty
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ mkdir tempstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ rmdir tempstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ ls -al
total 28
drwxr-xr-x 3 ldolce ldolce 4096 Feb 25 11:22 .
drwxr-x--- 3 ldolce ldolce 4096 Feb 25 11:11 ..
drwxr-xr-x 2 ldolce ldolce 4096 Feb 25 11:20 backups
-rw-r--r-- 1 ldolce ldolce 134 Feb 25 11:10 names.txt
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```

Screenshot 11.4

```

tions so significant. It was clear that the spinning top had potential if it could be made
more surprising.

"What about this?" Prof Berry suggested. "I'll show you how to cut it down."

Drawing a Swiss army knife from his pocket, he sliced through the air beneath the top, and
with the magnetic force interrupted, the top dropped to the ground.

That's the sort of cortickling thing you learn at science centers - a Swiss Army knife not
only has a tool for removing stones from horses' hooves but one for destroying adiabatic tr
aps.

* Boeing Science Centre is open daily 10am-6pm (843-555-5555), nearest stations Battle and
Polgate. The International Study Center offers limited accommodation (843-555-5555).ldolce
@DESKTOP-T9SASNL:~/linuxstuff$ less science.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ head science.txt
The Electronic Telegraph Science
This summer the Observatory at Boeing found new life as a science center. Andro Linklater c
elebrates a partial victory for the heritage

THE SIGHT of a child's top spinning unsupported in mid-air should have been surprising. Rot
ating there in space, it not only defied the rules of gravity, it defied common sense, and
at least three Fellows of the Royal Society gazed at it in something close to wonder.

But this was Fabricators' Week at the Boeing Science Centre, with exhibitors from science c
enters all over Europe arriving to demonstrate prototypes of experiments they hoped to prod
uce as hands-on displays - a tube of rocket-propelled rubber balls, a solar-powered toy car
, a model of planetary movement. They had a much tougher audience in mind. Would it astonis
h a child?

"Well I certainly found it surprising," Prof Michael Berry FRS, an expert in gravitational
physics and the top's demonstrator, said a trifle indignantly. "The physics of why the top
doesn't topple over are extraordinarily complex, and so far as I know, no one has ever demo
nstrated the experiment before.

"So challenging are the physics indeed that Berry has written a paper on the spinning top,
invented by Bill Hones of Seattle, for the scientific journal Nature. Its position in mid-a
ir was maintained by the straightforward method of positioning a magnet beneath it with rev
erse polarity, but its stability was acquired in far more complicated fashion, through the
interaction of the magnetic field and the forces created by its spin. In technical terms, i
t had become an adiabatic trap."
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ head -5 science.txt
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Screenshot 11.5

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"A child brought up on cinema special effects might think it quite normal to have a top spi
nning in space"

But Prof Richard Gregory, another FRS and emeritus professor of Neuro-Psychology at Bristol
University, was not convinced that this was enough to surprise a more blasé audience.

"A scientist might be impressed," he objected, "but a child brought up on cinema special ef
fects might think it quite normal to have a top spinning in space. The problem, then, would
be to demonstrate how surprising it really is."

For Gregory, one of the world's leading authorities on the psychology of perception, the ch
allenge presented by the encounter of science with a child's imagination has long been a pa
ssionate interest. In 1987 it led him to set up the Exploratory, Britain's first hands-on s
cience center housed in Temple Meads station in Bristol. All the exhibits, demonstrating ph
enomena as diverse as the electrical effects of lightning and the length of sound waves, we
re designed to be operated by children.

"The point about a science center is that the exhibits should be fun," he said. "By which I
don't mean frivolous but interesting. They should trigger some response in the child's min
d - what I call a 'cortickle'."

This taste for deplorable puns belies Gregory's standing as a scientist whose work on lunar
photography, for example, made possible the successful docking and landing of NASA's Moon
mission, but it is crucial to his achievement in making science enjoyable. Both the Explora
tory, which attracts 150,000 visitors a year, and other centers inspired by its success, su
ch as Birmingham's "Light on Science" exhibition, all betray the same puckish outlook.

Boeing, which opened in April this year, represents his most ambitious attempt at cortex ti
ckling. This time he aims not only to make science entertaining but to rescue an irreplacea
ble part of Britain's scientific heritage.

Much more challenging is the attempt to rescue a piece of scientific heritage

To judge by the response of both children and adults absorbed in working the exhibits alrea
dy in place, ranging from an Archimedes screw lifting water to light-sensitive acoustic chi
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```

Screenshot 11.6

```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ grep science science.txt
This summer the Observatory at Boeing found new life as a science center. Andro Linklater c
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That's the sort of cortickling thing you learn at science centers - a Swiss Army knife not
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Whether or not that was precisely the illusion intended by the center's director, Steve Piz
zey, whose Science Projects company devised the exhibits, there is no doubt about the enjoy
ment of the 15,000 customers who have already visited the center. Pinned to the noticeboard
were letters from local schools filled with phrases such as "the best trip ever", "a brill
iant day", "absolutely fabulous"
* Boeing Science Centre is open daily 10am-6pm (843-555-5555), nearest stations Battle and
Polgate. The International Study Center offers limited accommodation (843-555-5555).
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

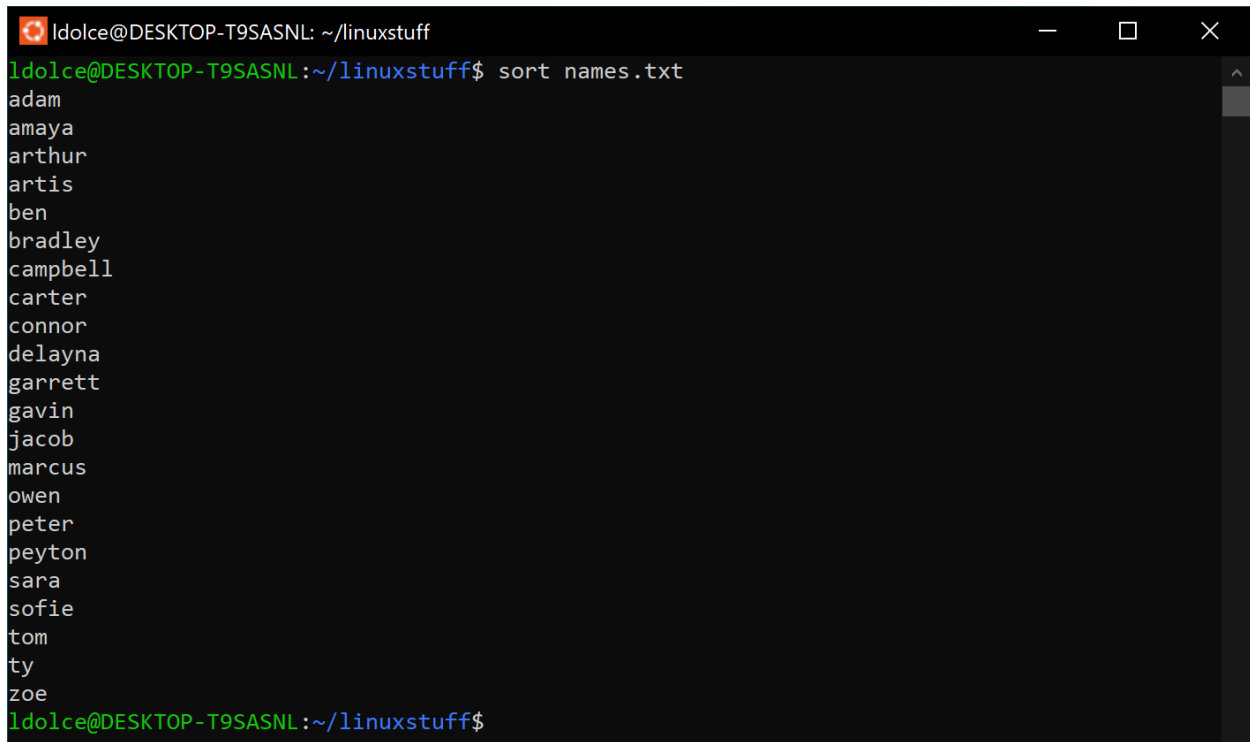
Screenshot 11.7

```
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* Boeing Science Centre is open daily 10am-6pm (843-555-5555), nearest stations Battle and
Polgate. The International Study Center offers limited accommodation (843-555-5555).
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ grep -i 'spinning top' science.txt
"so challenging are the physics indeed that Berry has written a paper on the spinning top,
invented by Bill Hones of Seattle, for the scientific journal Nature. Its position in mid-a
ir was maintained by the straightforward method of positioning a magnet beneath it with rev
erse polarity, but its stability was acquired in far more complicated fashion, through the
interaction of the magnetic field and the forces created by its spin. In technical terms, i
t had become an adiabatic trap."
To fund the serious side of Boeing, therefore, customers must be attracted to the entertain
ments. It was this that made the Fabricators' Week with its display of potential new attrac
tions so significant. It was clear that the spinning top had potential if it could be made
more surprising.
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ grep -n science science.txt
1:This summer the Observatory at Boeing found new life as a science center. Andro Linklater
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6:But this was Fabricators' Week at the Boeing Science Centre, with exhibitors from scienc
centers all over Europe arriving to demonstrate prototypes of experiments they hoped to pr
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science center housed in Temple Meads station in Bristol. All the exhibits, demonstrating
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mind - what I call a 'cortickle'."
20:This taste for deplorable puns belies Gregory's standing as a scientist whose work on lu
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on mission, but it is crucial to his achievement in making science enjoyable. Both the Expl
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22:Boeing, which opened in April this year, represents his most ambitious attempt at cortex
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26:To judge by the response of both children and adults absorbed in working the exhibits al
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traps.
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ grep -ive science science.txt
```

Screenshot 11.8

```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ wc -w science.txt
1244 science.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ wc -l science.txt
52 science.txt
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

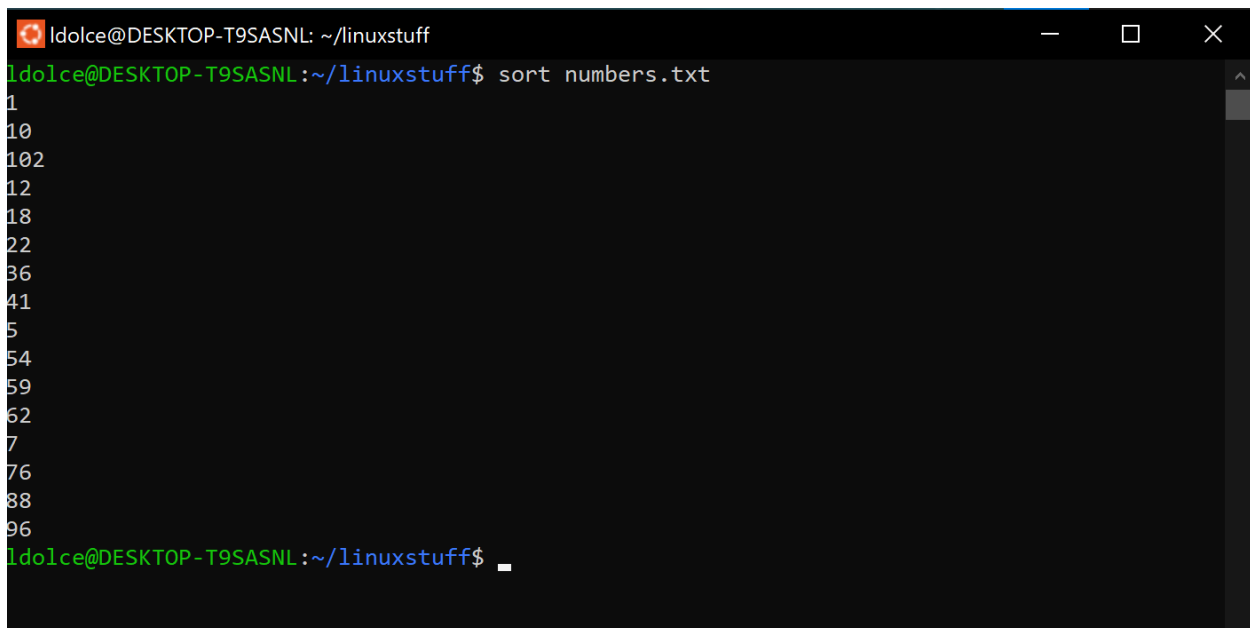
Screenshot 11.9



```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ sort names.txt
adam
amaya
arthur
artis
ben
bradley
campbell
carter
connor
delayna
garrett
gavin
jacob
marcus
owen
peter
peyton
sara
sofie
tom
ty
zoe
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

A terminal window titled 'ldolce@DESKTOP-T9SASNL: ~/linuxstuff' showing the command 'sort names.txt' and its output. The output lists 20 names in alphabetical order: adam, amaya, arthur, artis, ben, bradley, campbell, carter, connor, delayna, garrett, gavin, jacob, marcus, owen, peter, peyton, sara, sofie, tom, ty, and zoe. The prompt 'ldolce@DESKTOP-T9SASNL:~/linuxstuff\$' is visible at the bottom.

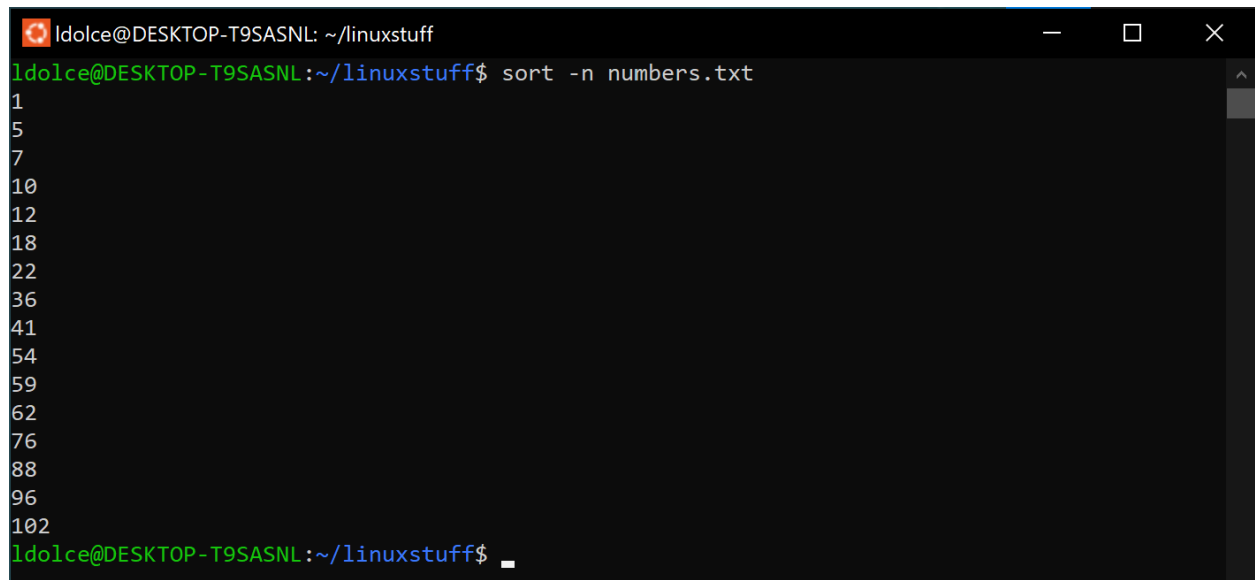
Screenshot 11.10



```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ sort numbers.txt
1
10
102
12
18
22
36
41
5
54
59
62
7
76
88
96
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

A terminal window titled 'ldolce@DESKTOP-T9SASNL: ~/linuxstuff' showing the command 'sort numbers.txt' and its output. The output lists 15 numbers in numerical order: 1, 10, 102, 12, 18, 22, 36, 41, 5, 54, 59, 62, 7, 76, 88, and 96. The prompt 'ldolce@DESKTOP-T9SASNL:~/linuxstuff\$' is visible at the bottom.

Screenshot 11.11



```
ldolce@DESKTOP-T9SASNL: ~/linuxstuff
ldolce@DESKTOP-T9SASNL:~/linuxstuff$ sort -n numbers.txt
1
5
7
10
12
18
22
36
41
54
59
62
76
88
96
102
ldolce@DESKTOP-T9SASNL:~/linuxstuff$
```

A terminal window with a black background and white text. The window title bar shows 'ldolce@DESKTOP-T9SASNL: ~/linuxstuff' and standard window controls. The command 'sort -n numbers.txt' has been executed, resulting in a list of 15 numbers: 1, 5, 7, 10, 12, 18, 22, 36, 41, 54, 59, 62, 76, 88, and 96. The prompt 'ldolce@DESKTOP-T9SASNL:~/linuxstuff\$' is visible at the bottom.