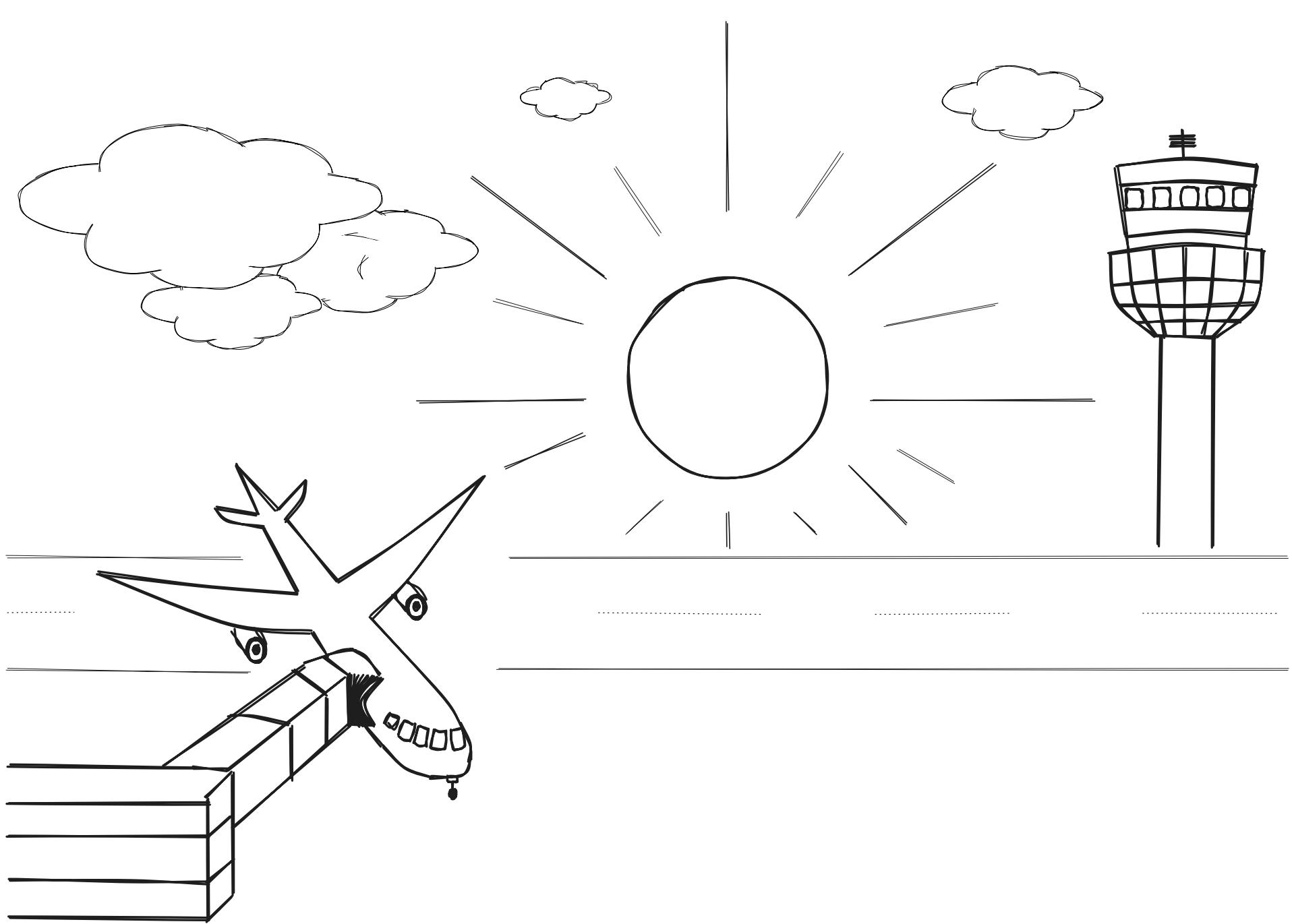
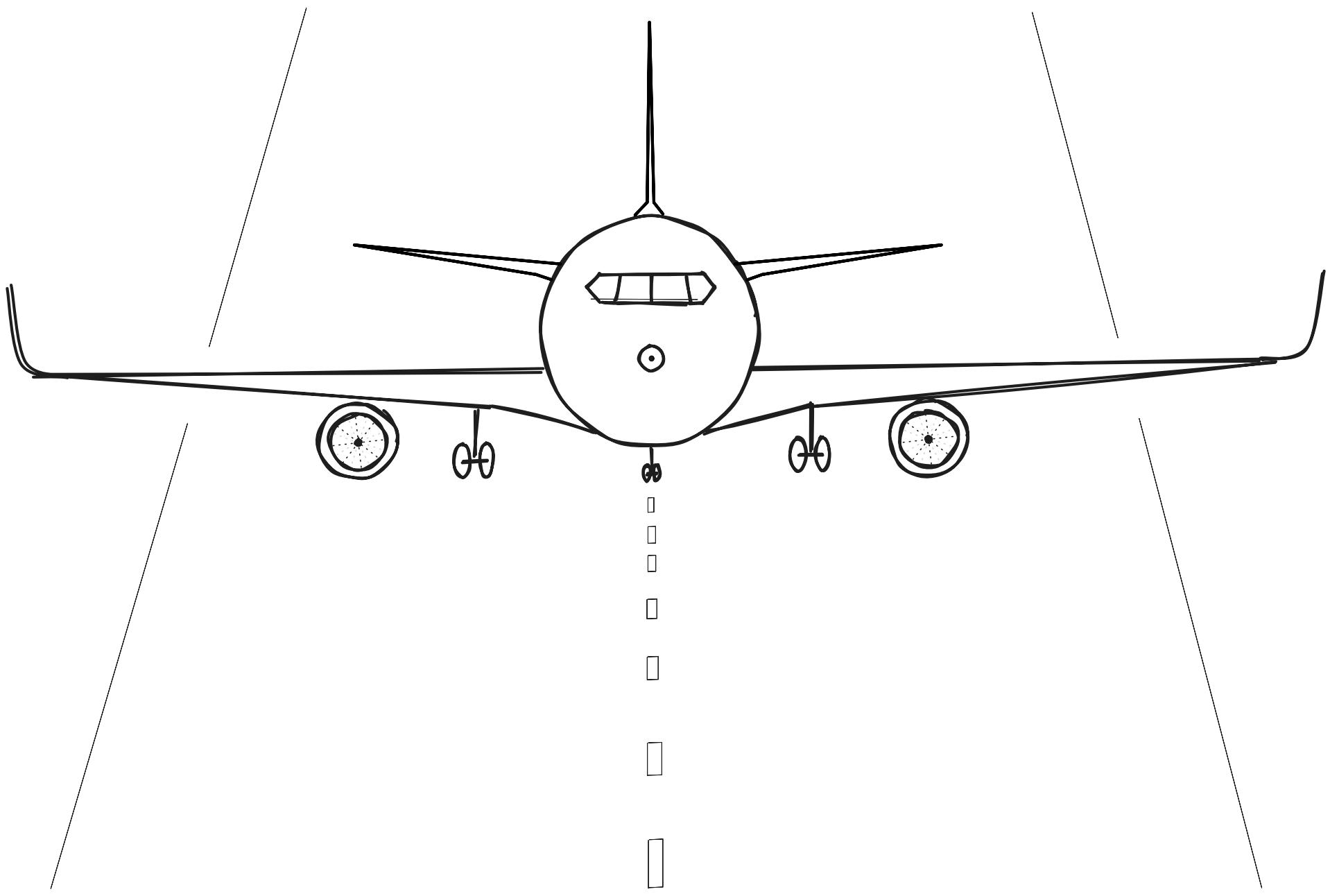
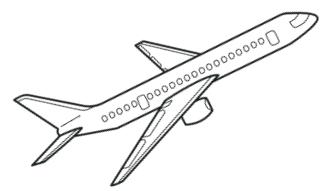


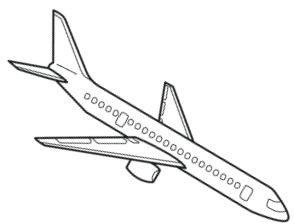
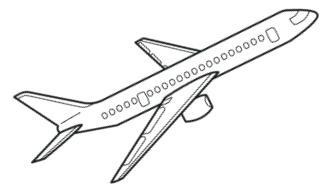
The Most Bizarre Software Bugs in History

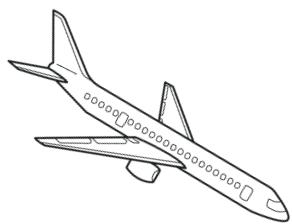
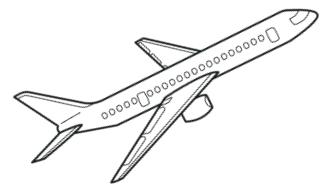
Mia Bajić

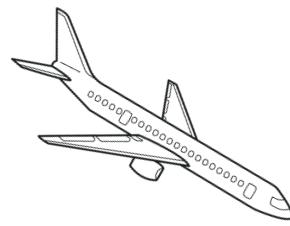
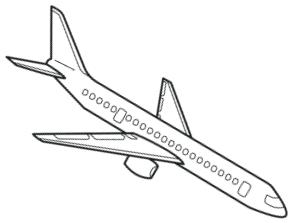
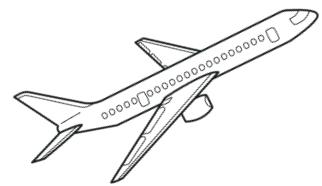


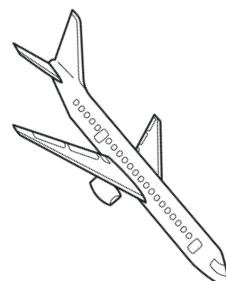
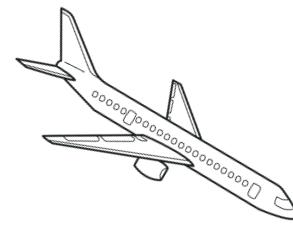
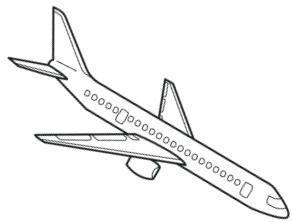
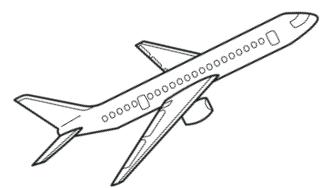




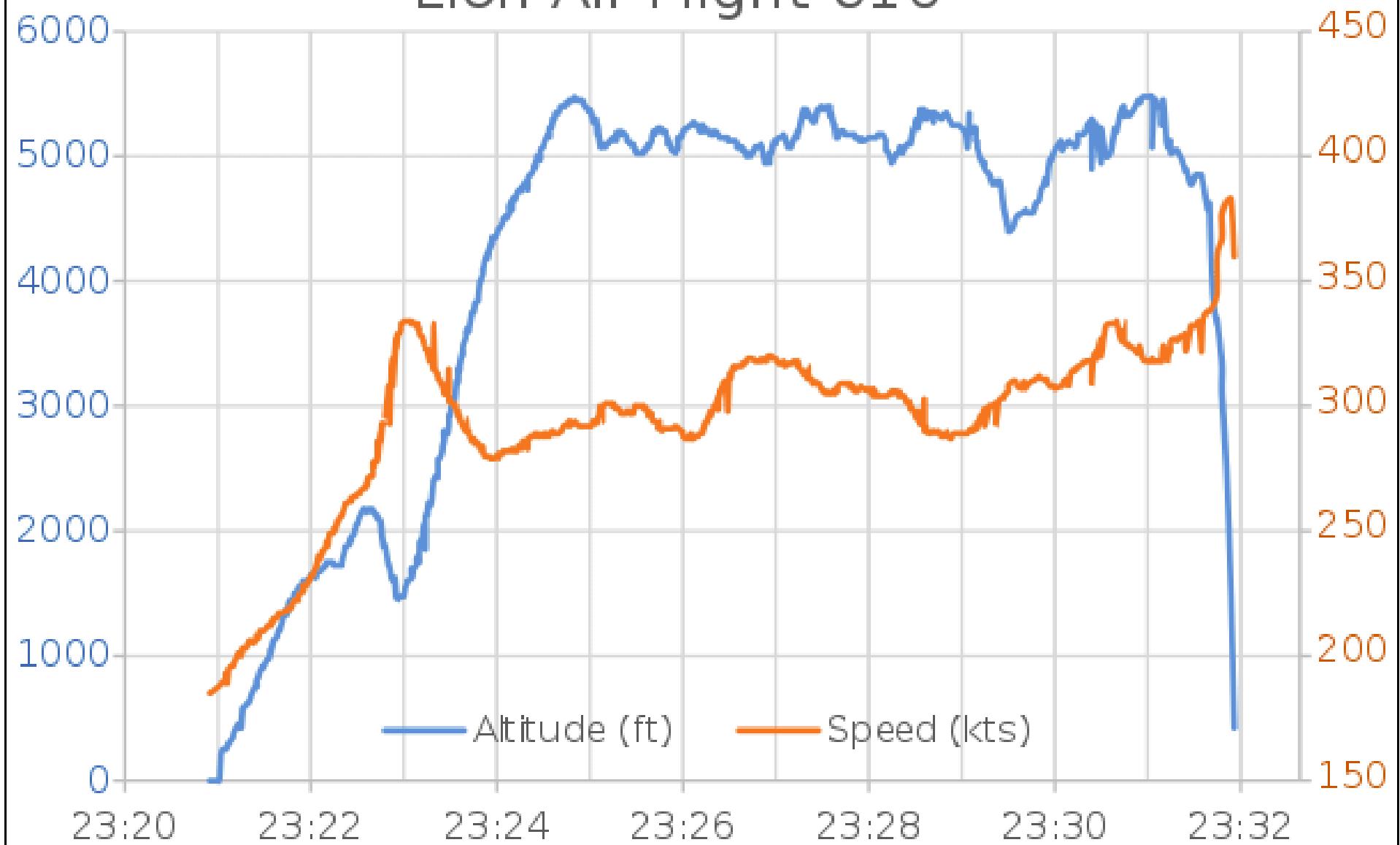


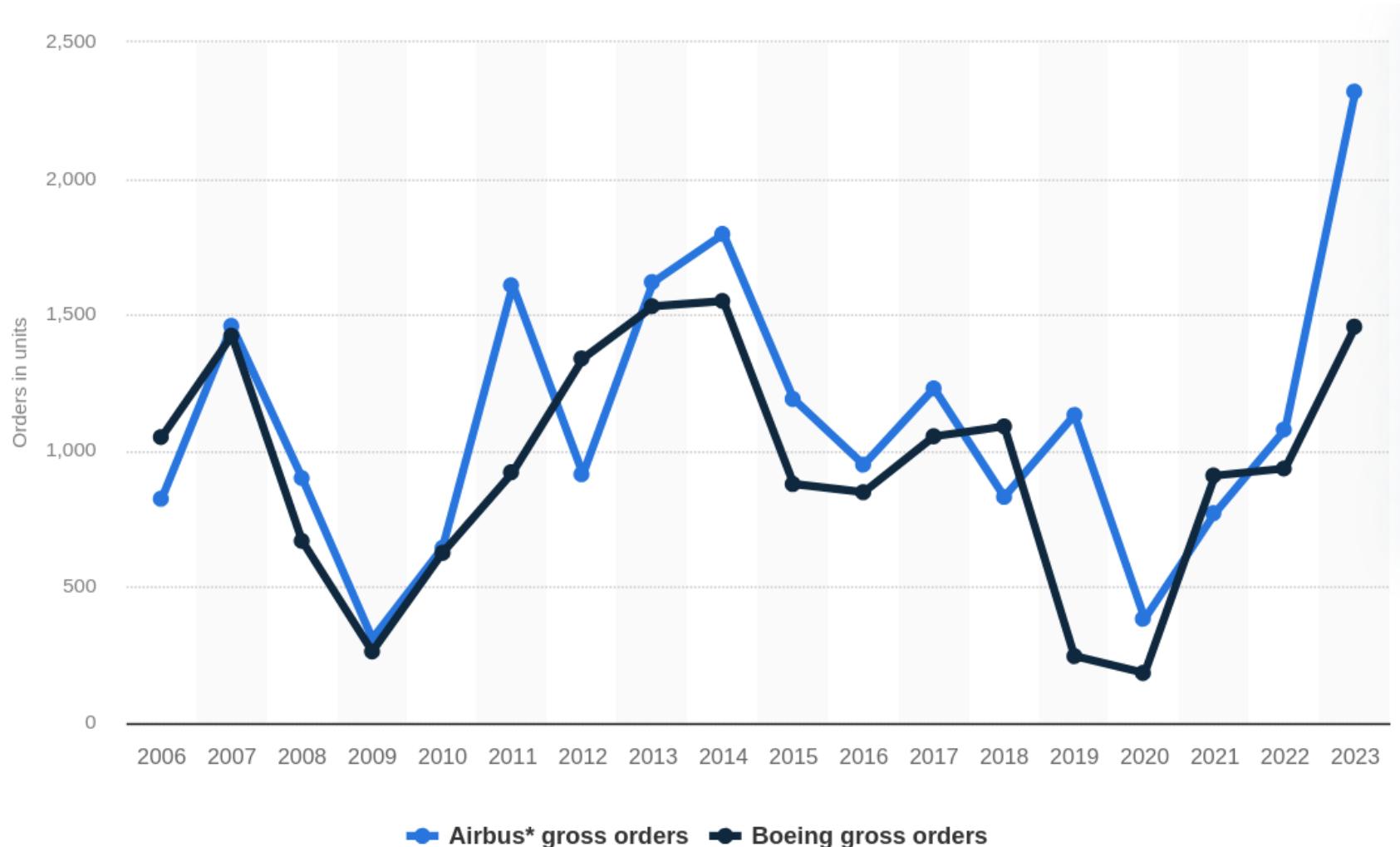






Lion Air Flight 610





A320

A320neo

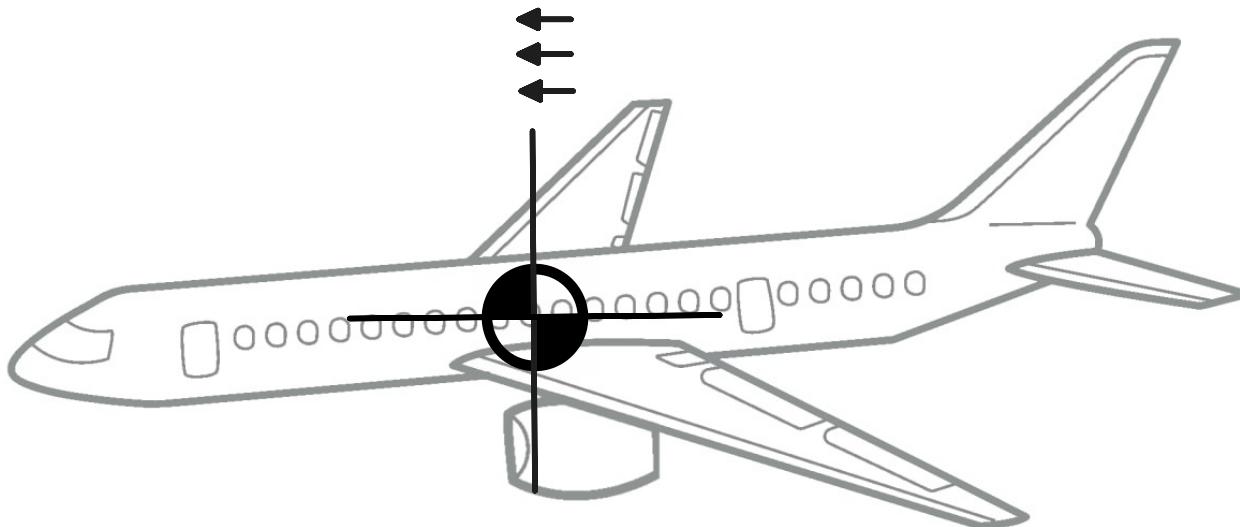
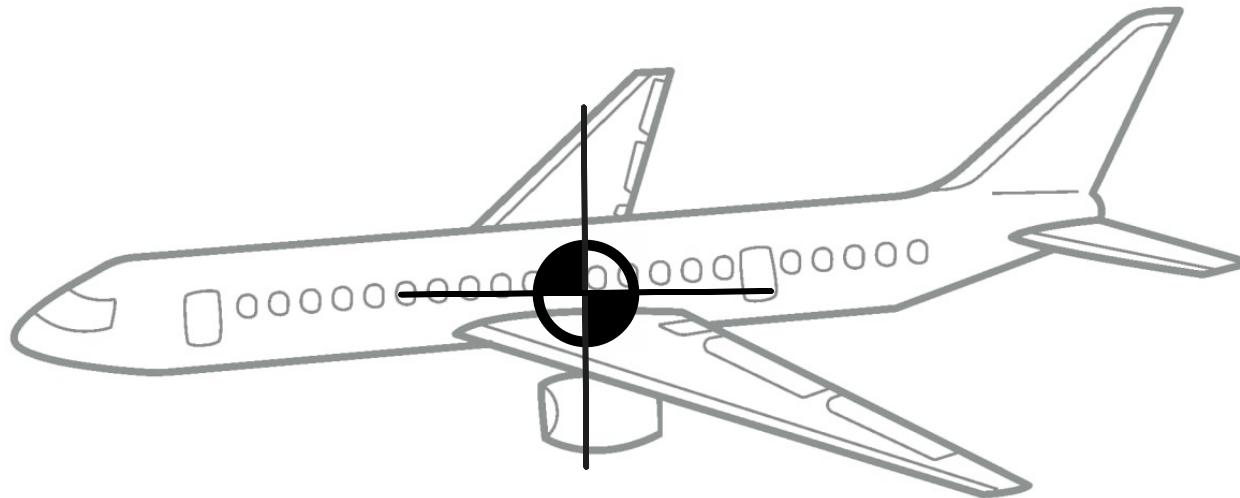




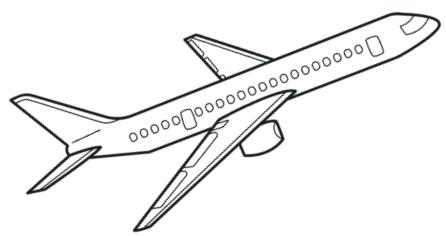
A320

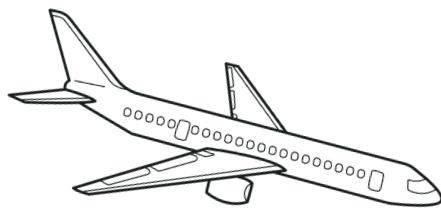
B737





Maneuvering Characteristics Augmentation System





Pilots didn't know about MCAS.

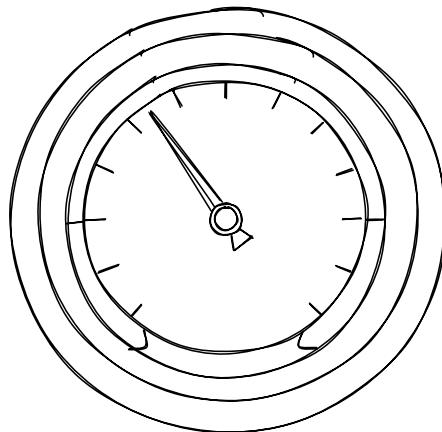
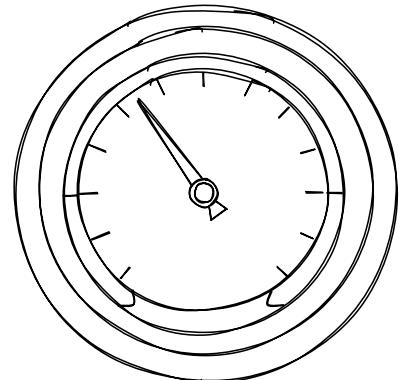
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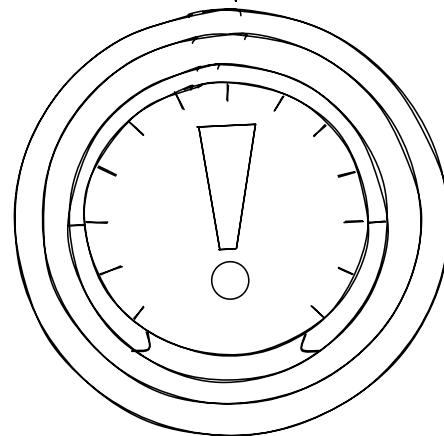
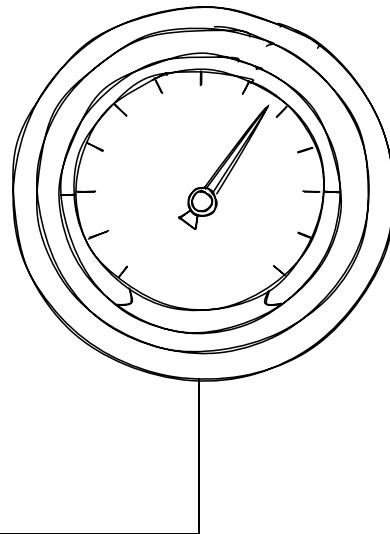
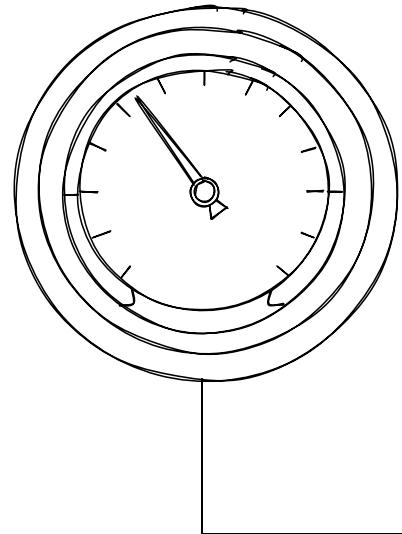
60 | EXTRA
MINUTES MINUTES

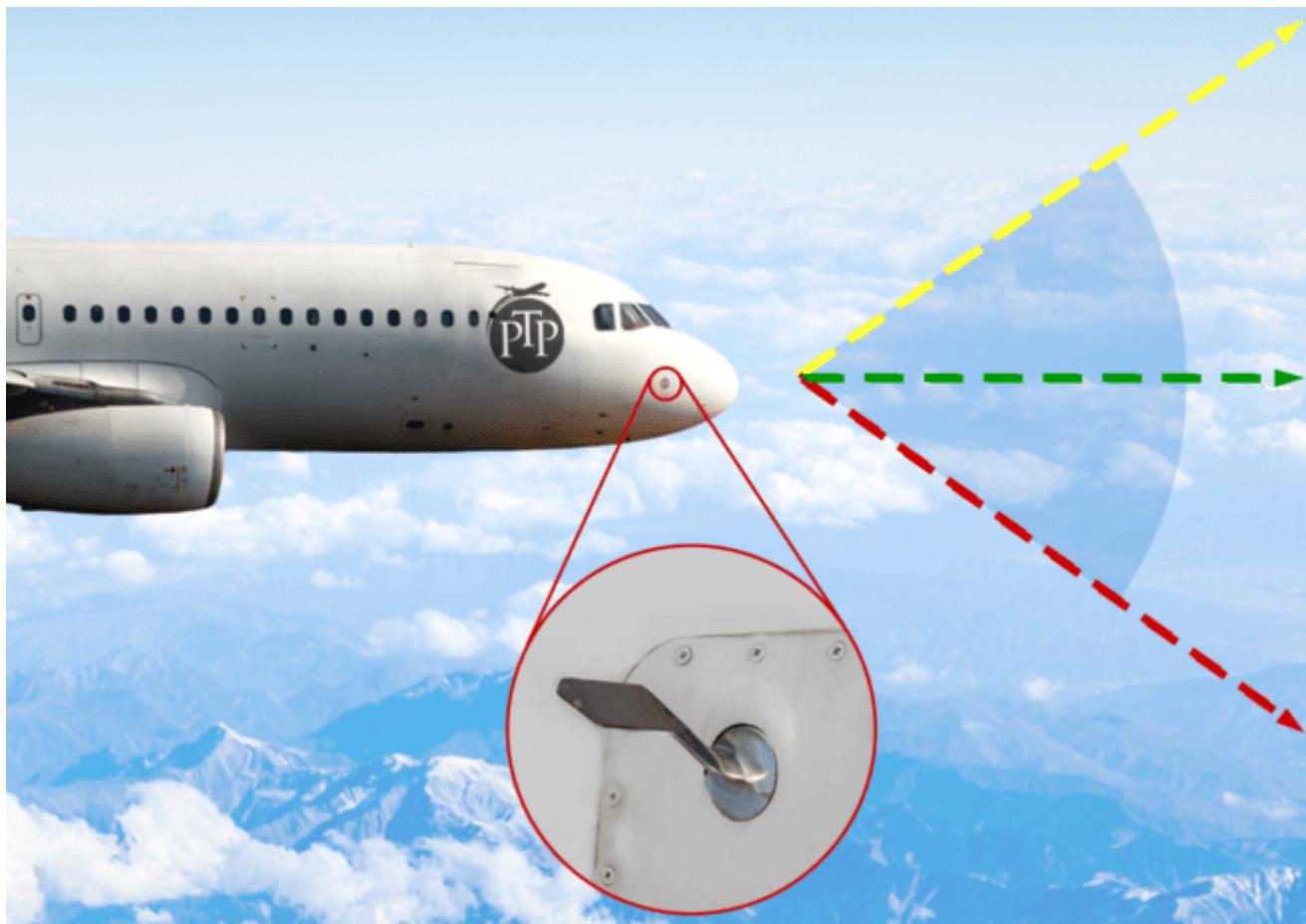
60
MINUTES



Terrifying final minutes of doomed Boeing 737 Max | 60 Minutes Australia







1. Boeing added MCAS to automatically adjust the plane's position if it tilted up too much.

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5. The pilots didn't know MCAS existed and how to disable it.

To earn certification for the 737 MAX 8, Boeing undertook a comprehensive test program that began just over one year ago with four airplanes, plus ground and laboratory testing. Following a rigorous certification process, the FAA granted Boeing an Amended Type Certificate for the 737 MAX 8, verifying the design complies with required aviation regulations and is safe and reliable.

- The Federal Aviation Administration

1. Two sensors instead of one to mitigate a single point of failure.

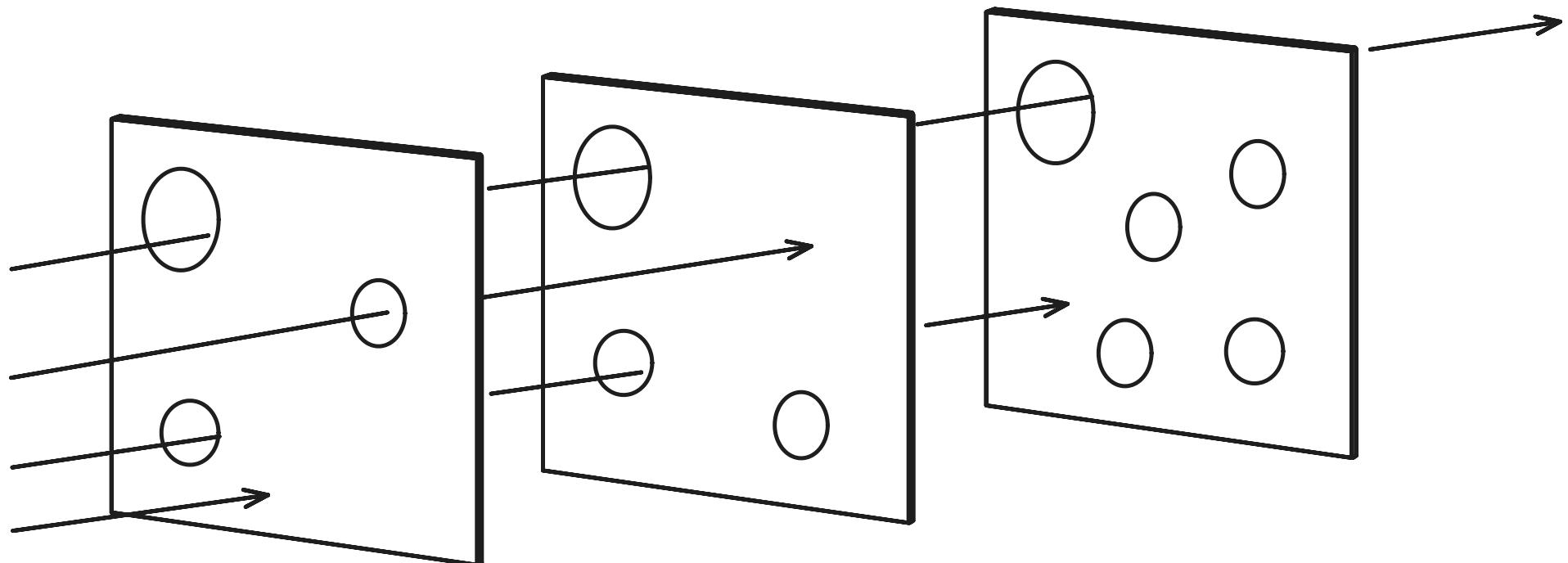
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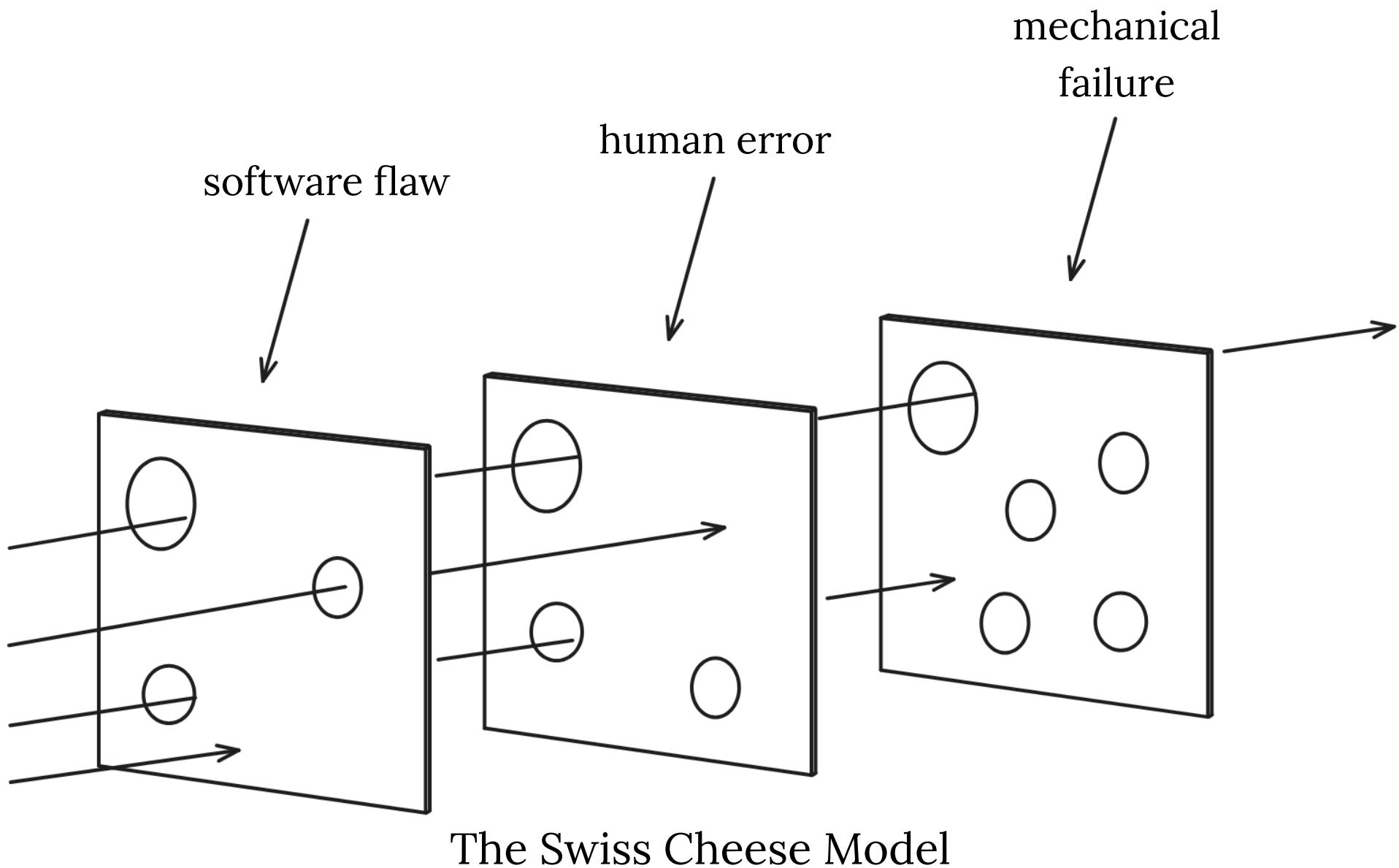
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5. A warning is now always turned on.
6. New sensor calibration checks.



The Swiss Cheese Model



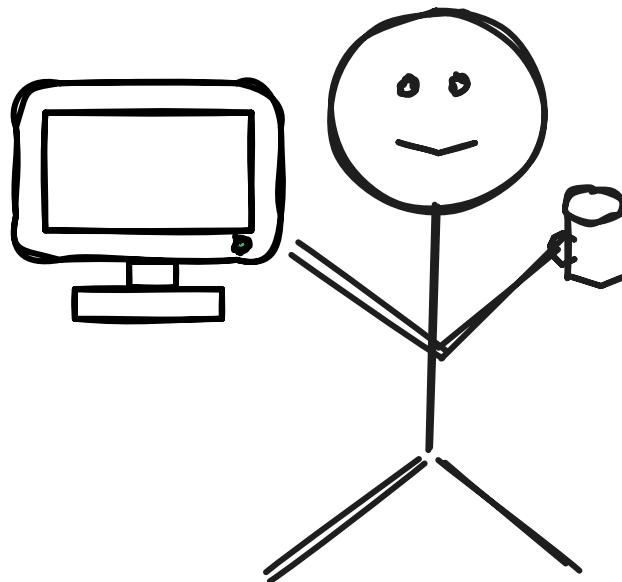
Number of inputs	Permutations without repetition
1	1
2	2
3	6
4	24
5	120
6	720
7	5040
8	40320
9	362880
10	3628800

Single points of failure are dangerous.

Failures are often a chain reaction.

Software should never do something users aren't aware of.

Google





google.com

Web [News](#)

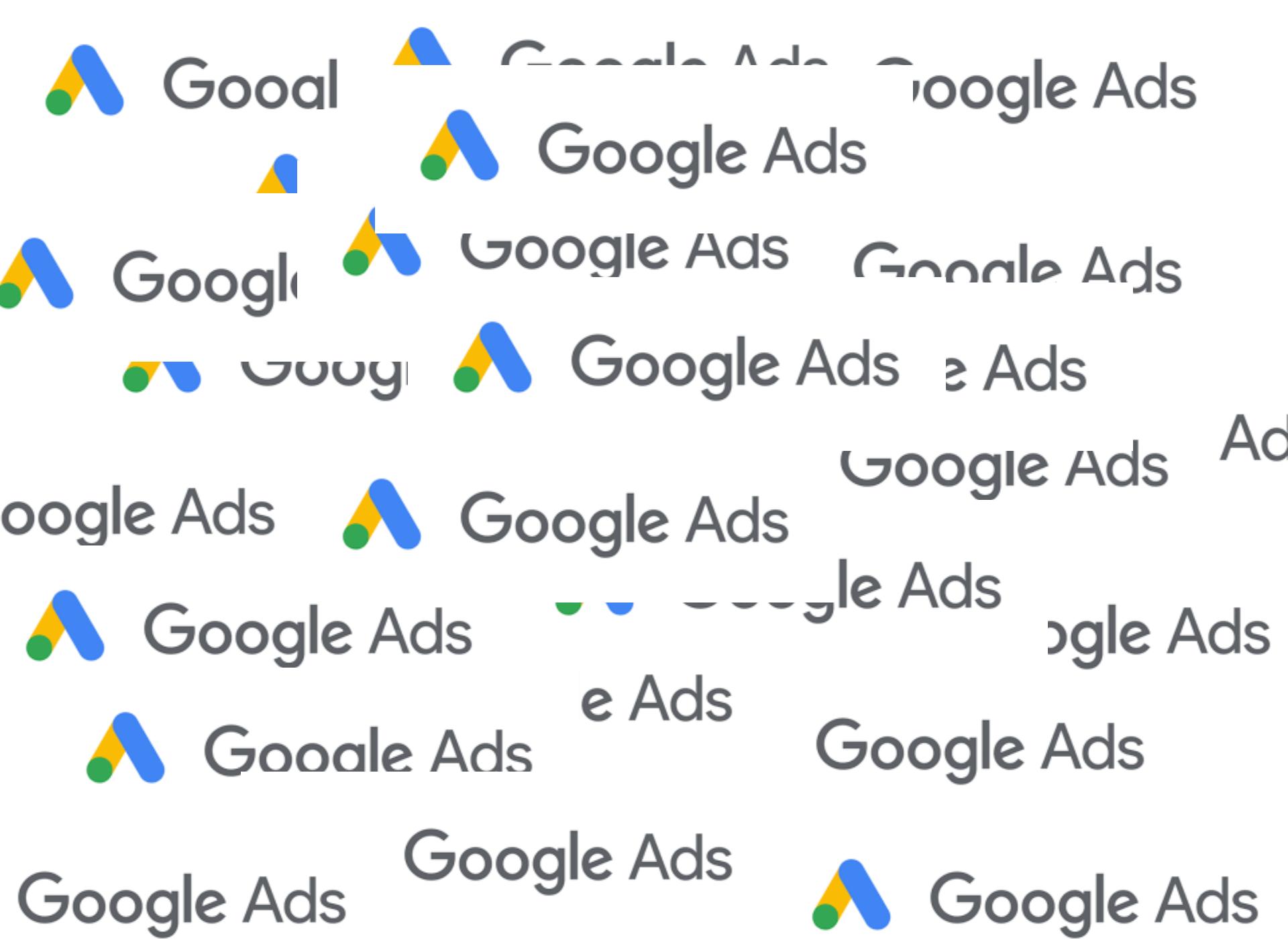
[Google](#)



[This site may harm your computer.](#)

Enables users to search the Web, Usenet, and images, and translation of results, and an option to find similar:

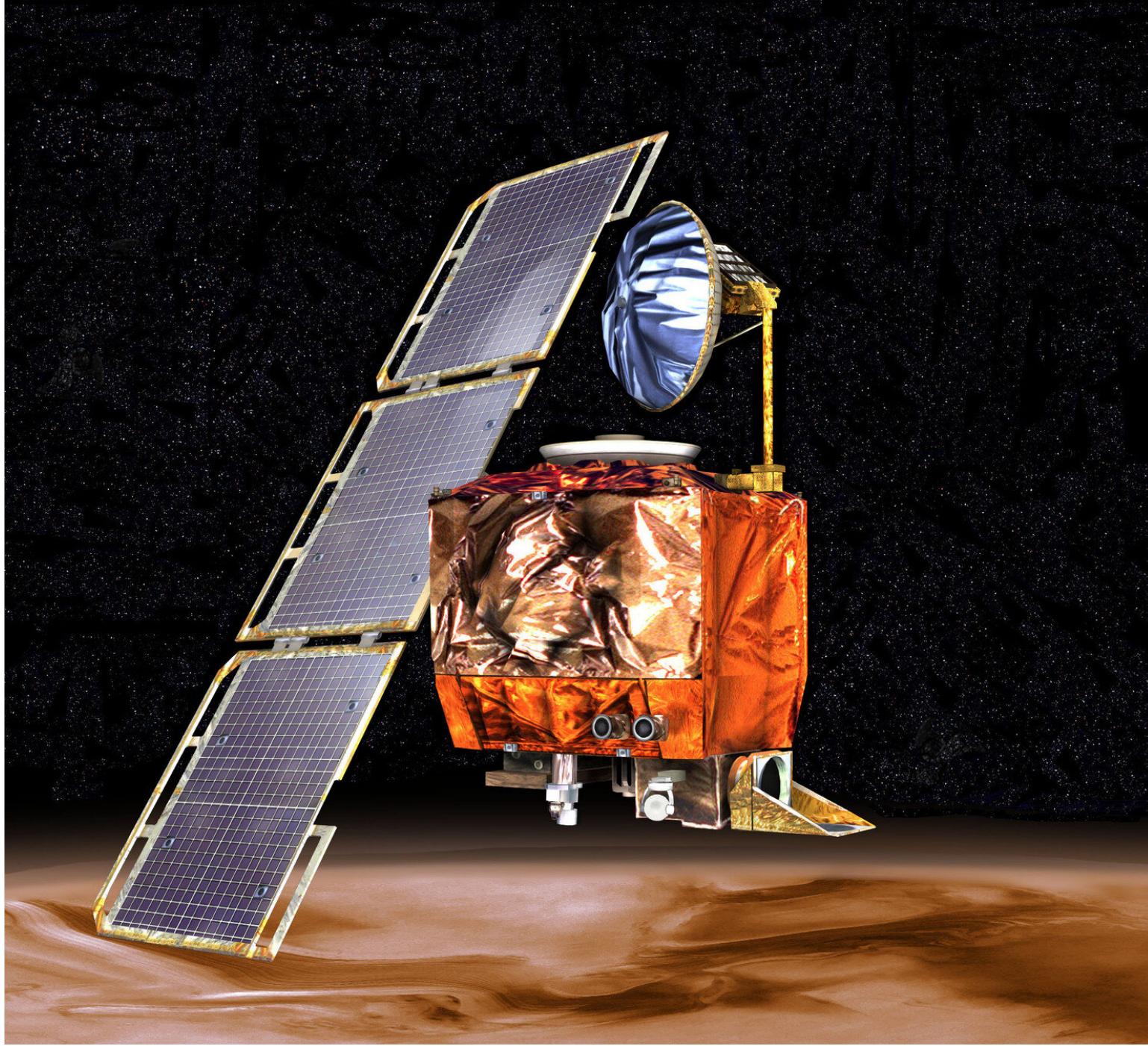
www.google.com/ - [Similar pages](#) -

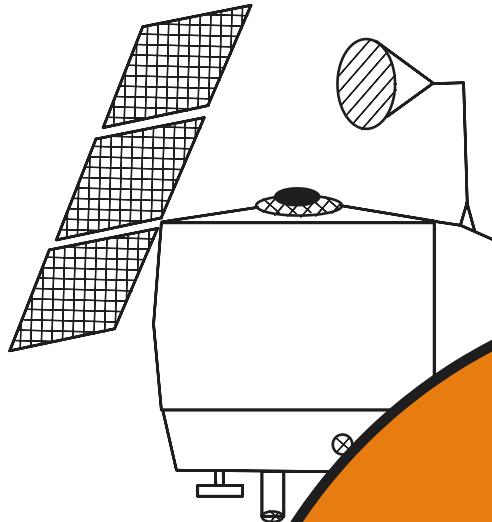




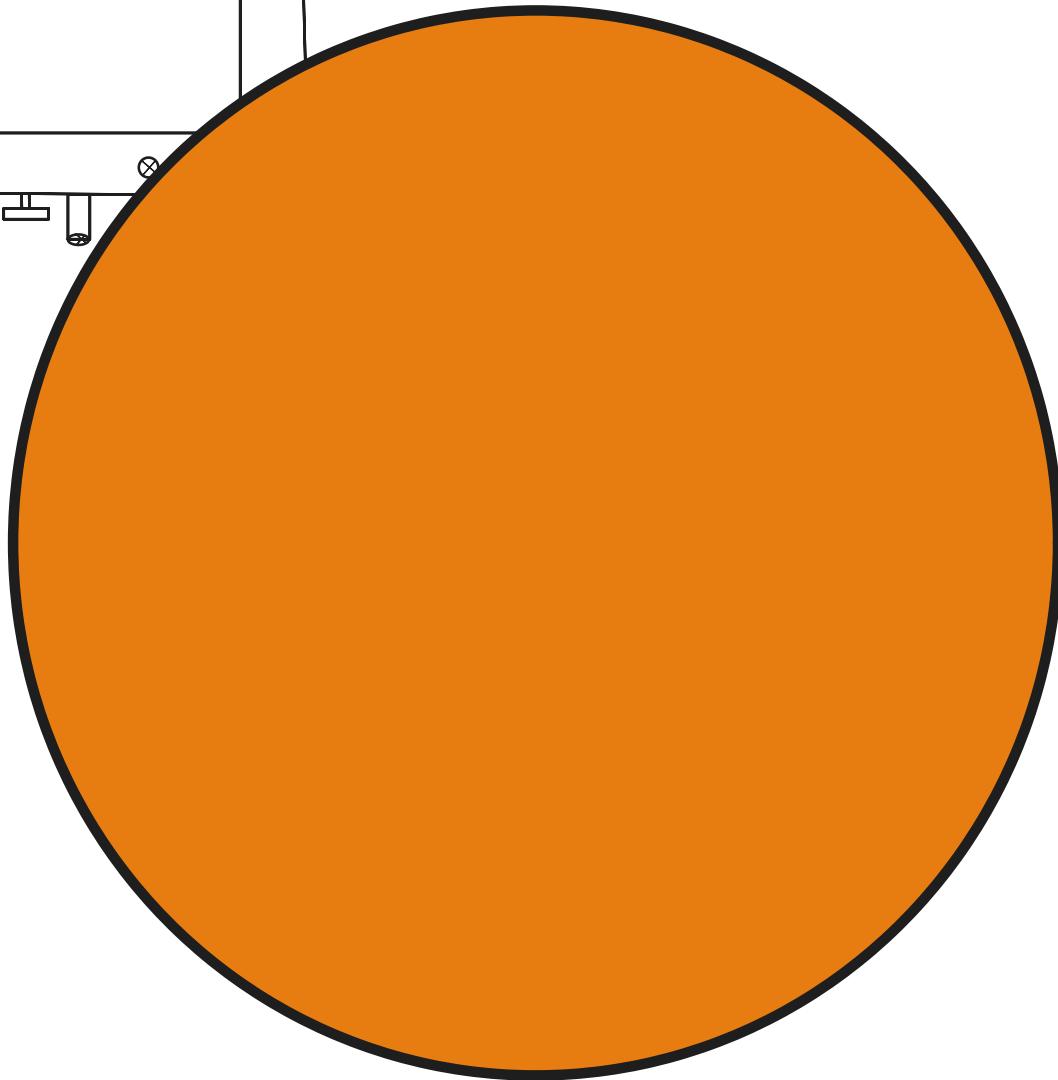
Typos happen.

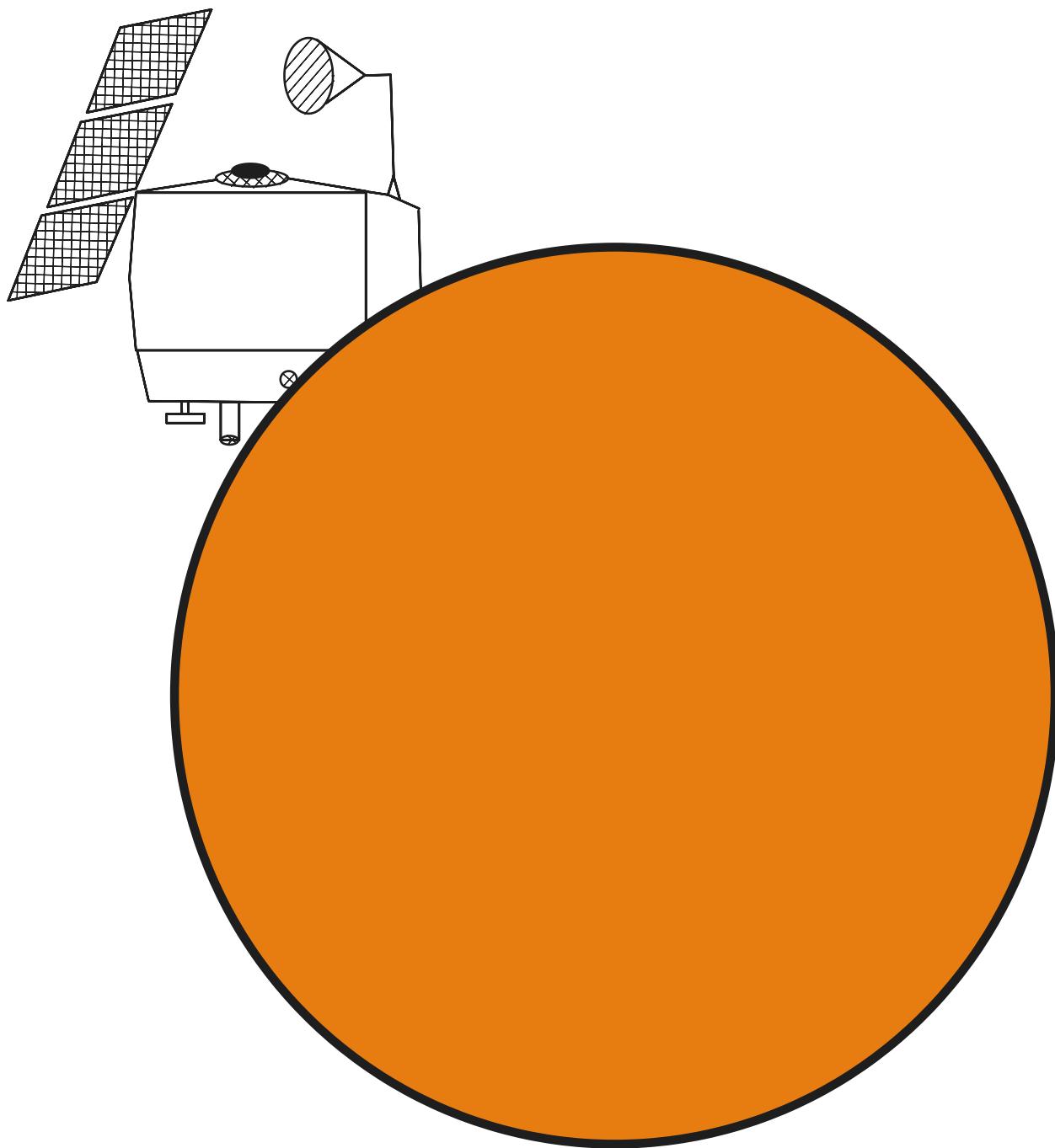
Sometimes, testing more is the answer.

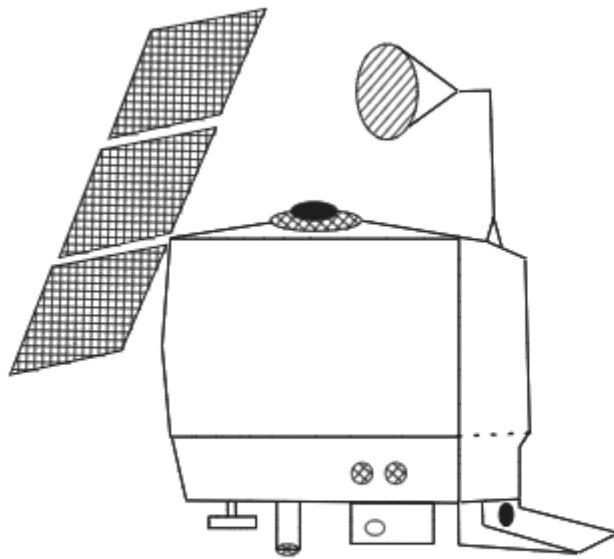




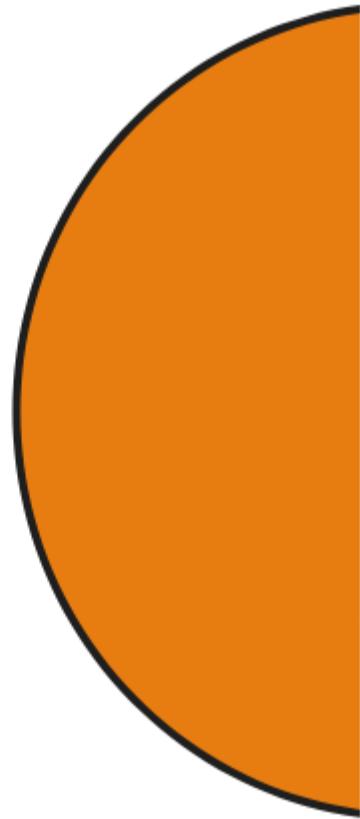
I made it!

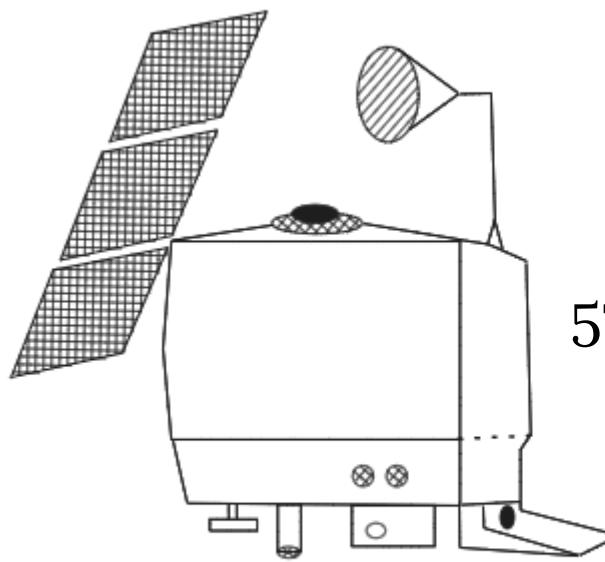




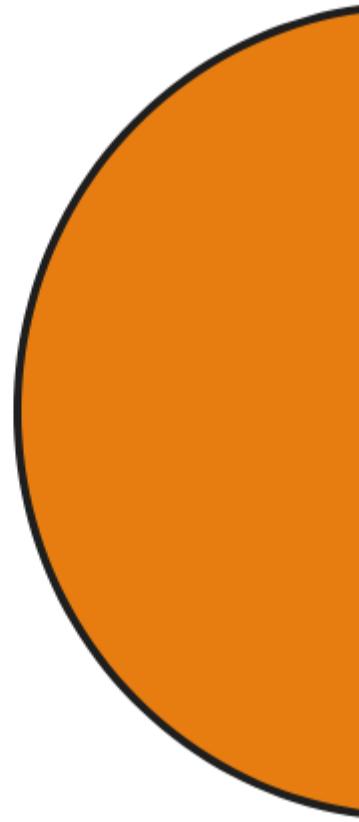


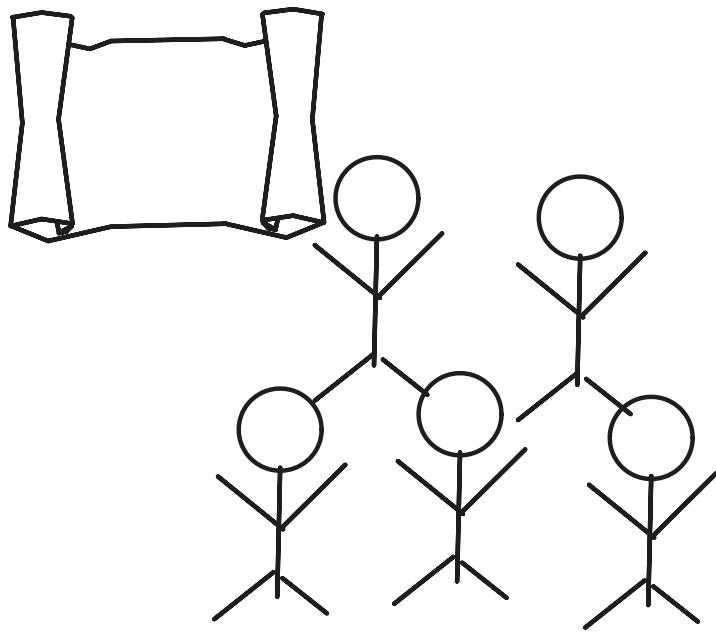
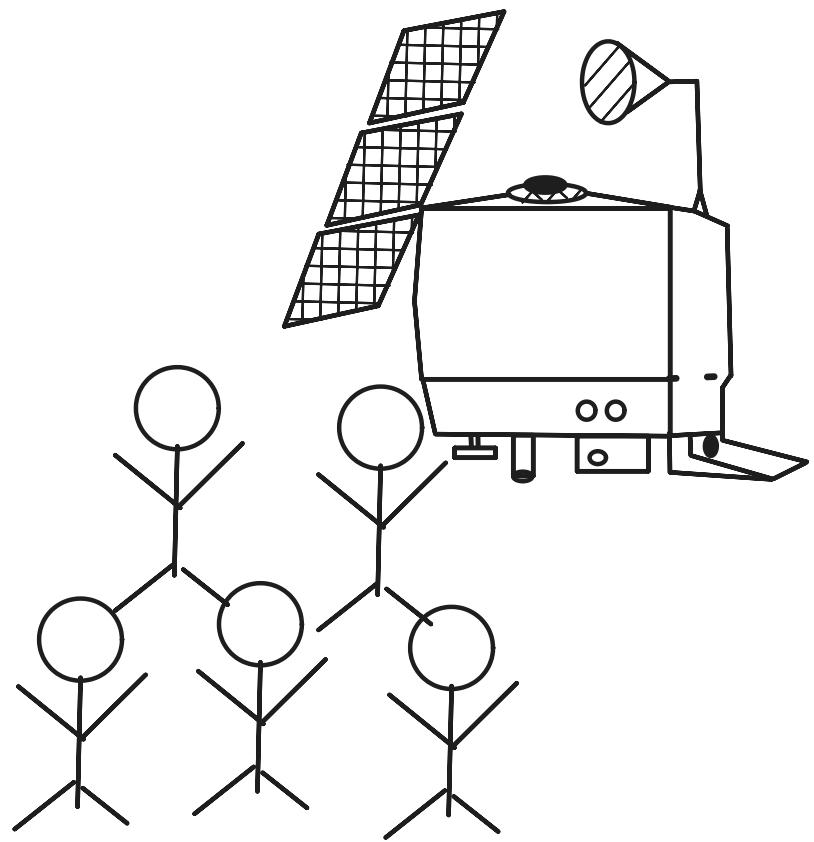
110 km

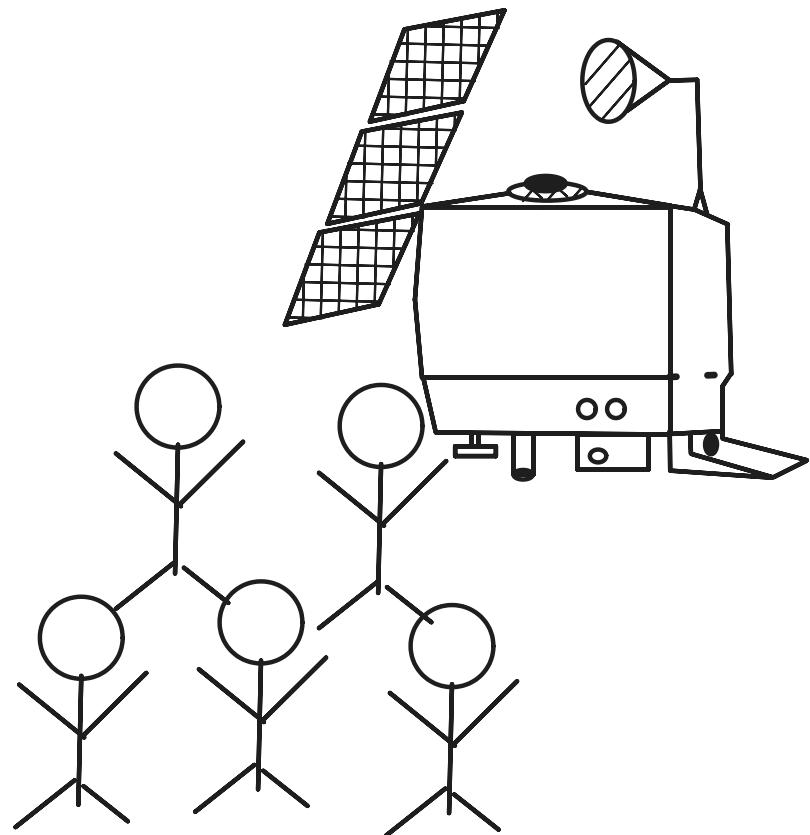




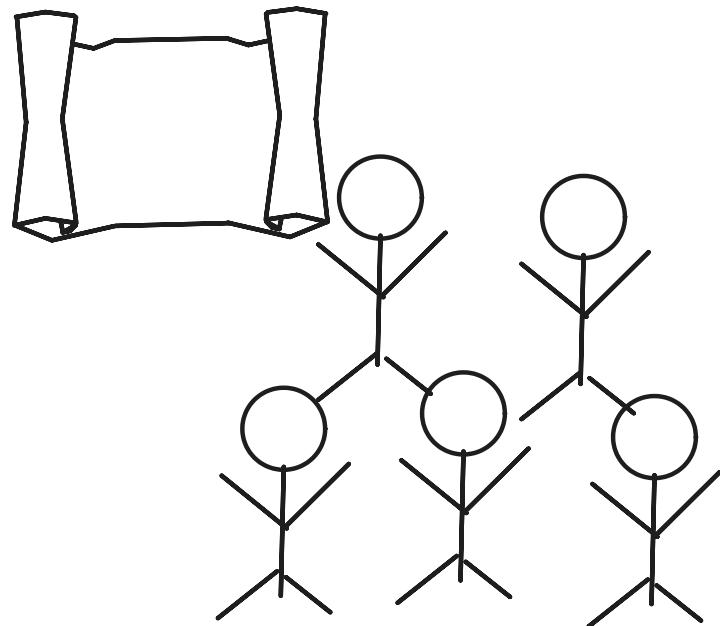
57 km







pound force seconds



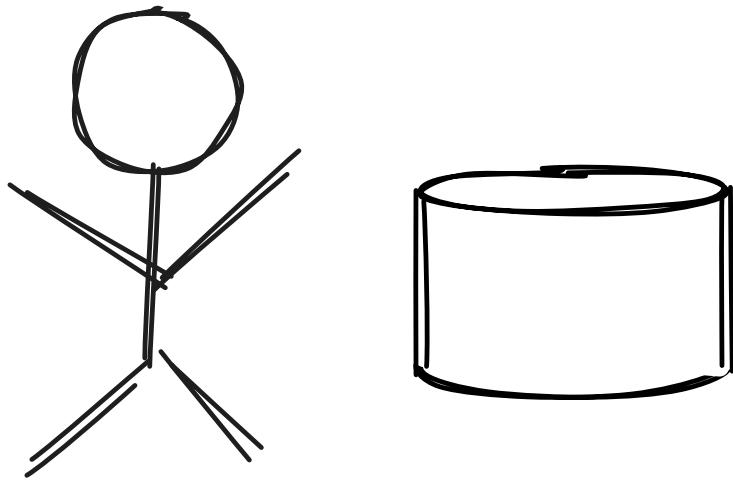
newton seconds

Establish clear interfaces.

Small mistakes can have huge consequences.

Integration tests are useful.

Learn and improve processes.



Steve Null

```
1 test_null_db=# CREATE TABLE people ( id SERIAL PRIMARY KEY, surname TEXT );
2 CREATE TABLE
3
4 test_null_db=# INSERT INTO people (surname) VALUES ('Null'), ('Smith'),
5 (NULL);
5 INSERT 0 3
6
7 test_null_db=# SELECT id, surname FROM people;
8   id | surname
9 -----
10  1 | Null
11  2 | Smith
12  3 |
13 (3 rows)
14
15 test_null_db=# SELECT id, surname FROM people WHERE surname = 'Null';
16   id | surname
17 -----
18  1 | Null
19 (1 row)
```

[Apache Flex](#) / [FLEX-33644](#)

XMLEncoder improperly handles encoding the string "null".



HI, THIS IS
YOUR SON'S SCHOOL.
WE'RE HAVING SOME
COMPUTER TROUBLE.



OH, DEAR - DID HE
BREAK SOMETHING?
IN A WAY -)



DID YOU REALLY
NAME YOUR SON
Robert'); DROP
TABLE Students;-- ?

OH, YES. LITTLE
BOBBY TABLES,
WE CALL HIM.

WELL, WE'VE LOST THIS
YEAR'S STUDENT RECORDS.
I HOPE YOU'RE HAPPY.



AND I HOPE
YOU'VE LEARNED
TO SANITIZE YOUR
DATABASE INPUTS.

Over three hundred children in the US between 1990 and 2020 have been Abcde.

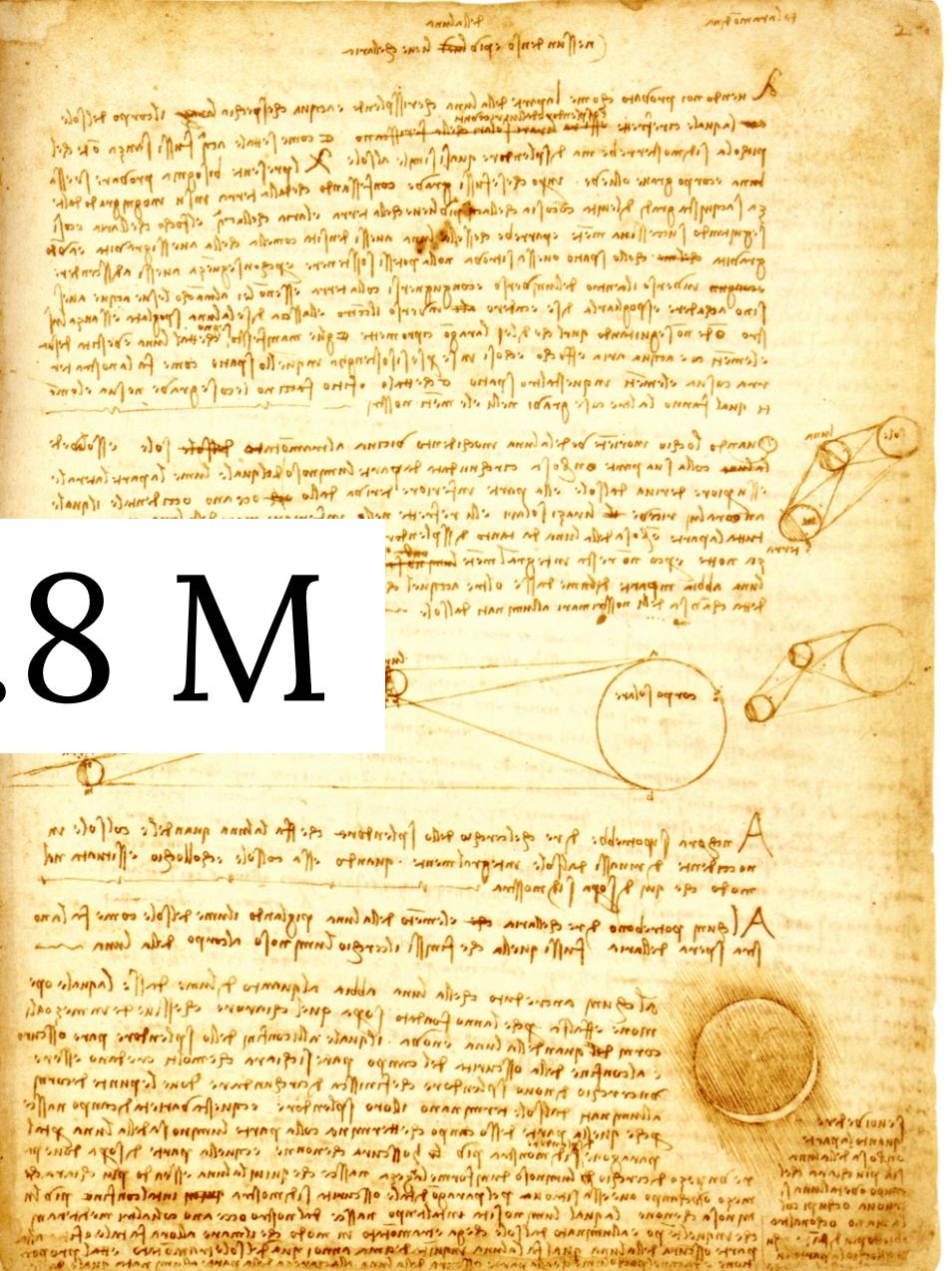
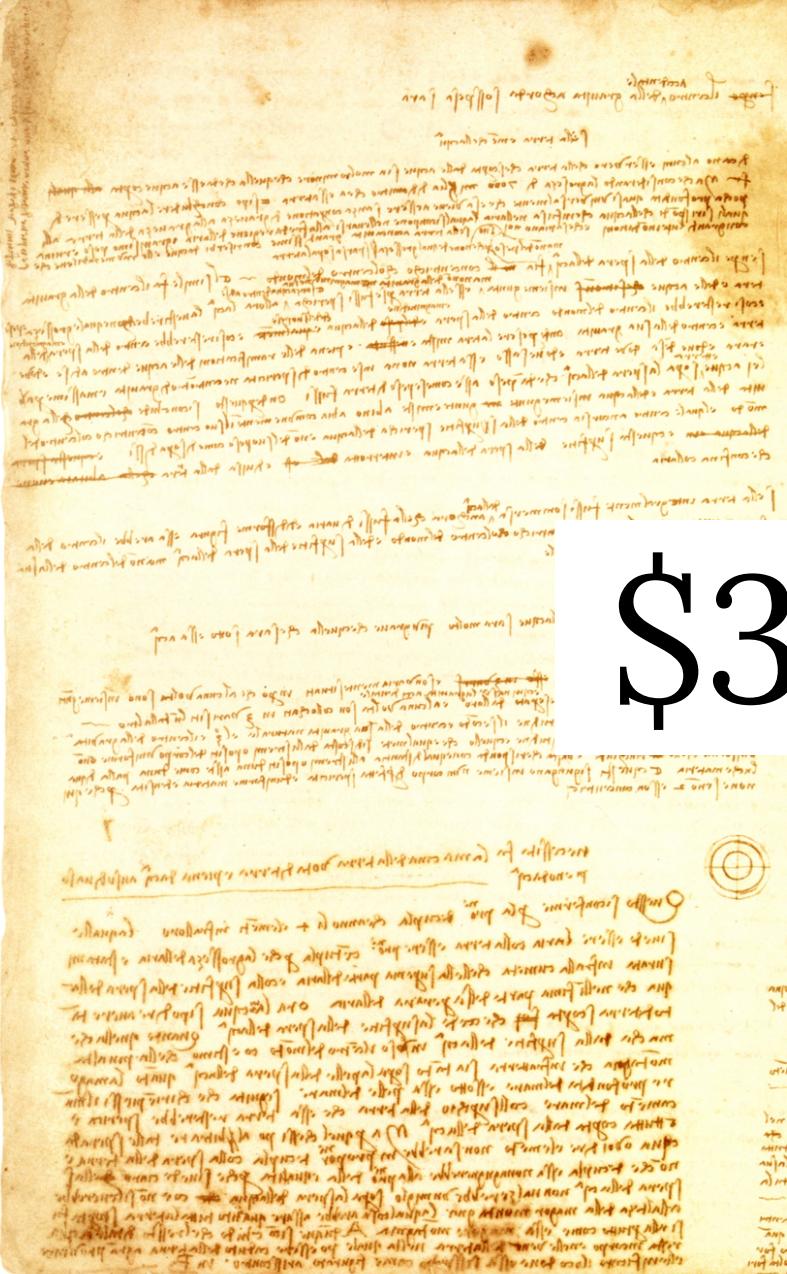


Handle edge case in user inputs.

Real-world data can surprise you.

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\$30.8 M



\$23.7 M

PETER A. LAWRENCE

The Making of a Fly

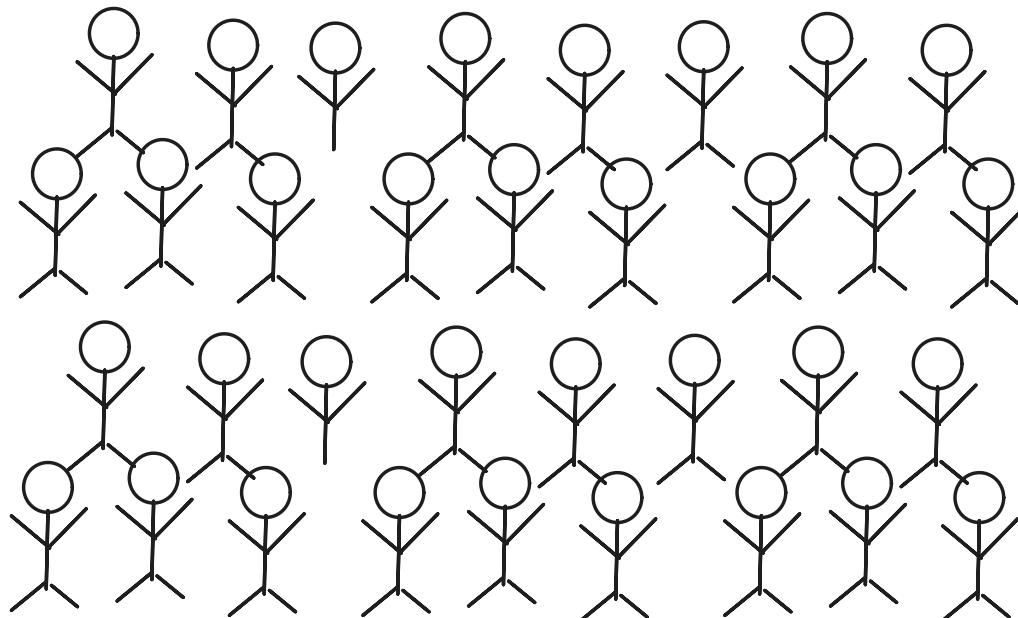
THE GENETICS OF ANIMAL DESIGN



Blackwell
Scientific
Publications

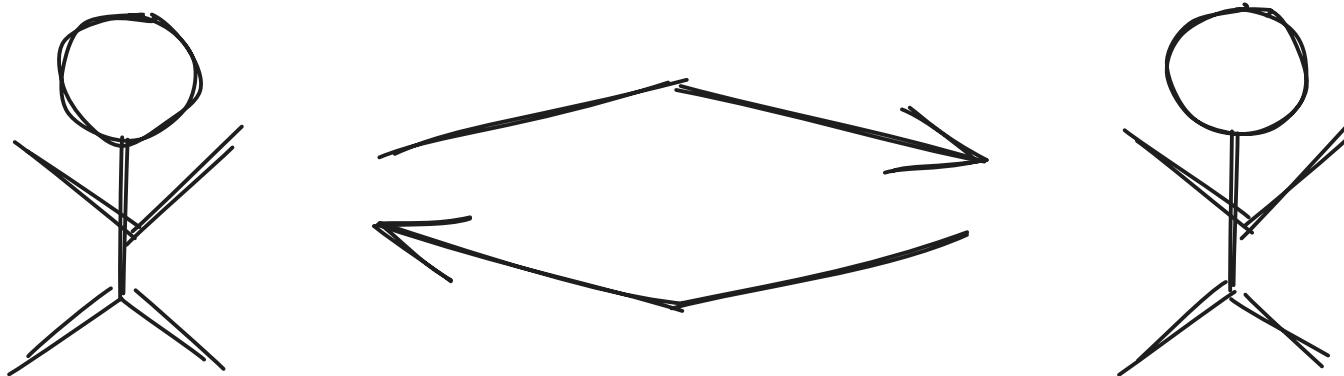
always be 0.07%
cheaper than the next
lowest price

always be 27% more
expensive than the
lowest option



always be 0.07%
cheaper than the next
lowest price

always be 27% more
expensive than the
lowest option



Be careful about your assumptions.



Total of 19.6% of gene studies contained errors.

University of Melbourne, 2016

MARCH5

SEP15

Around 90% of business spreadsheets contain errors.

The European Spreadsheet
Risks Interest Group

1. The average spreadsheet size was 113.4 KB.

- Enrol scandal, 2001

1. The average spreadsheet size was 113.4 KB.
2. The average spreadsheet had 6,191 non-empty cells.

- Enrol scandal, 2001

1. The average spreadsheet size was 113.4 KB.
2. The average spreadsheet had 6,191 non-empty cells.
3. One spreadsheet had 174 worksheets.

- Enrol scandal, 2001

1. The average spreadsheet size was 113.4 KB.
2. The average spreadsheet had 6,191 non-empty cells.
3. One spreadsheet had 174 worksheets.
4. 6,650 spreadsheets contained no formulas at all.

- Enrol scandal, 2001

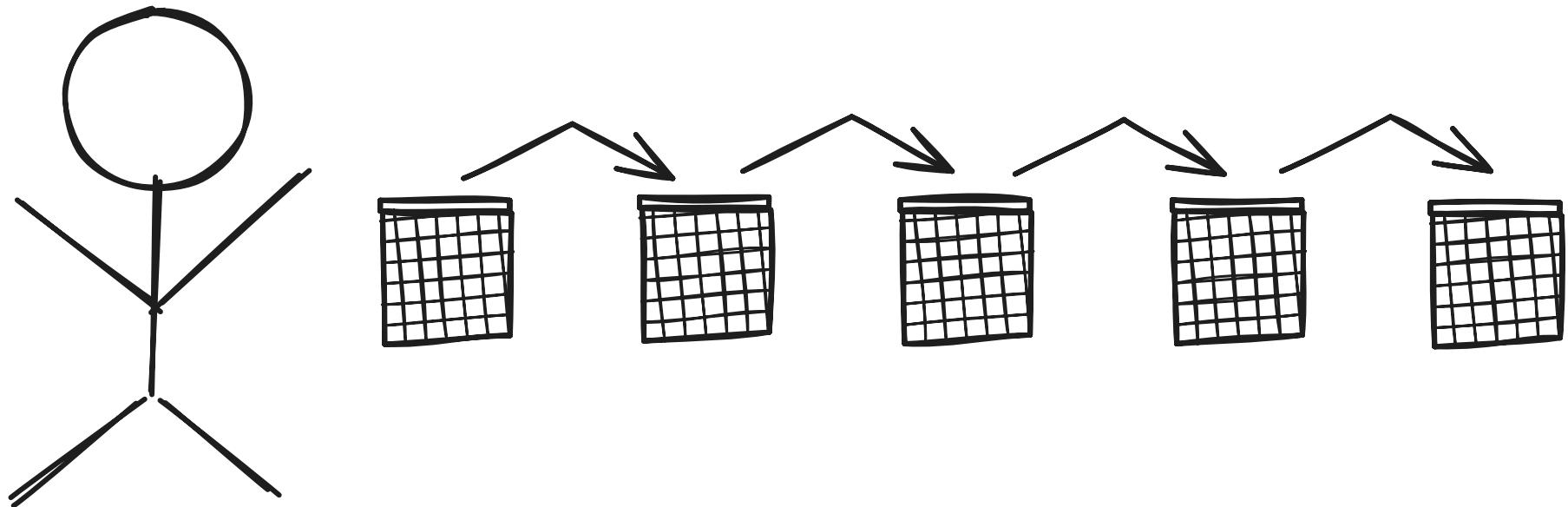
1. The average spreadsheet size was 113.4 KB.
2. The average spreadsheet had 6,191 non-empty cells.
3. One spreadsheet had 174 worksheets.
4. 6,650 spreadsheets contained no formulas at all.
5. 24% of spreadsheets with formulas had at least one error.

- Enrol scandal, 2001

Value at Risk (VaR)

What's the most money we could lose in a single day, with 95% certainty?

low VaR \rightarrow high risk investments
high VaR \rightarrow low risk investments



After subtracting the old rate from the new rate, the spreadsheet divided by their sum instead of their average. This error muted volatility by a factor of two and lowered the Value at Risk.

- JPMorgan Chase

Spreadsheets are code as well.

Tread spreadsheets like production software.

[Source](#)[Commits](#)[Network](#)[Pull Requests \(0\)](#)[Issues \(74\)](#)[Graphs](#)

Branch: master

Switch Branches (1) ▾

Switch Tags (0)

Branch List

Optimus Support for Linux Through VirtualGL — [Read more](#)<http://www.martin-juhl.dk> or <http://www.casalogic.dk>[Downloads](#)[HTTP](#)[Git Read-Only](#)<https://github.com/MrMEEE/bumblebee.git>**Read-Only** access

Merge pull request #358 from Ximi1970/master



MrMEEE (author)

about 3 hours ago

```
commit 66bf750d2e4ccb7792fb
tree 5ad60c749a30cdc3604c
parent 90e3c348cdeb8985115e
parent ab95217469041412fd95
```

bumblebee /

name	age	message	history
install-files/	about 8 hours ago	Script only valid when using repo. [Ximi1970]	
old-prime-ng/	May 08, 2011	Renamed from prime-ng to bumblebee and updated... [MrMEEE]	
stages/	1 day ago	Merge remote branch 'upstream/master' [Ximi1970]	
README	2 days ago	Added Ximi1970 to the support list. [Ximi1970]	
install.sh	1 day ago	Merge remote branch 'upstream/master' [Ximi1970]	

install script does rm -rf /usr for ubuntu #123

 Closed

 ginoputrino opened on May 24, 2011

...

An extra space at line 351:

```
rm -rf /usr /lib/nvidia-current/xorg/xorg
```

causes the install.sh script to do an rm -rf on the /usr directory for people installing in ubuntu.

Totally uncool dude!!! The script deletes everything under /usr. I just had to reinstall linux on my pc to recover.

Removing the space will fix this. Probably should do it quickly!!!

 1135

 73

 1262

 333

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 166

 252

Commit

GIANT BUG... causing /usr to be deleted... so sorry....

...ssue [#122](#), issue [#121](#)

git master



MrMEEE committed on May 24, 2011

884 comments on commit [a047be8](#)

884 comments on commit [a047be8](#)



drcatdoctor on Jun 16, 2011

How can you complain about bugs, Mr. Anderson, when you have no... operating system...

3

13

884 comments on commit [a047be8](#)



0xd34df00d on Jun 16, 2011

Bleeding edge really bleeding for someone now!



72



9



drcatdoctor on Jun 16, 2011

How can you complain about bugs, Mr. Anderson, when you have no... operating system...



3



13

884 comments on commit [a047be8](#)



0xd34df00d on Jun 16, 2011

Bleeding edge really bleeding for someone now!



72



9



jackjack-jj on Jun 16, 2011

no more lack of disk space now



21



3



drcatdoctor on Jun 16, 2011

How can you complain about bugs, Mr. Anderson, when you have no... operating system...



3



13

884 comments on commit [a047be8](#)



0xd34df00d on Jun 16, 2011

Bleeding edge really bleeding for someone now!

72

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Palleas on Jun 16, 2011

I didn't like that folder anyway.

74

109

3

2



jackjack-jj on Jun 16, 2011

no more lack of disk space now

21

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drcatdoctor on Jun 16, 2011

How can you complain about bugs, Mr. Anderson, when you have no... operating system...

3

13

Thank you for your attention!

slides



contact me



Resources

- <https://web.archive.org/web/20190330092322/https://boeing.mediaroom.com/2017-03-09-Boeing-737-MAX-8-Earns-FAA-Certification>
- https://www.faa.gov/sites/faa.gov/files/2022-08/737_RTS_Summary.pdf
- <https://web.archive.org/web/20210320042800/https://www.seattletimes.com/business/boeing-aerospace/failed-certification-faa-missed-safety-issues-in-the-737-max-system-implicated-in-the-lion-air-crash/>
- <https://web.archive.org/web/20190319122106/http://fortune.com/2019/03/18/boeing-safety-vetting-faa/>
- <https://www.justice.gov/archives/opa/pr/boeing-charged-737-max-fraud-conspiracy-and-agrees-pay-over-25-billion>
- <https://baatraining.com/wp-content/uploads/2022/04/Cover.webp>
- <https://www.statista.com/statistics/264492/aircraft-orders-from-airbus-and-boeing/>
- https://en.wikipedia.org/wiki/Maneuvering_Characteristics_Augmentation_System

Resources

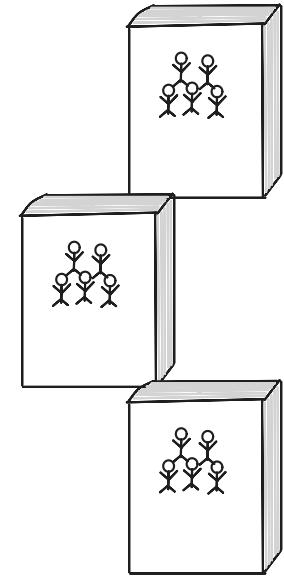
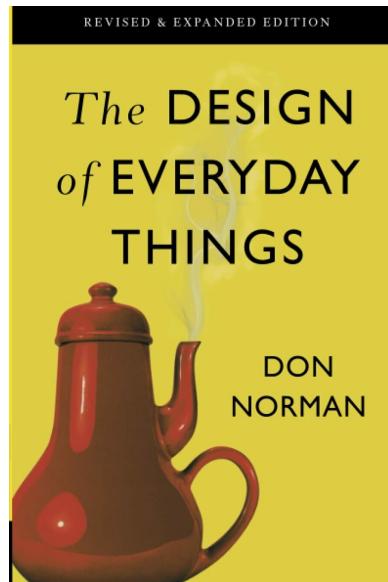
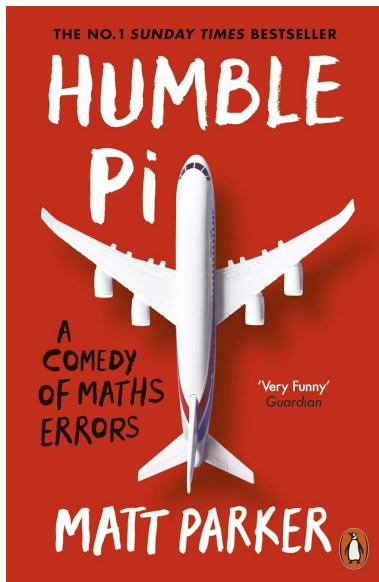
- <https://stackoverflow.com/questions/4456438/how-to-pass-null-a-real-surname-to-a-soap-web-service-in-actionscript-3>
- <https://issues.apache.org/jira/browse/FLEX-33644>
- <https://xkcd.com/327/>
- <https://hackaday.com/2014/04/04/sql-injection-fools-speed-traps-and-clears-your-record/>
- <https://eusprig.org/>
- <https://www.independent.co.uk/tech/whatsapp-group-chats-bigger-maximum-size-256-people-users-a6856491.html>
- <https://en.wikipedia.org/wiki/Therac-25>
- <https://github.com/MrMEEE/bumblebee-Old-and-abbandoned/issues/123>
- <https://www.solving-finance.com/post/the-wall-of-shame-for-the-worst-excel-errors>

Resources

- <https://www.spacevoyaging.com/insights/2024/10/27/the-mars-climate-orbiter-how-important-doing-the-right-calculations-is>
- https://en.wikipedia.org/wiki/Nuclear_Gandhi
- <https://googleblog.blogspot.com/2009/01/this-site-may-harm-your-computer-on.html>
- <https://www.pcgamer.com/software/life-isnt-easy-if-your-last-name-is-null-as-it-still-breaks-database-entries-the-world-over>
- <https://www.iflscience.com/the-weird-reason-why-trains-in-switzerland-are-not-allowed-256-axles-77693>

My Favorite Books About Software Flaws

- Humble Pi by Matt Parker
- The Design of Everyday Things by Don Norman



Q&A

slides



contact me

