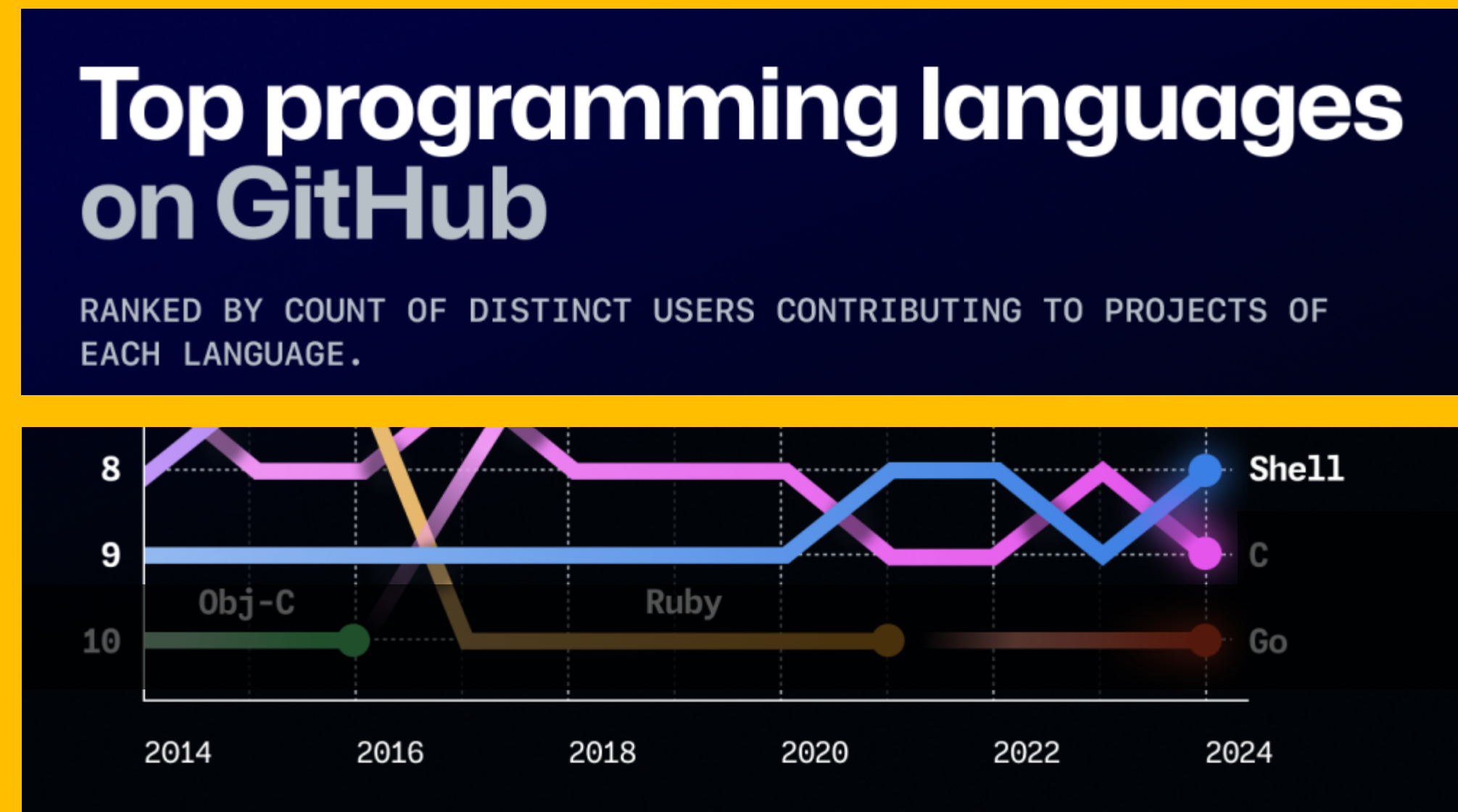


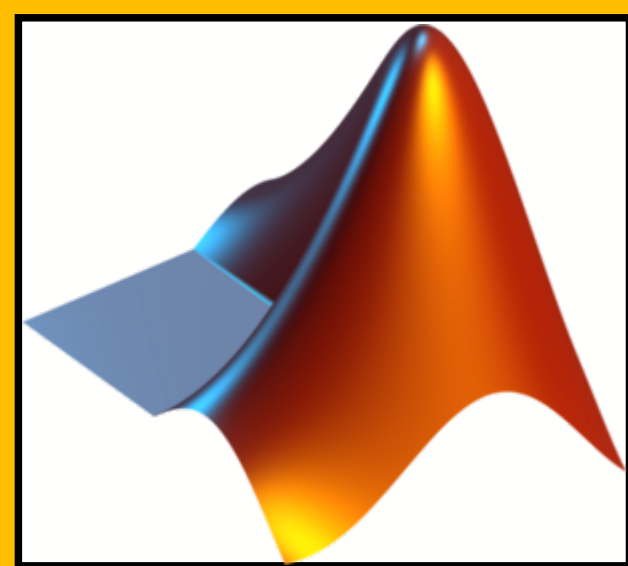
# Yes, That Script Could Wipe Your Computer

# The Shell is enduringly popular...

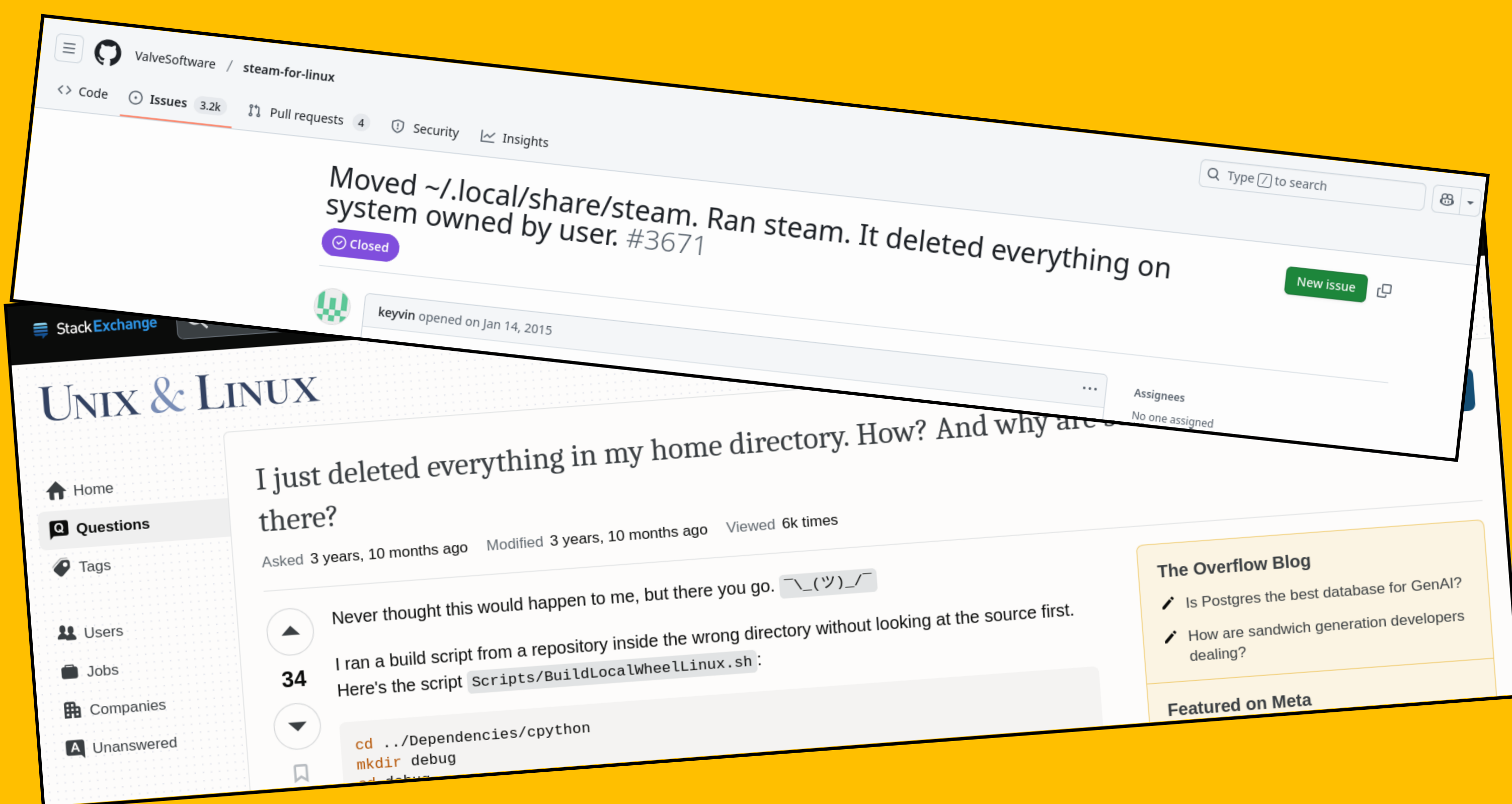


<https://github.blog/news-insights/octoverse/octoverse-2024>

... for orchestrating all kinds of software...



... but it can be tricky,  
and bugs be dangerous

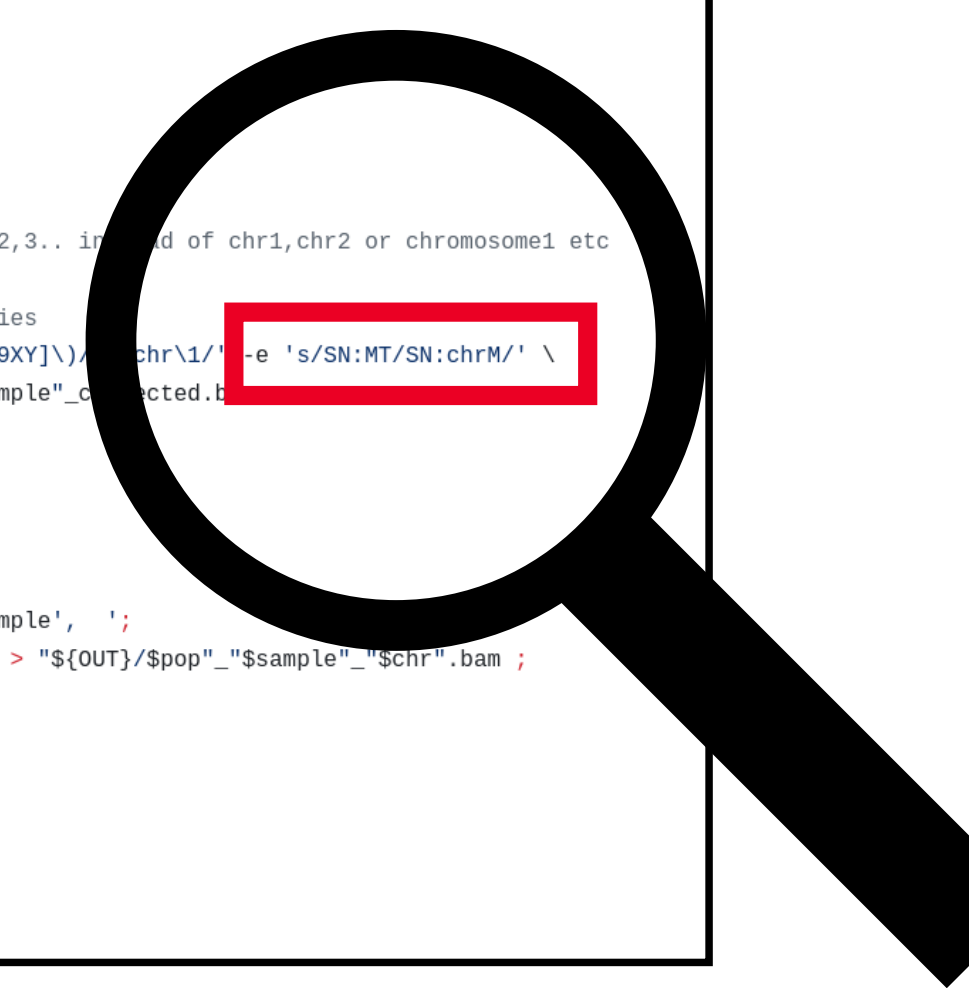


We can catch many dangerous bugs  
**before** executing shell scripts with  
**static analysis**

```

1 #!/bin/bash
2
3 cd "$(dirname "$0")"/.. || exit 1
4
5 IN="$1"
6 IN_NAME="$2"
7 OUT="$3"
8
9 cat <${IN_NAME}.while read $s_line;
10 do
11     sample=$(echo $s_line |cut -d " " -f 2);
12     pop=$(echo $s_line |cut -f 1 d "=");
13     loc=$(echo $s_line |cut -f 3 d "=");
14     ## correcting labeling of chromosomes so that all are 1,2,3,...,10,X,Y of chr1,chr2 or chromosome etc
15     echo "Processing sample $sample";
16     # extracts the chromosomes in the file due to inconsistencies
17     samtools view -H "$IN/$Sample".bam | sed -e 's/SM:[[:p:xy:]]/SM:[[:p:xy:]]/' | sed -e 's/SM:MT/SM:chrM/' \
18     > "${OUT}/${Sample}.bam.sorted"
19     # create bam file
20     samtools index -b "${OUT}/${Sample}.corrected.bam;
21     ## Isolating each relevant chromosome based on Gen_Locs
22     cut -f 2 -d Gen_Locs.txt |sort |uniq |while read chr;
23 do
24     echo "Isolating chromosome '$chr' from sample '$OUT/${Sample}'";
25     samtools view -b "${OUT}/${Sample}.corrected.bam chr"$chr" > "${OUT}/${Sample}.${Sample}.${chr}.bam;
26     echo "Indexing sample '$sample' - '$OUT/${Sample}.${Sample}.${chr}.bam";
27     samtools index -b "${OUT}/${Sample}.${Sample}.${chr}.bam;
28 done
29
30 rm "${OUT}/${Sample}.corrected.bam;
31 rm "${OUT}/${Sample}.corrected.bam.bai;
32 rm "${OUT}/${Sample}.bam
33
34 done;

```



## 515 scripts

**89%** accuracy

# How?

①

# (In)Correctness definitions

②

# Black-box program summaries

③

Symbolic execution  
+  
Type checking

□ Must/may crash

- ☐ Data misinterpretation

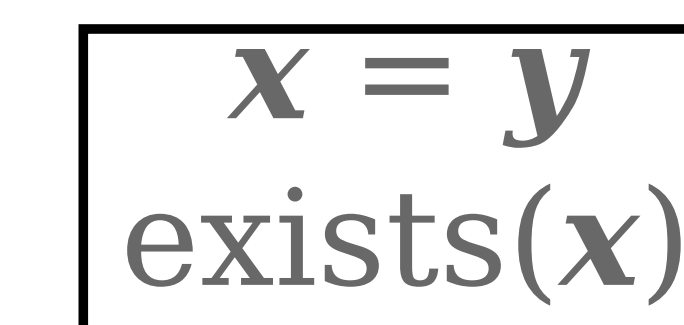
☐ Error output

☐ Must/may fail

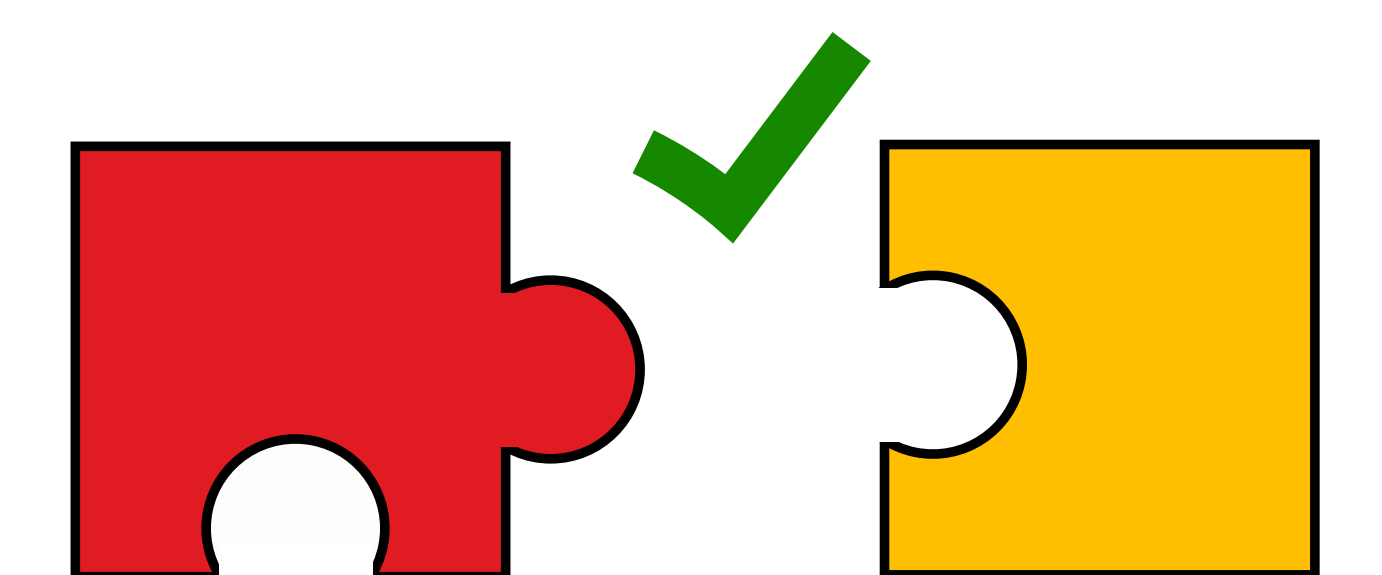
•

Input file: f

f deleted



```
cp x output/y
```



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