- This is a multi-pass problem.
- In the first pass, you are given a string s of length $n \leq 10\,000$ with only lowercase characters. You need to transmit this string by using 5 bitstrings, all of length at most $n + 10$.
- In the second pass, you are given the 5 bitstrings in arbitrary order, and you need to reconstruct the original string s.
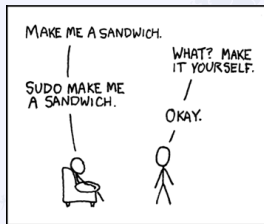
- Given dependencies between $n \leq 10^5$ files (in Makefile form) and one changed file, output a build order that satisfies dependencies.
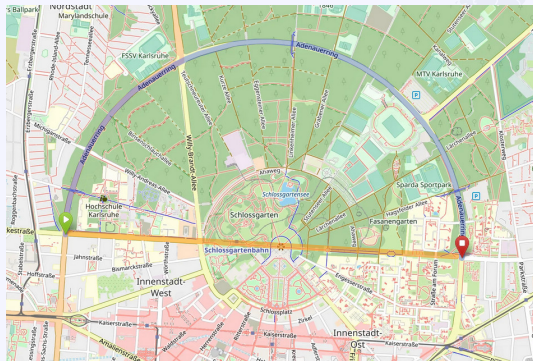- Each file has up to 10 dependencies.

```
gmp:                            gmp
solution: set map queue         map
base:                           set
set: base gmp                   solution
map: base gmp
queue: base
```

Given the Makefile on the left, if the file gmp has changed,
we can recompile in the order shown on the right, from top to bottom.

xkcd comic 149.
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- You want to travel from the west of Karlsruhe to the Dining Hall in the east.
- There are two possible routes:
  - A direct route through the busy park with length $d \leq 10^9$ (in orange).
  - A longer route along the *Adenauerring*, a perfect half-circle (in blue).
- How much longer is the circular route compared to the direct route?

Map data from OpenStreetMap