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--- Day 22: Reactor Reboot ---

Operating at these extreme ocean depths has overloaded the submarine's
reactor; it needs to be rebooted.

The reactor core is made up of a large 3-dimensional grid made up entirely
of cubes, one cube per integer 3-dimensional coordinate (x,y,z). Each cube
can be either on or off; at the start of the reboot process, they are all
off. (Could it be an old model of a reactor you've seen before?)

To reboot the reactor, you just need to set all of the cubes to either on
or off by following a list of reboot steps (your puzzle input). Each step
specifies a cuboid (the set of all cubes that have coordinates which fall
within ranges for x, y, and z) and whether to turn all of the cubes in that
cuboid on or off.

For example, given these reboot steps:

```
on x=10..12,y=10..12,z=10..12
on x=11..13,y=11..13,z=11..13
off x=9..11,y=9..11,z=9..11
on x=10..10,y=10..10,z=10..10
```

The first step (on x=10..12,y=10..12,z=10..12) turns on a 3x3x3 cuboid
consisting of 27 cubes:

    - 10,10,10
    - 10,10,11
    - 10,10,12
    - 10,11,10
    - 10,11,11
    - 10,11,12
    - 10,12,10
    - 10,12,11
    - 10,12,12
    - 11,10,10
    - 11,10,11
    - 11,10,12
    - 11,11,10
    - 11,11,11
    - 11,11,12
    - 11,12,10
    - 11,12,11
    - 11,12,12
    - 12,10,10
    - 12,10,11
    - 12,10,12
    - 12,11,10
    - 12,11,11
    - 12,11,12
    - 12,12,10
    - 12,12,11
    - 12,12,12

The second step (on x=11..13,y=11..13,z=11..13) turns on a 3x3x3 cuboid
that overlaps with the first. As a result, only 19 additional cubes turn
on; the rest are already on from the previous step:

    - 11,11,13
    - 11,12,13
    - 11,13,11
    - 11,13,12
    - 11,13,13
    - 12,11,13
    - 12,12,13
    - 12,13,11
    - 12,13,12

- `12,13,13`
- `13,11,11`
- `13,11,12`
- `13,11,13`
- `13,12,11`
- `13,12,12`
- `13,12,13`
- `13,13,11`
- `13,13,12`
- `13,13,13`

The third step (`off x=9..11,y=9..11,z=9..11`) turns off a 3x3x3 cuboid that overlaps partially with some cubes that are on, ultimately turning off 8 cubes:

- `10,10,10`
- `10,10,11`
- `10,11,10`
- `10,11,11`
- `11,10,10`
- `11,10,11`
- `11,11,10`
- `11,11,11`

The final step (`on x=10..10,y=10..10,z=10..10`) turns on a single cube, `10,10,10`. After this last step, `39` cubes are on.

The initialization procedure only uses cubes that have `x`, `y`, and `z` positions of at least `-50` and at most `50`. For now, ignore cubes outside this region.

Here is a larger example:

```
on x=-20..26,y=-36..17,z=-47..7
on x=-20..33,y=-21..23,z=-26..28
on x=-22..28,y=-29..23,z=-38..16
on x=-46..7,y=-6..46,z=-50..-1
on x=-49..1,y=-3..46,z=-24..28
on x=2..47,y=-22..22,z=-23..27
on x=-27..23,y=-28..26,z=-21..29
on x=-39..5,y=-6..47,z=-3..44
on x=-30..21,y=-8..43,z=-13..34
on x=-22..26,y=-27..20,z=-29..19
off x=-48..-32,y=26..41,z=-47..-37
on x=-12..35,y=6..50,z=-50..-2
off x=-48..-32,y=-32..-16,z=-15..-5
on x=-18..26,y=-33..15,z=-7..46
off x=-40..-22,y=-38..-28,z=23..41
on x=-16..35,y=-41..10,z=-47..6
off x=-32..-23,y=11..30,z=-14..3
on x=-49..-5,y=-3..45,z=-29..18
off x=18..30,y=-20..-8,z=-3..13
on x=-41..9,y=-7..43,z=-33..15
on x=-54112..-39298,y=-85059..-49293,z=-27449..7877
on x=967..23432,y=45373..81175,z=27513..53682
```

The last two steps are fully outside the initialization procedure area; all other steps are fully within it. After executing these steps in the initialization procedure region, `590784` cubes are on.

Execute the reboot steps. Afterward, considering only cubes in the region `x=-50..50,y=-50..50,z=-50..50`, how many cubes are on?

Your puzzle answer was `655005`.

--- Part Two ---

Now that the initialization procedure is complete, you can reboot the reactor.

Starting with all cubes off, run all of the reboot steps for all cubes in the reactor.

Consider the following reboot steps:

```
on x=-5..47,y=-31..22,z=-19..33
on x=-44..5,y=-27..21,z=-14..35
on x=-49..-1,y=-11..42,z=-10..38
on x=-20..34,y=-40..6,z=-44..1
off x=26..39,y=40..50,z=-2..11
on x=-41..5,y=-41..6,z=-36..8
off x=-43..-33,y=-45..-28,z=7..25
on x=-33..15,y=-32..19,z=-34..11
off x=35..47,y=-46..-34,z=-11..5
on x=-14..36,y=-6..44,z=-16..29
on x=-57795..-6158,y=29564..72030,z=20435..90618
on x=36731..105352,y=-21140..28532,z=16094..90401
on x=30999..107136,y=-53464..15513,z=8553..71215
on x=13528..83982,y=-99403..-27377,z=-24141..23996
on x=-72682..-12347,y=18159..111354,z=7391..80950
on x=-1060..80757,y=-65301..-20884,z=-103788..-16709
on x=-83015..-9461,y=-72160..-8347,z=-81239..-26856
on x=-52752..22273,y=-49450..9096,z=54442..119054
on x=-29982..40483,y=-108474..-28371,z=-24328..38471
on x=-4958..62750,y=40422..118853,z=-7672..65583
on x=55694..108686,y=-43367..46958,z=-26781..48729
on x=-98497..-18186,y=-63569..3412,z=1232..88485
on x=-726..56291,y=-62629..13224,z=18033..85226
on x=-110886..-34664,y=-81338..-8658,z=8914..63723
on x=-55829..24974,y=-16897..54165,z=-121762..-28058
on x=-65152..-11147,y=22489..91432,z=-58782..1780
on x=-120100..-32970,y=-46592..27473,z=-11695..61039
on x=-18631..37533,y=-124565..-50804,z=-35667..28308
on x=-57817..18248,y=49321..117703,z=5745..55881
on x=14781..98692,y=-1341..70827,z=15753..70151
on x=-34419..55919,y=-19626..40991,z=39015..114138
on x=-60785..11593,y=-56135..2999,z=-95368..-26915
on x=-32178..58085,y=17647..101866,z=-91405..-8878
on x=-53655..12091,y=50097..105568,z=-75335..-4862
on x=-111166..-40997,y=-71714..2688,z=5609..50954
on x=-16602..70118,y=-98693..-44401,z=5197..76897
on x=16383..101554,y=4615..83635,z=-44907..18747
off x=-95822..-15171,y=-19987..48940,z=10804..104439
on x=-89813..-14614,y=16069..88491,z=-3297..45228
on x=41075..99376,y=-20427..49978,z=-52012..13762
on x=-21330..50085,y=-17944..62733,z=-112280..-30197
on x=-16478..35915,y=36008..118594,z=-7885..47086
off x=-98156..-27851,y=-49952..43171,z=-99005..-8456
off x=2032..69770,y=-71013..4824,z=7471..94418
on x=43670..120875,y=-42068..12382,z=-24787..38892
off x=37514..111226,y=-45862..25743,z=-16714..54663
off x=25699..97951,y=-30668..59918,z=-15349..69697
off x=-44271..17935,y=-9516..60759,z=49131..112598
on x=-61695..-5813,y=40978..94975,z=8655..80240
off x=-101086..-9439,y=-7088..67543,z=33935..83858
off x=18020..114017,y=-48931..32606,z=21474..89843
off x=-77139..10506,y=-89994..-18797,z=-80..59318
off x=8476..79288,y=-75520..11602,z=-96624..-24783
on x=-47488..-1262,y=24338..100707,z=16292..72967
off x=-84341..13987,y=2429..92914,z=-90671..-1318
off x=-37810..49457,y=-71013..-7894,z=-105357..-13188
off x=-27365..46395,y=31009..98017,z=15428..76570
off x=-70369..-16548,y=22648..78696,z=-1892..86821
on x=-53470..21291,y=-120233..-33476,z=-44150..38147
off x=-93533..-4276,y=-16170..68771,z=-104985..-24507
```

After running the above reboot steps, 2758514936282235 cubes are on. (Just for fun, 474140 of those are also in the initialization procedure region.)

Starting again with all cubes off, execute all reboot steps. Afterward,

considering all cubes, how many cubes are on?

Your puzzle answer was 1125649856443608.

Both parts of this puzzle are complete! They provide two gold stars: **

At this point, you should return to your Advent calendar and try another puzzle.

If you still want to see it, you can get your puzzle input.

You can also [Share] this puzzle.