Advent of Code [About] [Events] [Shop] [Settings] [Log Out] jhillierdavis 40* {:year **2024**} --- Day 20: Race Condition ---The Historians are quite pixelated again. This time, a massive, black building looms over you - you're right outside the CPU! While The Historians get to work, a nearby program sees that you're idle and challenges you to a race. Apparently, you've arrived just in time for the frequently-held race condition festival! The race takes place on a particularly long and twisting code path; programs compete to see who can finish in the fewest picoseconds. The winner even gets their very own mutex! They hand you a map of the racetrack (your puzzle input). For example: |#########| |# . . . # . . . # # | # . # . # . # . # # # . # |#S#...#.#.#...#| |#######.#.#.### |#######.#.#..# #######.#.###.# |###..E#...#...#| |###.######.### # . . . # # # . . . # . . . # #.####.#.##.# |#.#...#.#.#..# |#.#.#.#.#.#.## |# . . . # . . . # . . . # # # | |########| The map consists of track (.) - including the start (S) and end (E) positions (both of which also count as track) - and walls (#). When a program runs through the racetrack, it starts at the start position. Then, it is allowed to move up, down, left, or right; each such move takes 1 picosecond. The goal is to reach the end position as quickly as possible.

In this example racetrack, the fastest time is 84 picoseconds.

will receive a segmentation fault and get disqualified.

picoseconds) by cheating for the two moves marked 1 and 2:

are allowed to cheat.

|########|

|#...#...12....#|

#.#.#.#.#.###.#

|#S#...#.#.#..#|

|#######.#.#.#.##|

|#######.#.#..#

#######.#.###.#

|####..E#...#...#|

|###.######.##

|# . . . # # # . . . # . . . #|

|#.####.#.##.#

|# . # . . . # . # . # . . . #|

#.#.#.#.#.#.#

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| # # # # # # # # # # # # # # # # # |

|########|

|# . . . # . . . # # |

#.#.#.#.#.##.#

#S#...#.#.#..#

|#######.#.#.#.###|

#######.#.#..#..#

#######.#.###.#

|###..E#...12..#|

###.########

|# . . . # # # . . . # . . . # |

#.####.#.###

|#.#...#.#.#..#

|#.#.#.#.#.#.#.##

#...#...#...###

|#########

|# . . . # . . . # #|

|# . # . # . # . # . # # . #

|#S#...#.#.#..#|

##########

#######.#.#...#

#######.#.###.#

####..E#...#...#

###.###1##.###

#...###.2.#...#

#.####.#.###

|#.#...#.#.#..#

|#.#.#.#.#.#.##

#...#...#...###

|########|

|#########|

|# . . . # . . . # #

#.#.#.#.#.####

#S#...#.#..#..#

|#######.#.#..#.

|#######.#.#.##.#

|###..21...#...#|

###.######.###

|# . . . # # # . . . # . . . #|

#.####.#.###

|#.#...#.#.#..#

|# . # . # . # . # . # . # # # |

|# . . . # . . . # . . . # # # |

############

and end position.

they save) are as follows:

Your puzzle answer was 1454.

lasts at most 20 picoseconds.

--- Part Two ---

76 picoseconds:

|#########|

|# . . . # . . . # #|

#.#.#.#.#.##.#

#S#...#.#.#..#

|#1#####.#.#.#.##|

#2#####.#.#..#

#3####.#.###.#

#456.E#...#...#

###.#######

|# . . . # # # . . . # . . . #|

#.####.#.###

|#.#...#.#.#..#

|#.#.#.#.#.#.###|

|# . . . # . . . # . . . # # # |

|########|

|#########|

|# . . . # . . . # #|

#.#.#.#.#.##

#S12..#.#.#...#

###3###.#.#.###

###4###.#.#....#

###5###.#.##.#

|###6.E#...#...#|

|# . . . # # # . . . # . . . # |

#.####.#.##.

|# . # . . . # . # . # . . . #|

|#.#.#.#.#.#.###|

. . . # . . . # . . . # # # |

|##############

saved for another cheat later.

- There are 32 cheats that save 50 picoseconds.

- There are 31 cheats that save 52 picoseconds.

- There are 29 cheats that save 54 picoseconds.

- There are 39 cheats that save 56 picoseconds.

- There are 25 cheats that save 58 picoseconds.

- There are 23 cheats that save 60 picoseconds.

- There are 20 cheats that save 62 picoseconds.

- There are 19 cheats that save 64 picoseconds.

- There are 12 cheats that save 66 picoseconds.

- There are 14 cheats that save 68 picoseconds.

- There are 12 cheats that save 70 picoseconds.

- There are 22 cheats that save 72 picoseconds.

- There are 4 cheats that save 74 picoseconds.

- There are 3 cheats that save 76 picoseconds.

would save you at least 100 picoseconds?

Your puzzle answer was 997879.

You can also [Share] this puzzle.

50 picoseconds or more:

different:

- There are 14 cheats that save 2 picoseconds.

- There are 14 cheats that save 4 picoseconds.

- There are 2 cheats that save 6 picoseconds.

- There are 4 cheats that save 8 picoseconds.

- There are 2 cheats that save 10 picoseconds.

- There are 3 cheats that save 12 picoseconds.

- There is one cheat that saves 20 picoseconds.

- There is one cheat that saves 36 picoseconds.

- There is one cheat that saves 38 picoseconds.

- There is one cheat that saves 40 picoseconds.

- There is one cheat that saves 64 picoseconds.

This cheat saves 38 picoseconds:

Because there is only a single path from the start to the end and the

The rules for cheating are very strict. Exactly once during a race, a

program may disable collision for up to 2 picoseconds. This allows the

So, a program could complete the course in 72 picoseconds (saving 12

Or, a program could complete the course in 64 picoseconds (saving 20

This cheat saves 64 picoseconds and takes the program directly to the end:

Each cheat has a distinct start position (the position where the cheat is

activated, just before the first move that is allowed to go through walls)

In this example, the total number of cheats (grouped by the amount of time

You aren't sure what the conditions of the racetrack will be like, so to

give yourself as many options as possible, you'll need a list of the best

The programs seem perplexed by your list of cheats. Apparently, the two-

latest version of the cheating rule permits a single cheat that instead

picoseconds, many more cheats are possible. This six-picosecond cheat saves

Because this cheat has the same start and end positions as the one above,

Cheats don't need to use all 20 picoseconds; cheats can last any amount of

time up to and including 20 picoseconds (but can still only end when the

program is on normal track). Any cheat time not used is lost; it can't be

You'll still need a list of the best cheats, but now there are even more to

choose between. Here are the quantities of cheats in this example that save

Find the best cheats using the updated cheating rules. How many cheats

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

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

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

it's the same cheat, even though the path taken during the cheat is

picosecond cheating rule was deprecated several milliseconds ago! The

Now, in addition to all the cheats that were possible in just two

cheats. How many cheats would save you at least 100 picoseconds?

and end position; cheats are uniquely identified by their start position

picoseconds) by cheating for the two moves marked 1 and 2:

programs all go the same speed, the races used to be pretty boring. To make

things more interesting, they introduced a new rule to the races: programs

program to pass through walls as if they were regular track. At the end of

the cheat, the program must be back on normal track again; otherwise, it

make Advent of

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