Here's a list of good [CS](https://everything2.com/title/CS)-like [interview](https://everything2.com/title/interview) questions that my friends and I have compiled over the years. Solutions provided in separate nodes.

1. There is a village of wizards and a village of dwarves. Once a year, the wizards go over to the village of dwarves and line all the dwarves up in increasing height order, such that each dwarf can only see the dwarves smaller than himself. The wizards have an [infinite](https://everything2.com/title/infinite) supply of [white](https://everything2.com/title/white) and [black](https://everything2.com/title/black) hats. They place either a white or black hat on the head of each [dwarf](https://everything2.com/title/dwarf). Then, starting with the tallest dwarf (in the back of the line), they ask each what color hat he is wearing. If the dwarf answers incorrectly, the wizards kill him (the other dwarves can hear his answer, but can't tell if he was killed or not). What [strategy](https://everything2.com/title/strategy) can the dwarves use to minimize the number of dwarves that are killed? What is the most number of dwarves that will be killed using this [optimal](https://everything2.com/title/optimal) strategy? ([**solution**](https://everything2.com/title/Wizards+and+Dwarves+solution))
2. Consider a two-player [game](https://everything2.com/title/game) played on a circular table of unspecified [diameter](https://everything2.com/title/diameter). Each player has an infinite supply of quarters, and take turns placing a quarter on the table such that it is completely on the table and does not [overlap](https://everything2.com/title/overlap) with any other quarters already played. A player wins if he makes the last [legal move](https://everything2.com/title/legal+move). Which player (if any) has a strategy that will guarantee a win, and what is that strategy? ([**solution**](https://everything2.com/title/Quarter+Game+solution))
3. How do you reverse the order of the words (not the characters) in a [string](https://everything2.com/title/string) of [length](https://everything2.com/title/length) n in with constant extra space in [linear time](https://everything2.com/title/linear+time)? ([**solution**](https://everything2.com/title/Reversing+the+words+solution))
4. How do you [rotate](https://everything2.com/title/rotate) a [string](https://everything2.com/title/string) of length n by m characters with constant extra space in linear time (wrt n)? ([**solution**](https://everything2.com/title/Rotating+a+String+solution))
5. Consider a rectangular cake with a rectangular section (of any size or orientation) removed from it. How do you divide the cake exactly in half with only one cut? ([**solution**](https://everything2.com/title/Dividing+a+Cake+in+Half+solution))
6. You have a bar of [chocolate](https://everything2.com/title/chocolate) that consists of n x m square blocks. If you can only break one piece at a time, how many breaks are necessary to break the original n x m piece into n\*m 1 x 1 pieces? How many are sufficient? ([**solution**](https://everything2.com/title/NxM+chocolate+bar+solution))
7. How do you quickly count the number of [set bit](https://everything2.com/title/set+bit)s in a [32-bit](https://everything2.com/title/32-bit) [integer](https://everything2.com/title/integer) in [linear time](https://everything2.com/title/linear+time) (with respect to the number of set bits)? In [constant time](https://everything2.com/title/constant+time)? ([**solution**](https://everything2.com/title/counting+1+bits))
8. Given an [array](https://everything2.com/title/array) of size N that contains values between 1 and N-1, find the duplicate element (assuming there is only one). If it contains values between 1 and N+1, how would you find the [missing](https://everything2.com/title/missing%2520) element (again assuming there is only one missing)? Do each in O(N). ([**solution**](https://everything2.com/title/Array+duplicates+solution))
9. Give a one-line [C](https://everything2.com/title/C) [expression](https://everything2.com/title/expression) to [test](https://everything2.com/title/test) whether an [unsigned int](https://everything2.com/title/unsigned+int) is a [power of two](https://everything2.com/title/power+of+two). ([**solution**](https://everything2.com/title/Power+of+Two+solution))
10. How many [point](https://everything2.com/title/point)s are there on the [globe](https://everything2.com/title/globe) where by walking one [mile](https://everything2.com/title/mile) [south](https://everything2.com/title/south), one mile [east](https://everything2.com/title/east) and one mile [north](https://everything2.com/title/north) you reach the place where you [start](https://everything2.com/title/start)ed? ([**solution**](https://everything2.com/title/Points+on+a+Globe+solution))
11. Given a [singly linked list](https://everything2.com/title/singly+linked+list), [determine](https://everything2.com/title/determine) whether it contains a [loop](https://everything2.com/title/loop) or not. ([**solution**](https://everything2.com/title/Determining+if+a+linked+list+loops+using+only+two+pointers))
12. Every day, Joe arrives at the [train station](https://everything2.com/title/train+station) from [work](https://everything2.com/title/work) at 6pm. His [wife](https://everything2.com/title/wife) leaves home in her car to meet him there at exactly 6pm, and drives him [home](https://everything2.com/title/home). One day, Joe gets to the [station](https://everything2.com/title/station) an [hour](https://everything2.com/title/hour) early, and starts walking home, until his wife meets him on the [road](https://everything2.com/title/road). They get home 20 [minute](https://everything2.com/title/minute)s earlier than usual. How long was he walking? Distances are [unspecified](https://everything2.com/title/unspecified). Speeds are unspecified, but [constant](https://everything2.com/title/constant). ([**solution**](https://everything2.com/title/Train+station+solution))
13. How do you [divide](https://everything2.com/title/divide) a [cake](https://everything2.com/title/cake) among n people, maximizing [fairness](https://everything2.com/title/fairness)? ([**solution**](https://everything2.com/title/Cutting+cake+without+favoritism))
14. In your [cellar](https://everything2.com/title/cellar) there are three [light switch](https://everything2.com/title/light+switch)es in the [OFF](https://everything2.com/title/OFF) [position](https://everything2.com/title/position). Each switch [control](https://everything2.com/title/control)s one of three [light bulb](https://everything2.com/title/light+bulb)s on [floor](https://everything2.com/title/floor%2520) above. You may move any of the switches but you may only go [upstairs](https://everything2.com/title/upstairs) to [inspect](https://everything2.com/title/inspect) the bulbs one time. How can you [determine](https://everything2.com/title/determine) the switch for each bulb with one inspection? ([**solution**](https://everything2.com/title/Three+Light+Bulbs+solution))
15. [Alice](https://everything2.com/title/Alice) and [Bob](https://everything2.com/title/Bob) are on separate [islands](https://everything2.com/title/islands). Bob is [sick](https://everything2.com/title/sick), and Alice has the [medicine](https://everything2.com/title/medicine). [Eve](https://everything2.com/title/Eve) has a [boat](https://everything2.com/title/boat) and a [chest](https://everything2.com/title/chest) that can be [locked](https://everything2.com/title/locked). She is willing to [transport](https://everything2.com/title/transport) [objects](https://everything2.com/title/objects) between Alice and Bob, but only in the chest, and if the chest is unlocked, she will [steal](https://everything2.com/title/steal) whatever is [inside](https://everything2.com/title/inside). If both Alice and Bob have a [padlock](https://everything2.com/title/padlock) and a [key](https://everything2.com/title/key) such that their own key only opens their own lock, how can Alice send Bob the medicine so that Eve won't steal it? ([**solution**](https://everything2.com/title/Commutative+lock+solution))
16. Write some [code](https://everything2.com/title/code) to [convert](https://everything2.com/title/convert) a [positive integer](https://everything2.com/title/positive+integer) into [base](https://everything2.com/title/base) [minus](https://everything2.com/title/minus) 2. That is, whereas [base 2](https://everything2.com/title/base+2) has a 1's place, a 2's place, a 4's place, etc., base minus 2 has a 1's place, a minus 2's place, a 4's place, a minus 8's place, ... (-2)^n. ([**solution**](https://everything2.com/title/Base+minus+2+solution))
17. A [couple](https://everything2.com/title/couple) invites n-1 other couples to [dinner](https://everything2.com/title/dinner). Once everyone arrives, each person shakes [hand](https://everything2.com/title/hand)s with everyone he doesn't know. Then, the [host](https://everything2.com/title/host) asks everyone how many hands they shook, and each person replies with a different number. Assuming that everyone knows his or her own [spouse](https://everything2.com/title/spouse), how many hands did the [hostess](https://everything2.com/title/hostess) shake? ([**solution**](https://everything2.com/title/answer%253A+handshakes))
18. Two [robots](https://everything2.com/title/robots) start at different places on the same [linear](https://everything2.com/title/linear) [track](https://everything2.com/title/track). What one program can you give to both robots to guarantee that they meet? The the program may consist only of the instructions move\_left n, move\_right n (where n is the number of spaces to move), if [statement](https://everything2.com/title/statement)s while [loop](https://everything2.com/title/loop)s, and the [boolean](https://everything2.com/title/boolean) values at\_own\_start and at\_other\_robots\_start (note that you can't use other variables or counters). ([**solution**](https://everything2.com/title/Two+robots+solution))
19. Which [offer](https://everything2.com/title/offer) is better and why?
    1. You are to make a [statement](https://everything2.com/title/statement). If the statement is [true](https://everything2.com/title/true), you get [exactly](https://everything2.com/title/exactly) $10. If the statement is [false](https://everything2.com/title/false), you get either [less than](https://everything2.com/title/less+than) or [more than](https://everything2.com/title/more+than) $10 but not exactly $10.
    2. You are to make a statement. [Regardless](https://everything2.com/title/Regardless) of whether the statement is true or false, you get more than $10.
20. ([**solution**](https://everything2.com/title/Two+offers+solution))
21. You have two [rope](https://everything2.com/title/rope)s and a box of [match](https://everything2.com/title/match)es. Each rope takes exactly one [hour](https://everything2.com/title/hour) to [burn](https://everything2.com/title/burn), but they may not necessarily burn [evenly](https://everything2.com/title/evenly) -- i.e., the first [half](https://everything2.com/title/half) might burn in the first 10 minutes and the second in the remaining 50). How can you measure out 45 minutes by just using these two ropes? ([**solution**](https://everything2.com/title/Two+ropes+solution))
22. [Consider](https://everything2.com/title/Consider) [three](https://everything2.com/title/three) [identical](https://everything2.com/title/identical) [airplane](https://everything2.com/title/airplane)s [start](https://everything2.com/title/start)ing at the same [airport](https://everything2.com/title/airport). Each [plane](https://everything2.com/title/plane) has a [fuel tank](https://everything2.com/title/fuel+tank) that holds just enough [fuel](https://everything2.com/title/fuel) to allow the plane to [travel](https://everything2.com/title/travel) half the distance around the [world](https://everything2.com/title/world). These airplanes possess the [special](https://everything2.com/title/special) [ability](https://everything2.com/title/ability) to [transfer](https://everything2.com/title/transfer) fuel between their tanks in mid-flight. Devise a [scheme](https://everything2.com/title/scheme) that will allow one airplane to travel all the way around the world, landing only at the [original](https://everything2.com/title/original) airport. ([**solution**](https://everything2.com/title/Three+airplanes+solution))
23. You are at the [bottom](https://everything2.com/title/bottom) of the [elevator shaft](https://everything2.com/title/elevator+shaft) of a 100 [story](https://everything2.com/title/story) [building](https://everything2.com/title/building). You see 21 [wire](https://everything2.com/title/wire)s labelled 1...21. The wires go up to the 100th [floor](https://everything2.com/title/floor) where the [end](https://everything2.com/title/end)s are labelled A...U, but you don't know how they [correspond](https://everything2.com/title/correspond) to the ends at the bottom. You have a [battery](https://everything2.com/title/battery), a [light bulb](https://everything2.com/title/light+bulb), and many small wires. How can you [determine](https://everything2.com/title/determine) the [pairing](https://everything2.com/title/pairing) between the [number](https://everything2.com/title/number)s and [letter](https://everything2.com/title/letter)s by only making one [trip](https://everything2.com/title/trip) to the 100th floor and back [down](https://everything2.com/title/down)? ([**solution**](https://everything2.com/title/Elevator+and+wires+solution)).
24. A [woman](https://everything2.com/title/woman) starts paddling [upstream](https://everything2.com/title/upstream) in a [canoe](https://everything2.com/title/canoe), and after one [mile](https://everything2.com/title/mile), encounters a [log](https://everything2.com/title/log) [float](https://everything2.com/title/float)ing with the [current](https://everything2.com/title/current). She continues to [paddle](https://everything2.com/title/paddle) upstream for one[hour](https://everything2.com/title/hour), then turns around and paddles [downstream](https://everything2.com/title/downstream), until she [return](https://everything2.com/title/return)s to the [dock](https://everything2.com/title/dock) where she [start](https://everything2.com/title/start)ed. If the woman and the log reach the dock at exactly the same time, how fast was the current [flow](https://everything2.com/title/flow)ing? Assume all [speed](https://everything2.com/title/speed)s are [constant](https://everything2.com/title/constant). ([**solution**](https://everything2.com/title/Canoe+solution))
25. Consider a [centrifuge](https://everything2.com/title/centrifuge) with 12 [slots](https://everything2.com/title/slots) for [test tube](https://everything2.com/title/test+tube)s. When you use a centrifuge, the tubes must be placed in the slots so that they are [radial](https://everything2.com/title/radial)ly [balanced](https://everything2.com/title/balanced) (we can [assume](https://everything2.com/title/assume) all tubes have the same [mass](https://everything2.com/title/mass)). For [example](https://everything2.com/title/example), for 3 tubes, you would place them in slots 4, 8 and 12. How can you [place](https://everything2.com/title/place) [exactly](https://everything2.com/title/exactly) 5 tubes in the centrifuge so that they are radially balanced? ([**solution**](https://everything2.com/title/Centrifuge+solution))
26. You are on a [strict](https://everything2.com/title/strict) [medical](https://everything2.com/title/medical) [regimen](https://everything2.com/title/regimen) that [require](https://everything2.com/title/require)s you to take [two](https://everything2.com/title/two) [type](https://everything2.com/title/type)s of [pill](https://everything2.com/title/pill)s each [day](https://everything2.com/title/day). You must take [exactly](https://everything2.com/title/exactly) one A pill and exactly one B pill at the same time. The pills are very [expensive](https://everything2.com/title/expensive), and you don't want to [waste](https://everything2.com/title/waste) any. So you [open](https://everything2.com/title/open) the [bottle](https://everything2.com/title/bottle) of A pills, and [tap](https://everything2.com/title/tap) one out into your [hand](https://everything2.com/title/hand). Then you open the bottle of B pills and do the same [thing](https://everything2.com/title/thing) -- but you make a [mistake](https://everything2.com/title/mistake), and two B pills come out into your hand with the A pill. But the pills are all exactly [identical](https://everything2.com/title/identical). There is no way to tell A pills [apart](https://everything2.com/title/apart) from B pills. How can you [satisfy](https://everything2.com/title/satisfy) your regimen and take exactly [one](https://everything2.com/title/one) of each pill at the same time, without wasting any pills? ([**solution**](https://everything2.com/title/Pills+solution))
27. [Write](https://everything2.com/title/Write) an [algorithm](https://everything2.com/title/algorithm) to find a given [element](https://everything2.com/title/element) in an n by n [matrix](https://everything2.com/title/matrix) where the [row](https://everything2.com/title/row)s and [column](https://everything2.com/title/column)s are [monotonically increasing](https://everything2.com/title/monotonically+increasing). ([**solution**](https://everything2.com/title/Monotonic+matrix+solution))
28. [General](https://everything2.com/title/General) [Alice](https://everything2.com/title/Alice) and General [Bob](https://everything2.com/title/Bob), [commander](https://everything2.com/title/commander)s of the [allied](https://everything2.com/title/allied) armies A and B, [respectively](https://everything2.com/title/respectively), are [camp](https://everything2.com/title/camp)ed in the [mountain](https://everything2.com/title/mountain)s on either [side](https://everything2.com/title/side) of a [valley](https://everything2.com/title/valley). Alice and Bob would like to [attack](https://everything2.com/title/attack) [enemy](https://everything2.com/title/enemy) [army](https://everything2.com/title/army) C, camped in the valley [below](https://everything2.com/title/below). Army A by [itself](https://everything2.com/title/itself) is unable to [defeat](https://everything2.com/title/defeat) army C, as is army B, but a [coordinated](https://everything2.com/title/coordinated) attack by A and B at the same [time](https://everything2.com/title/time) will [secure](https://everything2.com/title/secure) a [victory](https://everything2.com/title/victory) for Alice and Bob. However, the only way Alice and Bob can [communicate](https://everything2.com/title/communicate) is by [send](https://everything2.com/title/send)ing [messenger](https://everything2.com/title/messenger)s through the valley, who may or may not get [capture](https://everything2.com/title/capture)d [en route](https://everything2.com/title/en+route) by the enemy army C. Is there an [algorithm](https://everything2.com/title/algorithm) by which Alice and Bob can coordinate an attack on army C so as to secure their victory? ([**solution**](https://everything2.com/title/Two+armies+solution))
29. Consider a circular [race track](https://everything2.com/title/race+track) with n [gas station](https://everything2.com/title/gas+station)s spaced along it, each containing a fixed amount of [gas](https://everything2.com/title/gas). You are given an array containing the distances between [consecutive](https://everything2.com/title/consecutive) gas stations and an array containing the amount of gas at each. Suppose the total amount of gas at all the gas stations is the same as the number of [mile](https://everything2.com/title/mile)s around the race track. Your car gets [one mile to the gallon](https://everything2.com/title/one+mile+to+the+gallon), but its gas [tank](https://everything2.com/title/tank) has an [unlimited](https://everything2.com/title/unlimited) [capacity](https://everything2.com/title/capacity). Where do you start your car along the race track to guarantee that you get all the way around without [running out of gas](https://everything2.com/title/running+out+of+gas)? Do this in O(n) time. ([**solution**](https://everything2.com/title/Circular+race+track+solution))
30. Given an array of n integers, find all [Pythagorean triple](https://everything2.com/title/Pythagorean+triple)s in the array, that is, three elements such that a2 + b2 = c2. Do this in O(n2) time. ([**solution**](https://everything2.com/title/Pythagorean+triples+solution))
31. You are on a [spaceship](https://everything2.com/title/spaceship) that has a [computer](https://everything2.com/title/computer) with n [processor](https://everything2.com/title/processor)s. Suddenly, the spaceship gets hit with an [alien](https://everything2.com/title/alien) [laser](https://everything2.com/title/laser) [beam](https://everything2.com/title/beam), and some of the processors are [damage](https://everything2.com/title/damage)d. However, you know that *more than half* of the processors are still [good](https://everything2.com/title/good). You can ask one processor whether it thinks another processor is good or bad. A good processor will always tell the [truth](https://everything2.com/title/truth), but a [bad](https://everything2.com/title/bad) one will always [lie](https://everything2.com/title/lie). A '[step](https://everything2.com/title/step)' consists of asking one processor if it thinks another processor is good or bad. Find one good processor, only using n-2 steps. ([**solution**](https://everything2.com/title/Good+and+bad+processors+solution))
32. Given an [array](https://everything2.com/title/array) of n [integers](https://everything2.com/title/integers), where one element [appear](https://everything2.com/title/appear)s more than n/2 times, find that element in [linear time](https://everything2.com/title/linear+time) and [constant extra space](https://everything2.com/title/constant+space). ([**solution**](https://everything2.com/title/Array+mode+solution))
33. A spinning disc is painted black on one half and white on the other (*i.e.*, the line forming the border between the black and white regions of the disc is a diameter of the disc). The disk is spinning on a [turntable](https://everything2.com/title/turntable) in an unknown direction at an unknown speed. You have special [video camera](https://everything2.com/title/video+camera)s that can observe the color of a single point on the disc. How many cameras do you need to determine the direction the disc is spinning? ([**solution**](https://everything2.com/title/Spinning+disc+solution))
34. Create an [equilateral triangle](https://everything2.com/title/equilateral+triangle) using three toothpicks. Now add three more equilateral triangles of the same size as the original using only three more toothpicks. ([**solution**](https://everything2.com/title/Six+toothpicks+solution))

Feel free to /msg me with other cool interview questions or [brainteasers](https://everything2.com/title/brainteaser) you've heard... and don't bother sending the solutions, I like a good challenge.