

C08: Faster Lock Combinations


Saturday, December 23, 2023 4:54 PM

Difficulty: Level 2
Over on Steampunk Island, Bow Ninecandle is having trouble opening a padlock. Do some research and see if you can help open it!

CONVERSATION w/ Elf Bow Ninecandle	<p>Bow Ninecandle (Brass Bouy Port)</p> <p>Hey there! I'm Bow Ninecandle, and I've got a bit of a... 'pressing' situation.</p> <p>You see, I need to get into the lavatory, but here's the twist: it's secured with a combination padlock. Talk about bad timing, right? I could really use your help to figure this out before things get... well, urgent. I'm sure there are some clever tricks and tips floating around the web that can help us crack this code without too much of a flush... I mean fuss.</p> <p>Remember, we're aiming for quick and easy solutions here - nothing too complex. Once we've gathered a few possible combinations, let's team up and try them out. I'm crossing my legs - I mean fingers - hoping we can unlock this door soon.</p> <p>After all, everyone knows that the key to holiday happiness is an accessible lavatory! Let's dive into this challenge and hopefully, we won't have to 'hold it' for too long! Ready to help me out?</p> <p>** ----- Response after completing challenge ----- **</p> <p>Oh, thank heavens! You're a lifesaver! With your knack for cracking codes, we've just turned a potential 'loo catastrophe' in to a holiday triumph!</p> <p>From https://2023.holidayhackchallenge.com/badge?section=conversation&id=bowninecandle</p>
HINTS	

MY WORK AND ANSWER
I have participated in lockpicking before so I enjoyed this (and the other lockpicking) challenge. While it was more difficult to do in software, it was doable using the hints from the elf and those provided by the other players.

I reviewed the video and a paper another player had shared which outlined the steps. In my initial review of the video, I jotted down the steps on paper leaving room to record the results from my challenge. I watched the video again to ensure I didn't miss any instructions and corrected my notes where needed.

... Ready to crack this lock with the steps in front of me:	
<p>Step 1: Find the sticky bit</p> <ul style="list-style-type: none">- Turn clockwise until you feel tension on the shackle.- Rotate to make sure it continues to stick in the same area/at the same number. <p><i>This number is your sticky bit, sb</i></p>	Sticky bit = 31
<p>Step 2: Find the two guess numbers: g1, g2</p> <ul style="list-style-type: none">- With tension, turn the dial counterclockwise to find 2 #s	g1 = 6, g2 = 10

<p>between half #s. If it's between whole numbers, that's NOT it</p> <p>NOTE: The Guess #s will be between 0-11.</p> <p>Step 3: Do the math! love math! I'd already wrote this out as a algebraic expression when I did my notes from the video --></p> <p>A. Find the 1st digit, X where $X = \text{sticky \#} + 5$ (or $X = sb + 5$)</p> <p>B. Find the 3rd digit, Z where is a set of 10 possibilities, calculated: $X/4 = a$, with remainder b</p> <p>Using g1 and g2, add 10 to each 3 times. So you will have 10 possibilities: g1, g1+10, g1+20, g1+30 g2, g2+10, g2+20, g2+30</p> <p>This set of 10 numbers are possible numbers as the 3rd digit in the combination, or Z.</p> <p>NOTE: You can reduce the set in two ways: 1. Divide each g1 and g2 by 4 and calculate the remainder, b. Eliminate those g1s and g2s whose remainder doesn't equal the remainder b 2. Manually manipulate the lock to see which of the two numbers are looser. The looser one is likely the 3rd digit in the combination. The others are still possible.</p> <p>C. Find the 2nd digit, Y where it is a set of 10 possibilities, calculated: 2 possibilities determined by e and f, where $b+2 = e$ and $b+2+4 = f$</p> <p>Add 8 to each e and f 4 times. So you will have 10 possibilities: e, e+8, e+16, e+24, e+32 f, f+8, f+16, f+24, f+32</p> <p>The 3rd digit, Z has to be greater than 2 digits away so you can eliminate those that are less than 2 digits away - e.g., greater than any (e or f)+2</p> <p>Step 4: Test it out</p>	<p>Yes, math! Combination: X - Y - Z, where $X = sb + 5$ $Y = \{e, e+8, e+16, e+24, e+32, f, f+8, f+16, f+24, f+32\}$ $Z = \{g1, g1+10, g1+20, g1+30, g2, g2+10, g2+20, g2+30\}$</p> <p>A. Find the 1st digit, X $X = 31 + 5$ X = 36</p> <p>B. Find the 3rd digit, Z $X/4 = a$, with remainder b $36/4 = 9$ with remainder, 0</p> <p>A = 9, b = 0</p> <p>g1, g1+10, g1+20, g1+30 --> { 6, 16, 26, 36 } g2, g2+10, g2+20, g2+30 --> { 5, 15, 20, 25 }</p> <p>Dividing each by 4 leaves {16, 20 and 36} as possible numbers in combination, in position Z</p> <p>Checking for the looser one among the three numbers, 16, 20 and 36, 16 was clearly the looser. So, Z = 16</p> <p>C. Find the 2nd digit, Y $b+2 = e$, $b+2+4 = f$ $0+2 = 2$; $0+2+4 = 6$ $e=2$, $f=6$</p> <p>e, e+8, e+16, e+24, e+32 --> { 2, 10, 18, 32, 40 } f, f+8, f+16, f+24, f+32 --> { 6, 14, 22, 30, 38 }</p> <p>If Z = 16, then Y = {2, 6, 10, 22, 30, 32, 38, 40}</p> <p>And just in case, I'm wrong about Z = 16, here are alternate options: If Z = 20, then Y = {2, 6, 10, 32, 40, 6, 14, 30, 38} If Z = 36, then Y = {2, 10, 18, 32, 40, 6, 14, 22, 30}</p> <p>Educated guess: Y = 2</p> <p>Tried combination, 36-2-16 and it worked!</p>
---	--

Comments of Interest from other Players

f00, I used a completely different approach to get the combination. If you are really stuck, why not relax and have a snowbal I fight with Santa? Something will come to you. That wasn't very satisfying but the lock opens easily once you have the combination.

Operations

pull up the shackle with the mouse and use arrow keys to turn the lock

Right key to the first digit

Whole left rotate once and then the second digit with left key

Again right key directly to the third

When done, you need to pull up on the shackle. The lock will not open automatically when you finish the combination.

Hi, I did the calculations and found out the numbers and I'm sure the combination is correct. I noticed that for every other combination I tried, the

status changed to "reset" when turning the lock for the third number, except for 1 combination (was still green and not reset),, so I know it's correct. When I pull the lock up to open it doesn't work, I'm not sure why! Could I get help please?

I find the three digits, as soon as I enter the second "the reset status" turns red.

- Keep going. That just means the lock face has been turned and you will need to reset it if you want to start from the beginning.

Has anyone taken note of what color the tension status needs to be to get the 2 guessing numbers?

I'm having trouble with the tension - I can see color changes in the tension status but I'm not able to get the right amount of tension. With a bit of tension I get slowness when passing one number, but if I try to apply additional tension to find the two "guess" numbers I just get stuck at every number.

There is an indicator on the bottom right, showing the tension applied.

You need to control the tension.

I think the reset indicator remains green as long as the combination and operation is correct. But I am not entirely sure about it.

I had a hard time controlling the lock tension--getting it to be brown for light tension and red for heavy tension. Frustrating. The third number, which of the two choices is 'looser' was hard for me in chrome.

Guess numbers are between 0 and 11. And also they get stuck half way between numbers. So if you can only move between 5 and 6, it's not a guess number. If you can move between 5.5 and 6.6 then 5 is a guess number.

Video Hints

the youtube video provided in the "hints" isn't very good. This is a much better and longer video on explaining the 'how' and 'why' the algorithm works. <https://www.youtube.com/watch?v=gkolWO6pAL8>

- It seems like it is possible for the second number to be within 2 of the 3rd number. So if the 3rd number is 38, the second number can be 0 (as was the case in my game) According to the video this should not be possible. Maybe you are missing an edge case because my scenario does happen over the modulo (38->0)

- As someone noted above, it appears that contrary to what the guy in the YouTube vid said, the 2nd and 3rd digit *can* be two digits apart. It took me way too long to realize this (I would essentially cross out a viable second digit without even trying it because it would violate the rule of '2nd and 3rd digit must be > than 2 apart').

So all this to say that yeah, 2nd and 3rd digit *can* be 2 numbers apart in this challenge. Hope this helps!

fun challenge. I remember doing this irl when I forgotten my locker combination in high school, the website <https://samy.pl/master/master.html> really helps. Though challenge could also be completed via one function call

- That website allows you to choose what your third digit is. When I clicked my third digit it would remove some numbers from the list of possible second digits including a number that in the end turned out to be the correct one (e.g. in my case the third digit was 39 and when I clicked it, 37 would disappear from the list of possible second digits but my second digit was exactly that... 37).

- OMFGGG I GOT IT!!!! Basically followed this: <https://samy.pl/master/master.html>; it should help with the calculations. Also, the last video is good to understand the formula,

even watched this but now I'm confused more

<https://www.youtube.com/watch?v=NRRqallNCAQ&list=PL3TUEZ1v7oB2TFVPpsK54KsArH2QrXhez>

Hacking Code

not really because it's specific to the instance in your iframe, the combo is generated randomly when the iframe opens
The combination changes every time you open the terminal

Ended up fiddling around the stage var ... could not make it the "formal way"

Solved without explicitly changing the stage var but still using the console in case anyone wants to chat

There's a super easy way to do this just by looking at the code.

If you're tired of this because it doesn't work, check the variable named `||stage||` and how it needs to be a certain number for the lock to open. If you're trying everything but not getting it, you're not following the steps to make the code change the value of `||stage||` to that specific number. I know it's silly, but hey.

From <<https://docs.google.com/document/d/1QhKZLDr22G0RpuTSGm0M6pz4dG82lByesim3elwfw98/edit>>