Computational Questions

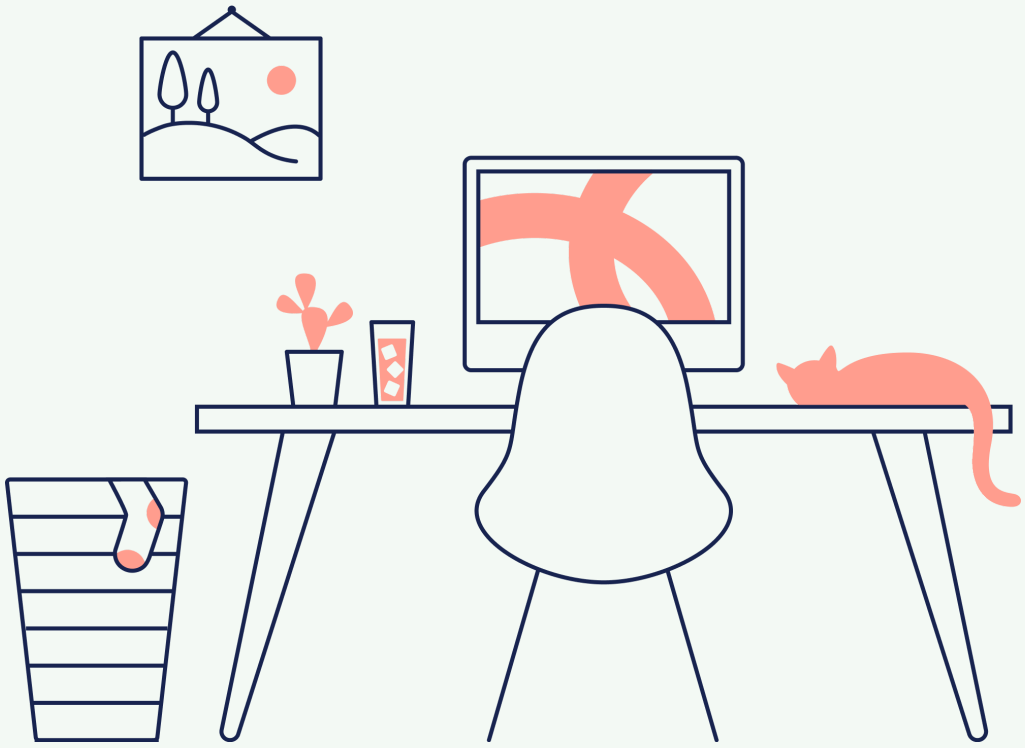
Show off your problem solving skills!

The computational questions are your opportunity to demonstrate your problem-solving skills. We use the computational questions as a sign of your readiness to learn computer science.

The computational questions are not meant to be a test of your knowledge. We encourage you to do research if you're unsure about how to answer a question at first. Answer all computational questions to the best of your ability.

We highly recommend working on the solutions to the computational questions in a separate document (Google Doc, Word Document, paper, etc.). Once you have your answers, submit them using the **Dev Degree - Computational Questions form**.

Good luck!



Problem 1

You're shopping online for a new snowboard. There is one store that catches your attention by giving away a 50% discount code. The only catch is it's locked behind a keyword cipher. In order to claim the discount code, you must crack the encryption.

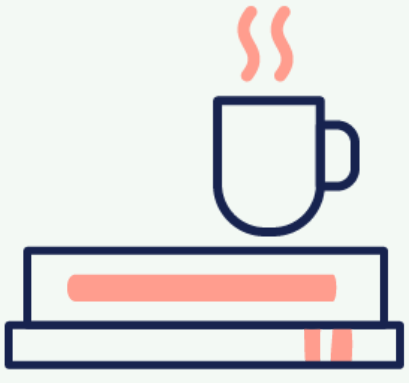
You will require the use of a "secret key". Two secret keys can be found in the source code of devdegree.ca; but you have insider information that one of the keys is a fake.

CIPHER INFORMATION

ENCRYPTED MESSAGE: VIAGUIGTLBILOCSDQN

KEY: Two **secret keys** can be found in the source code of devdegree.ca; but one of them is fake!

Decode the message encrypted with a Keyword cipher left on the scrap piece of paper. Select the correct decoded message in the Dev Degree Computational Questions Google Form!



Problem 2 🟨

You and your friends are in an escape room, trying to win the game by escaping. To get through the final door, you need to input a set of passwords that's been encrypted using the Playfair Cipher. What are the passwords? The clues you have gathered to help decipher this is as follows:

Password 1

Encrypted Text: FLYGNZLETLE

P	O	I	N	T
F	S	A	L	E
B	C	D	G	H
K	M	Q	R	U
V	W	X	Y	Z

Password 2

Encrypted Text: AVCRCUNDNIFRCRP

M	E	R	C	H
A	N	D	I	S
B	F	G	K	L
O	P	Q	T	U
V	W	X	Y	Z

Password 3

Encrypted Text: QCCINZBCNAISKEKMIEFXKLZ

L	O	C	A	M
E	R	H	N	T
S	B	D	F	G
I	K	P	Q	U
V	W	X	Y	Z

Decode the message encrypted with a Playfair cipher left on the scrap piece of paper. Select the correct decoded messages in the Dev Degree Computational Questions Google Form!

Problem 3 🟨

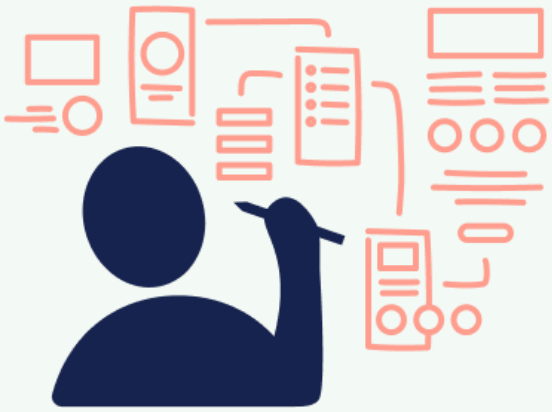
Aaliyah's store has been doing really well with online sales, so they had an idea to have a series of special order sales, to try and clear out their inventory. They've decided to give a 35% discount on a particular t-shirt that was marked-up in price 20% from an original retail price of $36. Added to that item, there is a 7.75% order fee. There's another specific t-shirt, that is being given a 40% discount from a marked-up price of 5% from an original retail price of $30, also with an order fee of 7.75%. If you order both shirts as a special order bundle, you will only have to pay one order fee—on the more expensive t-shirt—and you get an additional 8% off the total!

What would the price of this special order bundle be? Select the correct answer in the Dev Degree Computational Questions Google Form!

Problem 4 🟨

Orders have been coming in like crazy since the special order bundle sale started! Aaliyah has asked Missy to help them out with packing and shipping everything. Together, they were able to get the first round of orders done in 3 hours and 15 minutes. Aaliyah however, works a lot faster than Missy does; Aaliyah is 2 and a half times as fast as Missy. For the second day of fulfilling and shipping orders, Aaliyah is unavailable; Missy will have to do the same amount of work by themselves, on the second day.

How long in <u>hours : minutes</u> will it take Missy to complete the same amount of work, on their own? Select the correct answer in the Dev Degree Computational Questions Google Form!



Problem 5

What is the missing letter in this sequence?

g w m t __ q y

Select the correct answer in the Dev Degree Computational Questions Google Form!

Problem 6

Alex wants to come up with a system to encode program languages. They decide to set C=10. From this, RUBY = 94 and RAILS = 94. What does JAVASCRIPT equal?

Select the correct answer in the Dev Degree Computational Questions Google Form!

Problem 7

Chuck has had a busy summer moving merchant products around a Shopify warehouse for delivery fulfillment. They worked so hard in fact that parts of Chuck are now malfunctioning and need replacing. Until fixed, whenever Chuck attempts to rotate in a given direction an additional rotation occurs: 90° clockwise times the total number of attempted rotations. Chuck makes their way to the engineering department by navigating a complex passage corridor within the warehouse. Chunk enters the east facing door and begins their journey to get fixed.

Chuck moves forward 10ft and attempts to turn 360° to the left. Chuck moves another 10ft forward and attempts to turn 90° to the right. Chuck realizes they are facing the wrong direction and attempts to turn 180° to the left. Chuck continues forward for 25ft and approaches another set of doors. Through these doors the hallway splits left and right. Chuck attempts to turn 90° to the right and moves forward 15ft. Starting to hear the telltale sounds of the engineering department, Chuck grows more comfortable knowing his problems will soon be fixed. Chuck attempts to turn 90° to the left, moves forward 8ft, and attempts to turn 90° to the right. Chuck is now standing outside the Engineering Department, but what direction are they facing?

What direction is Chuck facing? Select the correct answer in the Dev Degree Computational Questions Google Form!

Problem 8

After spending the day packing merchandise into boxes for a makers convention, Jaime is ready to pack up their rental van and make the drive to the next town over. Jaime wants the unloading of the van to go as smoothly as possible so they can maximize their time selling items at the convention. To achieve this they plan to put items in their van arranged from largest to smallest back to front, in cases where items are the same size, Jaime plans to order them via weight, with heavier objects placed before lighter ones.

The boxed merchandise that Jaime plans to bring with them is as follows:

- An 96 x 30 inch plastic table weighing 4.5 kilograms
- An 16 x 12 x 12 inch box with 9 Dresses weighing 0.5 kilograms each
- An 18 x 16 x 18 inch box with 35 pairs of Socks weighing 60 grams each sock
- An 18 x 16 x 18 inch box with 18 T-Shirts weighing 85 grams each
- A 30 x 96 inch metal table weighing 8.2 kilograms
- An 16 x 12 x 12 inch box with 14 Hats weighing 150 grams each
- An 18 x 18 x 24 inch box with 6 Jackets weighing 2 kilograms each
- An 16 x 12 x 12 inch box with 12 Scarfs weighing 0.3 kilograms each

In what order should Jaime pack their merchandise starting from the back of the van to the front? Select the correct answer in the Dev Degree Computational Questions Google Form!