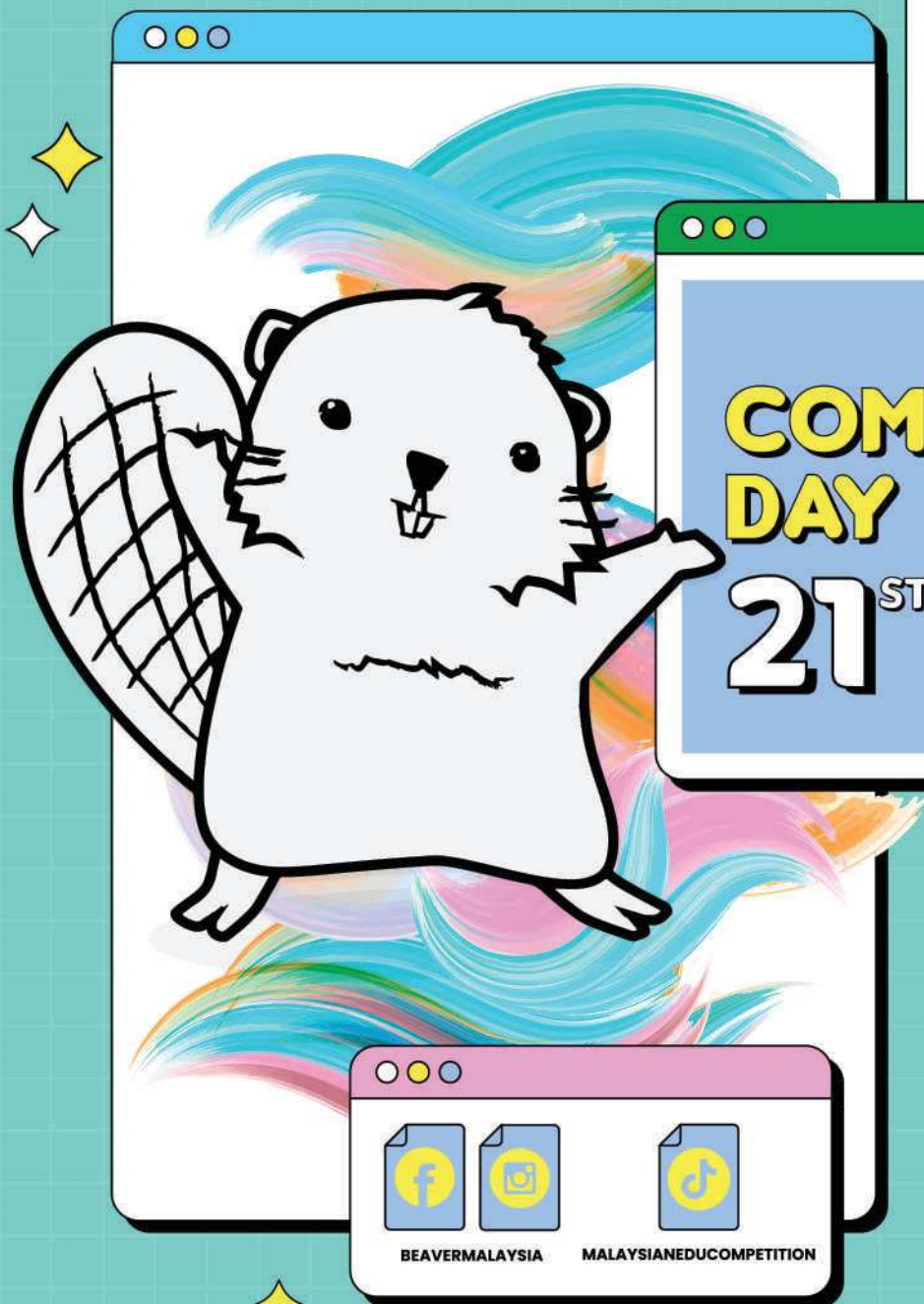




# BEAVER COMPUTATIONAL THINKING Competition 2023







## INTRODUCTION

The Beaver Computational Thinking Competition is an online-based competition that is part of the international Bebras effort. The Bebras competition was organized in Lithuania, and the word “Bebras” means beaver in Lithuanian. Bebras aims to promote interest in Information Technology, Informatics and Computational Thinking among students. As of 2022, nearly 2.8 million participants from more than 60 countries have participated in Beaver worldwide, with 5,000 of them registered from Malaysia. For more information on the Bebras initiative, visit [www.bebbras.org](http://www.bebbras.org).

## WHAT IS COMPUTATIONAL THINKING (CT)

Computational thinking is a thought process that allows one to break down problems and formulate solutions like how computers “think”. It involves a problem-solving process that includes (but not limited to) the following characteristics:

- ▶ Formulating problems in a way that enables us to use a computer and other tools to help solve them
- ▶ Logically organizing & analyzing data
- ▶ Representing data through abstraction such as simulations
- ▶ Automation solutions through algorithmic thinking (a series of ordered steps)
- ▶ Identifying, analyzing and implementing possible solutions to achieve the most effective combination of steps and resources
- ▶ Generalizing and transferring the problem-solving process to a wide variety of problems

## OBJECTIVES

- ▶ Cultivates students’ creativity, information culture, algorithmic and computational thinking
- ▶ Facilitates a deeper understanding of information technology
- ▶ Illustrates to students the advantages of information technologies that are helpful in learning various subjects
- ▶ Solves problems through computational thinking using computer-based solutions
- ▶ Prepares the students with a good foundation in preparing for future digital economy jobs



## WHO SHOULD JOIN THIS COMPETITION?

- ▶ With just the ability to think logically as well as patience, students are more than equipped to join this competition
- ▶ No prior background in computer science is needed
- ▶ If you are 7 years old to 18 years old, you are automatically eligible to participate in the following categories:



## LANGUAGE

In the online contest system, two language versions are available for participants to choose from; **English** and **Bahasa Melayu**. However, each participant can only access one language version at a time, and cannot change versions.

## CATEGORIES

Pre-Ecolier : Year 1 & 2

Ecolier : Year 3 & 4

Benjamin : Year 5 & 6

Cadet : Form 1 & 2

Junior : Form 3 & 4

Student : Form 5 & 6 /  
Pre-University

Students should be registered into the mentioned categories according to their academic year in 2023/2024 session

## COMPETITION FORMAT

- ▶ The competition will be held online and will be administered at each participating schools under the invigilation of the respective school teachers. Each registered participants will be given a username and password
- ▶ There are 15 questions with 3 level of difficulties that are to be answered in 45 minutes
- ▶ It is strongly advisable for all participants to sit down for the competition at once. However, the teacher-in-charge may arrange for participants to answer the question in batches should there be any hindrance
- ▶ The questions are multiple choice and interactive: presenting a puzzle-like problem involving basic concepts in mathematics, computer science and problem solving that does not require any programming. Students can test their logical reasoning too!
- ▶ A laptop or personal computer is needed to answer the question
- ▶ The scoring rules are as follows:

Level	Correct	Incorrect	Unanswered
A (Easy)	+6	-2	0
B (Medium)	+9	-3	0
C (Difficult)	+12	-4	0

A user manual and tutorial of the competition system will be provided before the competition for reference



## TECHNICAL REQUIREMENT

- ▶ All participants need a stable internet connection to take part in the competition
- ▶ Participants are recommended to use any browser **except** INTERNET EXPLORER
- ▶ If a participant is disconnected during the competition, it is possible to resume after the internet connection is restored, but the lost time will be counted towards the 45 minutes time limit. Therefore, it helps to ensure that the internet connection is stable before starting the competition

## COMPETITION PROCEDURE

Registration for the competition is done by the Teacher-In-Charge at [www.contesthub.my/register](http://www.contesthub.my/register)



Fill in the school, teacher and student details and make the payment



The competition manual, username and password for participants will be provided in the Contesthub a few days before the competition day



During the competition period, schools conduct the competition at their own venues, invigilated by the Teacher-In-Charge



Schools enforce the standard examination or competition regulations



3 months after the competition, the results will be announced



The e-certificate will be provided in the Contesthub



Hard copies of the certificates and medals for winners are couriered to the schools

## HOW TO REGISTER?

- ▶ Registration can only be done by the school's Teacher-In-Charge
- ▶ Each school or education centre may have more than one invigilator, but should only be ONE Teacher-In-Charge to handle the registration
- ▶ Registration must be made online. The information needed for the registration are the students' full name, IC number, age, category, race, gender and school name

## AWARDS AND CERTIFICATES

Every participant will receive a certificate signed by the Founder & Chairperson of the Bebras Board, Prof. Valentina Dagiene, and the President of The Malaysian Computational Thinking Association, Mr. Khairul Anwar Mohd Zaki.

The allocation of percentage for participants from each category is as follows:



**TOP 10%.**

Gold, Silver & Bronze Award



**NEXT 40%.**

Honorable Mention



**NEXT 50%.**

Certificate of Participation

## SAMPLE QUESTIONS

### Primary (Pre-Ecolier, Ecolier & Benjamin) Sudoku

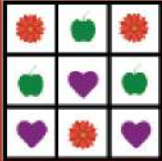
1. Benjamin is asked to fill a box with different shapes. The box has 9 sections.

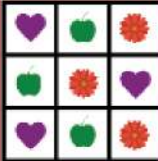
#### Rules:

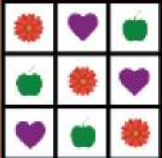
There may be only one of the same shape in each row and each column.

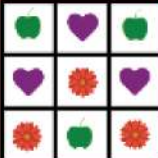
#### Question:

Which of the following boxes is filled correctly?

A) 

B) 

C) 

D) 

The answer is **C**

#### Explanation:

A is wrong because there is at least 1 row with two of the same shapes. B is wrong because there is at least 1 column with two of the same shapes. D is wrong because there is at least 1 row with two of the same shapes.

#### Real-world examples:

Elimination can help you in solving challenges in life. For example, when taking a test and answering a question with multiple choice responses, you can delete erroneous answers to reduce the number of options.

## SAMPLE QUESTIONS

### Primary (Pre-Ecolier, Ecolier & Benjamin) Broken window

2. Six children were playing in the yard.



One of them threw a ball and broke Mr. Beaver's window. Mr. Beaver only saw the back of the child running away. The child had a red shirt and short dark hair.

Who broke the window?

- A) Jane   B) Eve   C) John  
D) Anne   E) Dan   F) Tom

The answer is **C**

#### Explanation:

Only three of the children wear a red shirt:

Jane, John and Dan. But Jane has long blonde hair and Dan painted his hair violet. So it had to be John.

#### Real-world examples:

Classification is an important tool in today's world, where big data is used to make all kinds of decisions in government, economics, medicine, and more. Researchers have access to huge amounts of data, and classification is one tool that helps them to make sense of the data and find patterns.

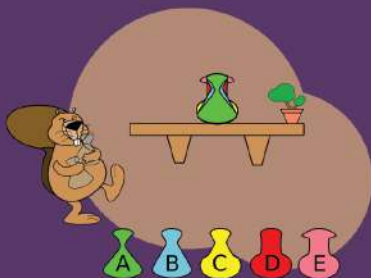


## SAMPLE QUESTIONS

### Primary (Pre-Ecolier, Ecolier & Benjamin) Bottles

3. A Beaver puts five bottles on a table. He places them so that every bottle is slightly visible.

He places the first bottle at the back of the table and puts each new bottle in front of those already placed.



#### Question:

In what order are the bottles placed when they appear as shown in the picture?

- A) EDCBA    B) DBCAE  
C) ECDAB    D) DCEBA

The answer is **A**

#### Explanation:

You can try to solve this in different ways. If you figured out the green bottle will disappear if placed behind one of the other bottles, you already know that the green bottle has to be in front. You can also check which bottle is large at the top or middle, since in those places the bottles differ the most. Small bottles need to be in front.

#### Real-world examples:

This is basically a sorting problem. We apply sorting in our day to day life either knowingly or unknowingly. For example, English dictionaries in which names or words are arranged in alphabetical order.

## SAMPLE QUESTIONS

### Secondary (Cadet, Junior, Benjamin) Email scam

4. Edgar is looking for a new home to live in. He searched the internet and found a perfect apartment for a very good price. He has sent an e-mail to Francis, who is selling the apartment, and received a quick reply:

Hi,  
Thank you for your interest in my flat. Although I am not in town, I can send you the key to the flat so you can inspect it, but I need a security deposit of \$5.000,- beforehand. To show my trustworthiness, I attach a copy of my ID. Cheers, Francis

Edgar is unsure what to do and is asking for your help.

#### Question:

What would be your best advice?

- A) Pay the deposit. With the ID you can always go to the police if you don't get the deposit back.  
B) That is perfect. If you like the flat, you can keep the key right away.  
C) Don't pay the deposit, there is a high chance that this is a mail fraud.  
D) Pay the deposit, go and have a look and decide later on.

The answer is **C**

#### Explanation:

Response C would be the best advice. The copy of the ID might be fake, because it is not the actual physical ID, but only an image of the ID. You will not be able to meet the person to verify the ID. Statements 1 and 2 are not good as there is a high chance of not even receiving the key. Statement 4 is not good since the authenticity of the ID can't be proven.

#### Real-world examples:

Phishing emails & phishing scams are dangerous. Phishing emails are hard to spot, look real, and can have devastating consequences. For example, someone who came up to you with an offer that is too good to be true. So you have to be alert at all times.



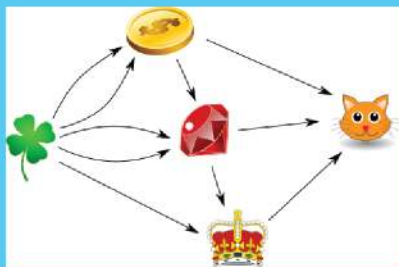
## SAMPLE QUESTIONS

Secondary (Cadet, Junior, Benjamin)

### Beaver the Alchemist

5. Beaver the Alchemist can convert objects into new objects. He can convert:

- Two leaves into a coin
- A coin and two leaves into a ruby
- A ruby and a leaf into a crown
- A coin, a ruby, and a crown into a kitten.



#### Question:

How many leaves does Beaver the Alchemist need to create one kitten?

5

10

11

12

The answer is 11

#### Explanation:

The correct answer is 11. We can see the conversion as follows:

coin = 2 leaves

ruby = 2 leaves + 1 coin = 4 leaves

crown = 1 ruby + 1 leaves = 4 leaves + 1 leaves = 5 leaves

kitten = 1 coin + 1 ruby + 1 crown = 2 leaves + 4 leaves + 5 leaves = 11 leaves

#### Real-world examples:

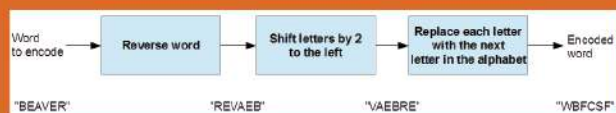
This task demonstrates how graphs can be used to represent dependencies between items. Using a graph to represent information can really help you see the structure behind your problem. Other applications are, for instance, route planning and scheduling.

## SAMPLE QUESTIONS

Secondary (Cadet, Junior, Benjamin)

### You won't find it

Beaver Alex and beaver Betty send each other messages using the following sequence of transformations on every word.



For example, the word "BEAVER" is transformed to "WBFCSF". Beaver Betty receives the encoded message "PMGEP" from beaver Alex.

#### Question:

What did Alex want to say?

- A) LODGE    B) RIVER  
C) FLOOD    D) KNOCK

The answer is C

#### Explanation:

The correct answer is FLOOD.

The steps of the transformation, applied in the reverse order, are:

"PMGEP" > "OLFDO" > "DOOLF" > "FLOOD"

That is:

- Replace each letter with the previous letter in the alphabet;
- Shift letters by 2 to the right;
- Reverse the word.

#### Real-world examples:

In this task, the algorithm changes text so that nobody can understand it. This is called ciphering. Many communication technologies, including phones, digital television and ATMs, rely on ciphers to maintain security and privacy.

## REGISTRATION FEE

**NORMAL FEE  
VIA SCHOOL**  
**RM 35**  
**PER PARTICIPANT**

**NORMAL FEE  
INDIVIDUAL**  
**RM 50**  
**PER PARTICIPANT**

Payment method: Online payment (BillPliz) or manual payment (cheque or local order (LO))

## IMPORTANT DATES

Event	Dates
Normal Registration	4 <sup>th</sup> Feb 2023 – 2 <sup>nd</sup> June 2023
<b>Beaver Day</b>	<b>21<sup>st</sup> June 2023</b>
Result Announcement	September 2023

## HOW TO REGISTER

Registration can be made at [www.contesthub.my](http://www.contesthub.my)

**REGISTER NOW!**

## CONTACT INFO

### BEAVER MALAYSIA

c/o ARDENT EDUCATION CONSULTANTS SDN BHD  
100-1, JALAN 2/23A, OFF JALAN GENTING KLANG  
TAMAN DANAU KOTA  
53300 SETAPAK, KUALA LUMPUR

☎ 018-392 0204 (Mrs. Suri) / 018-360 4143 (Mrs. Jannah) / 010-272 7849 (Ms. Najia)

✉ [hello@beaver.my](mailto:hello@beaver.my)