



UNIVERSITY OF
WATERLOO



The CENTRE for EDUCATION in
MATHEMATICS and COMPUTING



2022
*Beaver
Computing
Challenge
(Grades 5 & 6)*

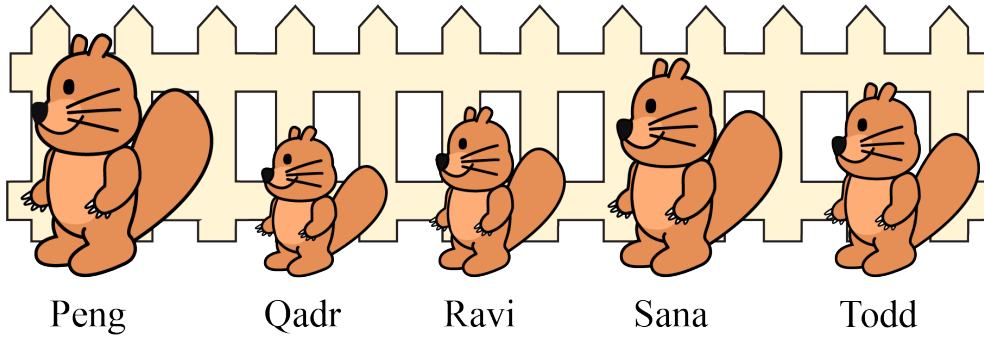
Questions

Part A

Beaver Children

Story

A beaver family has five children with different heights as shown.



The two tallest children and two shortest children leave.

Question

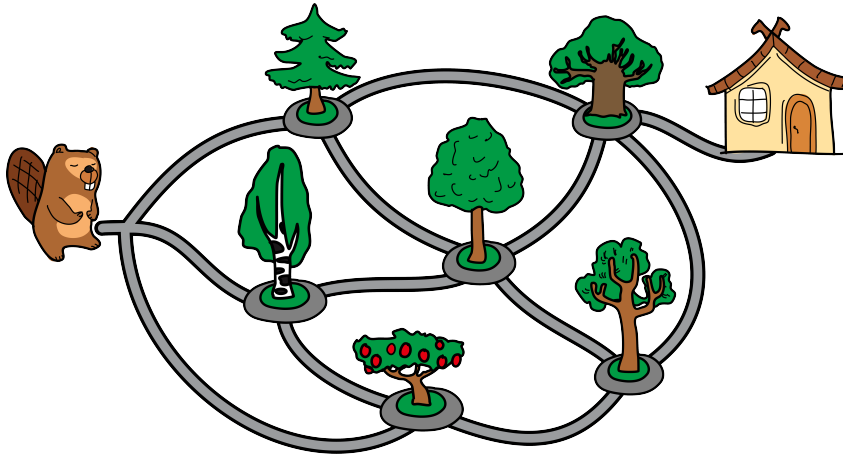
Which child remains?

- (A) Qadr
- (B) Ravi
- (C) Sana
- (D) Todd

Trail Home

Story

In between a beaver and her home are some trails, where each intersection is marked with a different tree. The beaver walks home using these trails passing exactly four intersections on the way.



Question

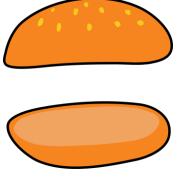





In which order could the beaver have passed the intersections?

- (A)
- (B)
- (C)
- (D)

Hamburger Recipe

Story

A hamburger is made using the following six ingredients.

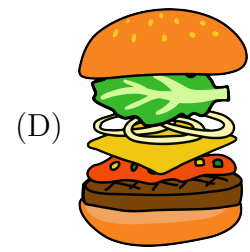
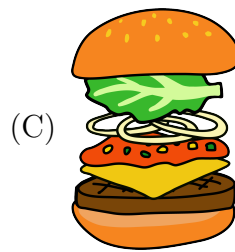
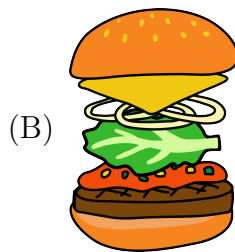
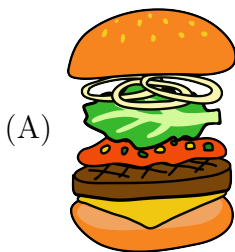
| Bun | Meat | Sauce | Lettuce | Onions | Cheese |
|---|---|---|--|---|---|
|  |  |  |  |  |  |

The hamburger is made according to the following three rules.

1. The sauce should be directly on top of the meat.
2. The meat and cheese should be somewhere below the lettuce and onions.
3. The onions should not be in contact with the bun.

Question

Which of the following could be the hamburger?



Lila's Guessing Game

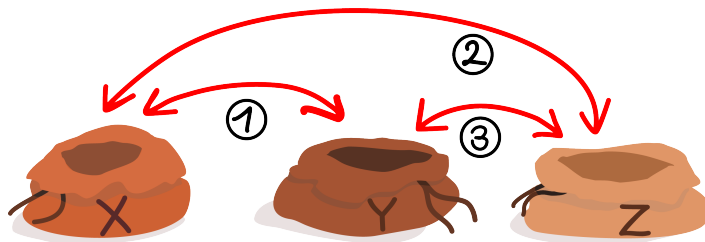
Story

Lila and her friends play a guessing game. To start, Lila puts a marble in bag X, a gem in bag Y, and a crumpled piece of paper in bag Z.



Then, while her friends' eyes are closed, she mixes up the contents of the bags.

1. First, she switches the items in bags X and Y.
2. Then, she switches the items in bags X and Z.
3. Finally, she switches the items in bags Y and Z.



Question

Where are Lila's items now?

- (A) The marble is in bag X, the paper is in bag Y, and the gem is in bag Z.
- (B) The paper is in bag X, the gem is in bag Y, and the marble is in bag Z.
- (C) The gem is in bag X, the paper is in bag Y, and the marble is in bag Z.
- (D) The paper is in bag X, the marble is in bag Y, and the gem is in bag Z.

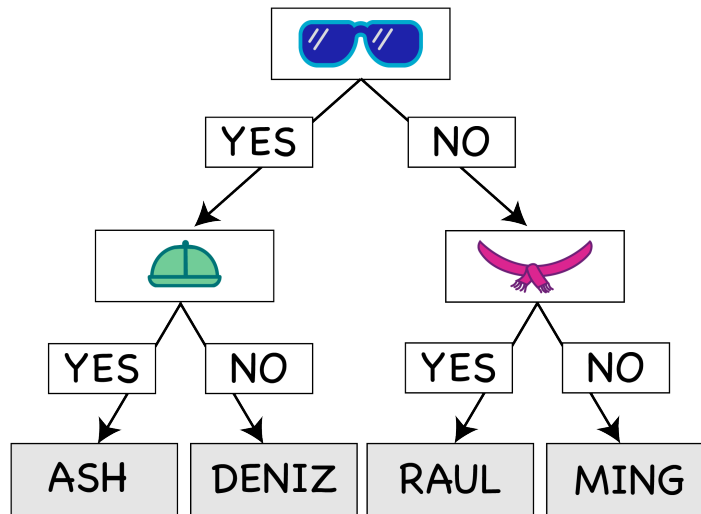
Part B

Remembering Faces

Story

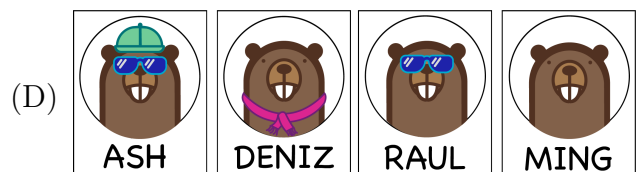
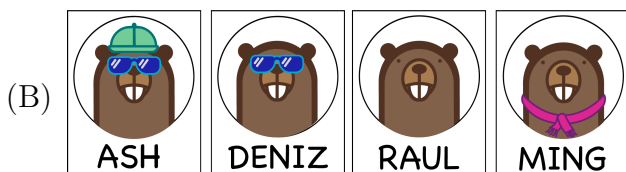
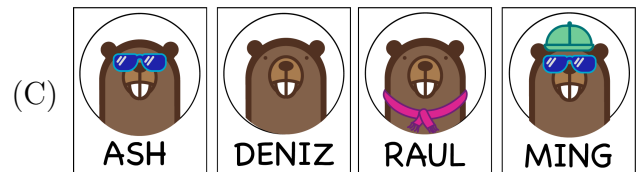
Talia is very forgetful, so she has created a system to help her remember the names of her four group members.

If a group member is wearing sunglasses, Talia checks to see if they are wearing a hat. If they are wearing a hat, then it is Ash, otherwise it is Deniz. If the group member is not wearing sunglasses, Talia checks to see if they are wearing a scarf. If they are wearing a scarf, then it is Raul, otherwise it is Ming.



Question

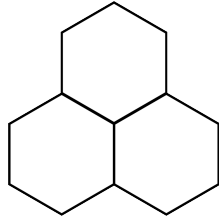
Which of the following correctly matches names with faces?



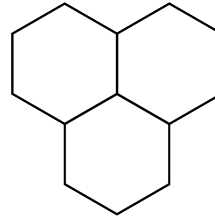
Colourful Tower

Story

Luis has hexagon pieces in three different colours. Whenever Luis arranges three pieces in a way that resembles an upright triangle, the three pieces must either be *all the same colour*, or *all different colours*. These rules do not apply to other three-piece arrangements. In particular:

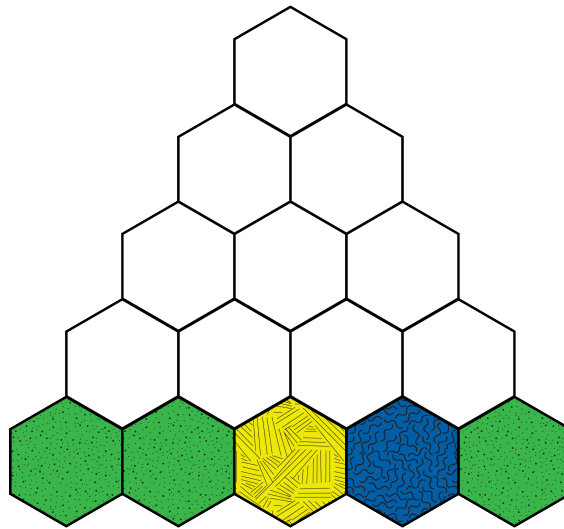


All colours the same
or all colours different



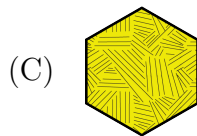
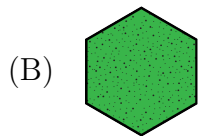
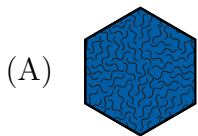
No colour rules

Luis arranges his hexagon pieces in a way that resembles a tower as shown:



Question

Which hexagon piece must be at the very top?



(D) There is more than one possibility

Apples, Bananas, Broccoli, and Carrots

Story

Some fruit (apples and bananas), and some vegetables (broccoli and carrots) are placed on four plates:



Then the following actions are performed, in the order given:

1. One banana is added to each plate.
2. Each plate with less than four items in total, is removed.
3. All the fruit is removed from each plate.
4. Each plate with at least one carrot and no other fruit or vegetables, is removed.

Question

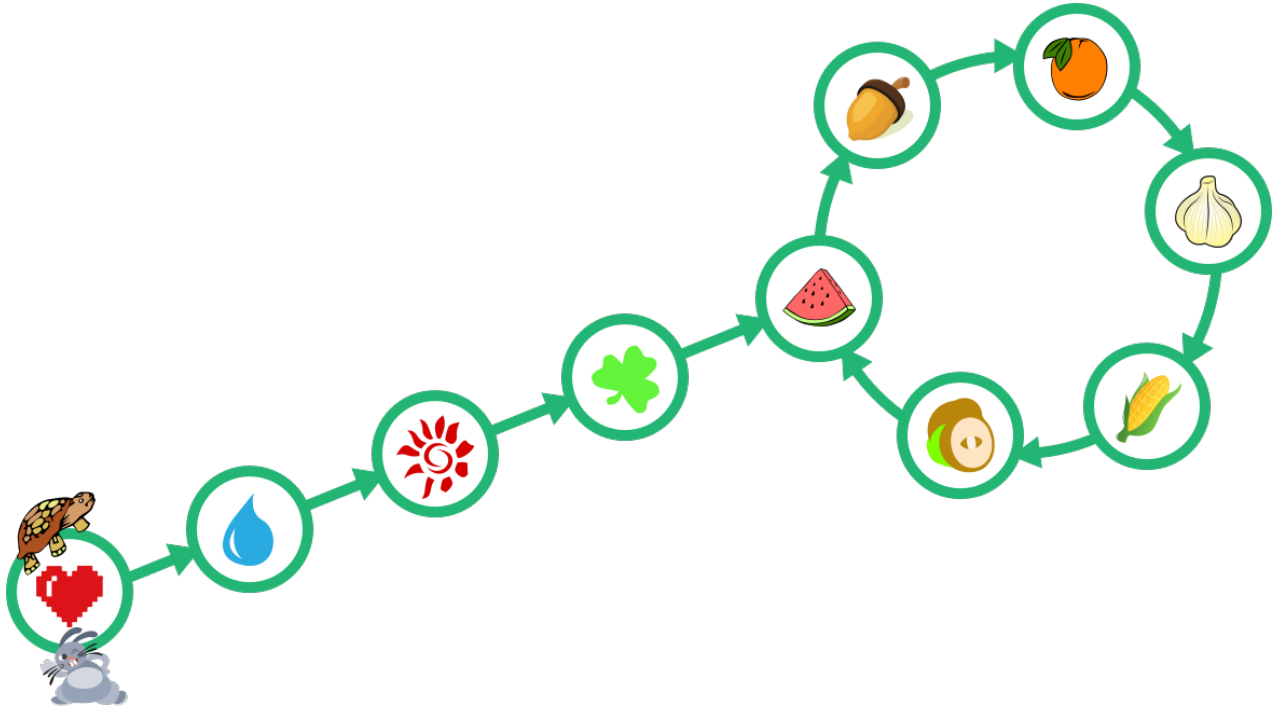
How many plates remain after all the actions are performed?

- (A) 0
- (B) 1
- (C) 2
- (D) 3

Tortoise and Hare

Story

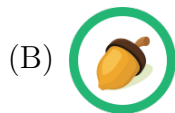
A tortoise and a hare follow the arrows in the diagram shown.



They both start at the same time at the circle labelled with a heart. The tortoise moves from one circle to the next in two minutes. The hare moves from one circle to the next in one minute.

Question

Where do the tortoise and hare meet for the first time after they begin moving?







Part C

Spring Blossom

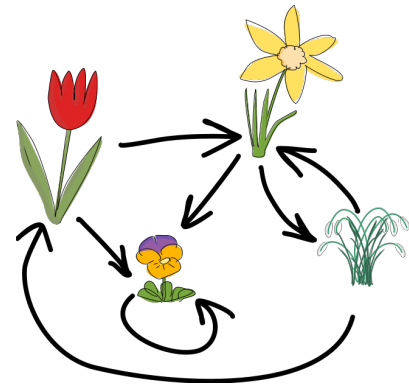
Story

Janine is planting a row of seven flowers in her flowerbed. She has the following types of flowers.

| Tulip | Daffodil | Pansy | Snowdrop |
|---|---|---|--|
|  |  |  |  |

She plants her flowers in her flowerbed according to the following plan.

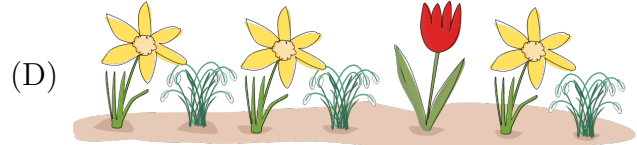
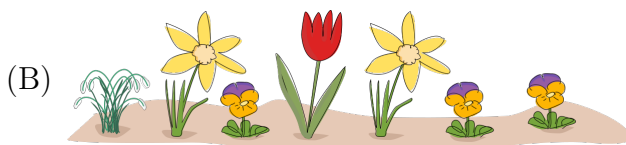
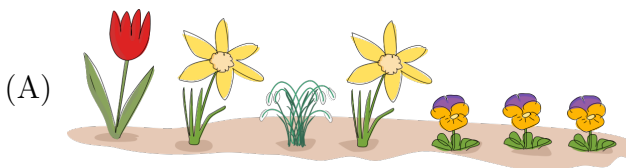
1. The flowers must be planted in a row from left to right.
2. Any flower can be planted in the leftmost spot.
3. Two flowers can be planted next to each other only if the diagram shows an arrow from the flower being planted first to the flower being planted next.



For example, Janine can plant a tulip and then a daffodil to its right because there is an arrow from the tulip to the daffodil. However, she cannot plant a daffodil and then a tulip to its right because there is no arrow from the daffodil to the tulip.

Question

Which flowerbed **could not** possibly be Janine's?



Hide and Seek

Story

Four of Gosia's friends are hiding in a park. No two friends are hiding in the same spot. Gosia knows the following information about who is hiding where:

- Beka or Nissa is hiding behind the trees.
- Rona or Pasha is hiding behind the fountain.
- Beka or Nissa is hiding behind the bench.
- Rona or Beka is hiding behind the lamppost.

Question

What is Rona hiding behind?

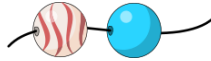
- (A) The trees
- (B) The fountain
- (C) The bench
- (D) The lamppost

Beach Necklaces

Story

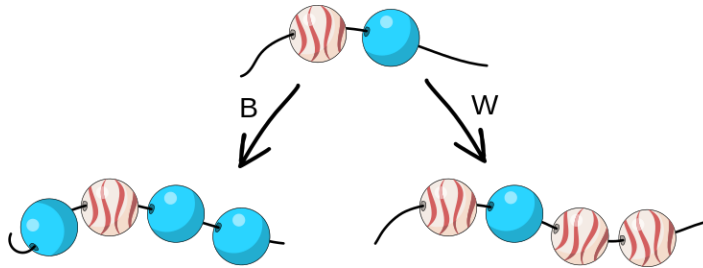
Bashir makes necklaces using wavy beads and blue beads. He always makes them as follows.

1. Place one wavy bead and one blue bead on a string with the wavy bead to the left of the blue bead.



2. Do one of the following two actions.

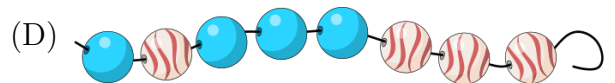
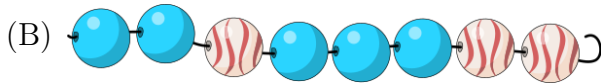
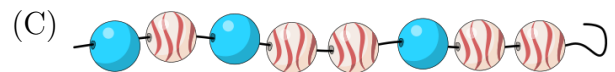
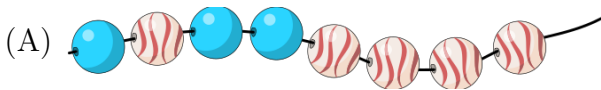
- *Action B*: Add a blue bead to both ends of the string.
- *Action W*: Add two wavy beads to the rightmost end of the string.



3. Repeat step 2 until the necklace is complete.

Question

Which necklace below **cannot** be made by Bashir?



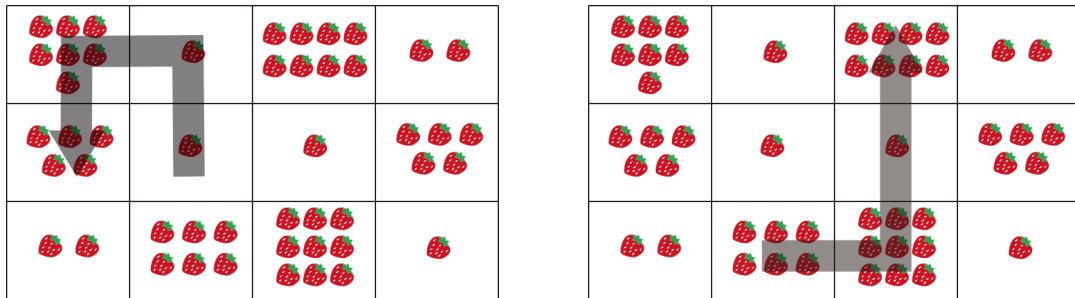
Strawberry Patch

Story

Every day, a beaver goes to a strawberry patch for dessert. It starts eating strawberries from one of the twelve fields in the patch. Then it moves either north (\uparrow), south (\downarrow), east (\rightarrow), or west (\leftarrow) to a neighbouring field exactly three times.

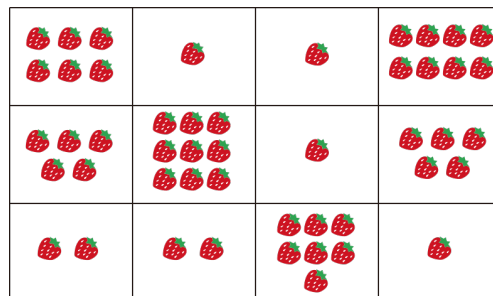
This behaviour ensures that the beaver eats strawberries from exactly four fields and leaves the rest of the strawberries for others to enjoy.

For example, in the strawberry patch shown, a beaver could follow the path shown on the left and eat $1 + 1 + 7 + 5 = 14$ strawberries or follow the path shown on the right and eat $6 + 9 + 1 + 8 = 24$ strawberries.



Question

What is the maximum number of strawberries the beaver could eat from the following patch?



(A) 21

(B) 22

(C) 23

(D) 24