



UNIVERSITY OF
WATERLOO



The CENTRE for EDUCATION in
MATHEMATICS and COMPUTING























2019
Beaver
Computing
Challenge
(Grade 5 & 6)

Questions

Cloud Communication

Story

Smoke signals were used by different groups of ancient peoples to send messages. A very simple code using small and large smoke clouds is given below.

			
			
			
			
			
north	east	south	west

Messages are read from top to bottom. The following message contains an error. Either one small cloud should be a large cloud or one large cloud should be a small cloud.



Question

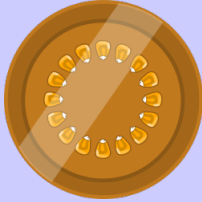
What is the correct message?

- (A) north
- (B) east
- (C) south
- (D) west

Beaver Coins

Story

Beavers use coins with the following values:



16



8



4



2



1

Question

Which of the following total values can be made using exactly three coins?

- (A) 23
- (B) 2
- (C) 38
- (D) 13

Push-Away Parking

Story

In the parking lot shown, each car is either parked in a parking space or in front of two parking spaces.



Cars that are parked in front of two parking spaces may be moved forward or backward in order to allow blocked cars to exit. For example, Car A is not blocked and can exit without any other cars moving; however, Car L is blocked by Car Q. If Car Q is moved, then Car L can exit.

Question

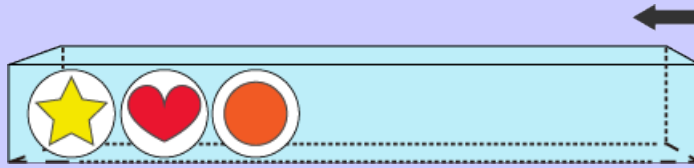
Which car **cannot** exit its parking space unless two different cars move?







- (A) Car G
- (B) Car H
- (C) Car I
- (D) Car B



Box of Balls

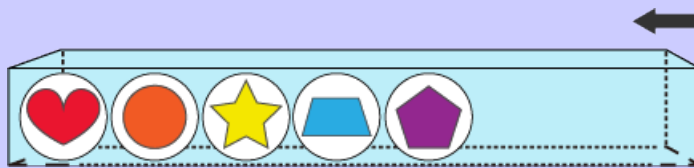
Story

A beaver has a box with an opening on the right-hand side.



At any time, the beaver can take out the rightmost ball from the box, or put in a new ball from the right. For example, if the beaver wants  in between  and , it needs to take out , put in , and then put in .























Now suppose the beaver has five balls in the box as shown, and two balls ( and ) out of the box.



The beaver wants the balls in the box to be in the order: , , , , , , .

Question

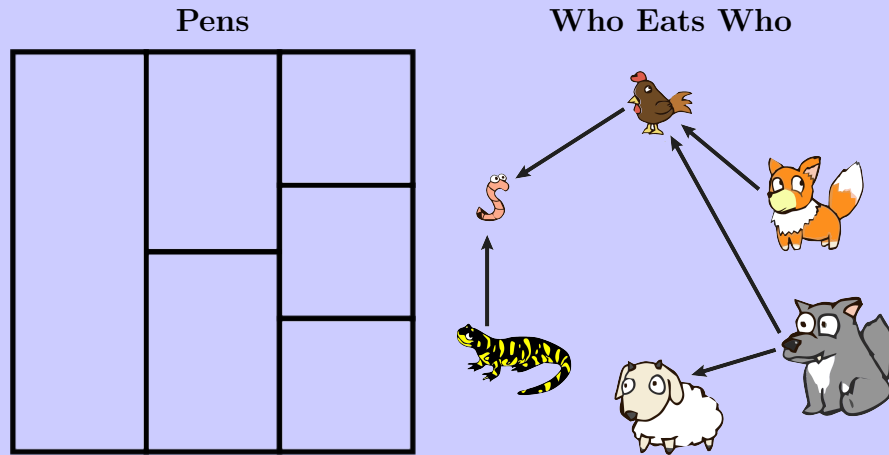
What should the beaver do?

- (A) Take out , take out , put in , put in , put in , and then put in .
- (B) Take out , take out , put in , put in , put in , and then put in .
- (C) Take out , put in , put in , and then put in .
- (D) Take out , take out , put in , put in , put in , and then put in .

Koko's Animals

Story

Koko has six animals and needs to place each one in its own pen. Two animals cannot be placed in touching pens if one animal will eat the other. In the diagram shown, arrows point from an animal to all the other animals that it will eat.



For example, the wolf will eat the chicken, but the wolf will not eat the worm.

Question

Which of the following choices is **not** a good placement?

(A)

🐔	🐑	🐛
	🐕	🐺
🐅		

(B)

🐛	🐑	🐔
	🐕	🐅
	🐺	

(C)

🐺	🐕	🐛
	🐑	🐔
🐅		

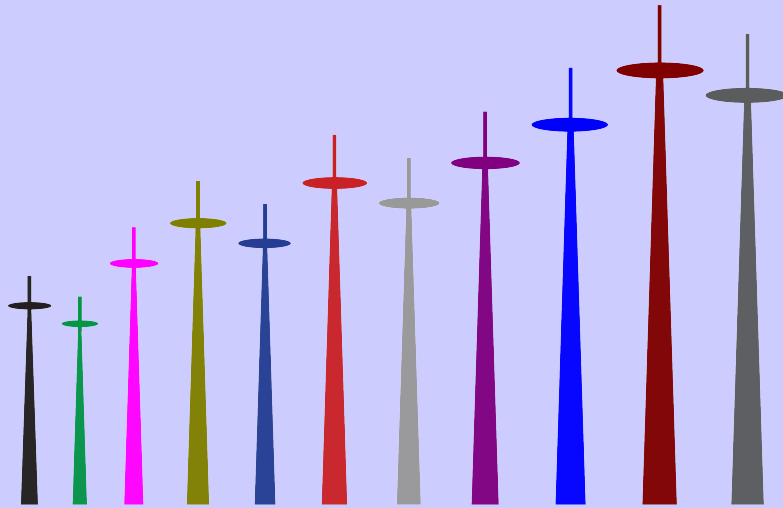
(D)

🐔	🐑	🐕
	🐛	🐺
🐅		

Special Towers

Story

Consider the towers shown.



A tower is *special* if all towers to the left of it are shorter, and all towers to the right of it are taller.

Question

How many special towers are there?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Ancient Code

Story

Beaver Cleveria discovered a table of symbols carved in wood.

	I	II	III	IIII	○	⊙	⊗	⊕	◌
☀	A	B	C	D	E	F	G	H	I
☞	J	K	L	M	N	O	P	Q	R
☜	S	T	U	V	W	X	Y	Z	

After studying the table, Cleveria figures out that it is an ancient code. The symbol assigned to a row and the symbol assigned to a column are combined to form a single image. This image is the code for the letter where that row and column meet. For example, the letter H is encoded as shown:

	I	II	III	IIII	○	⊙	⊗	⊕	◌
☀	A	B	C	D	E	F	G	H	I
☞	J	K	L	M	N	O	P	Q	R
☜	S	T	U	V	W	X	Y	Z	

☀ + ⊗ = ☀⊗

Later, Cleveria sees the following coded message on a tree:



Question

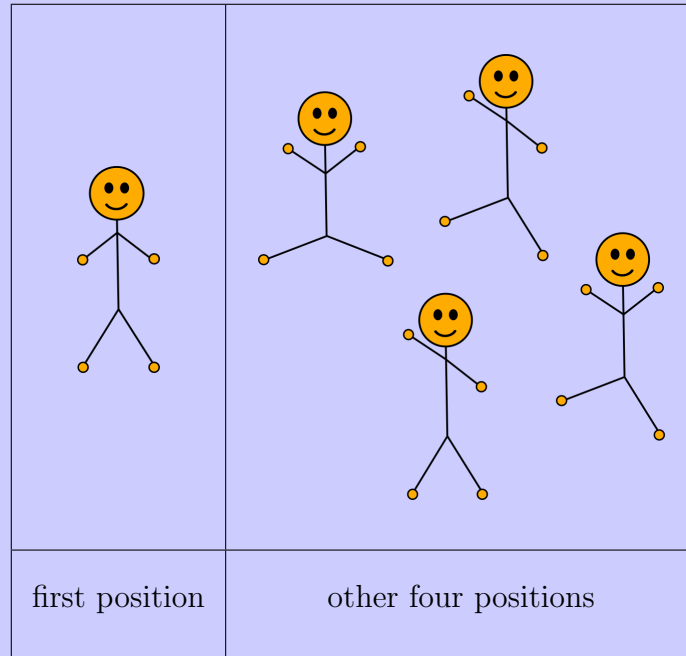
What is the message?

- (A) LOVEWATER
- (B) SLEEPDAYS
- (C) LOVEMYSUN
- (D) CAREFORME

Beaverumba

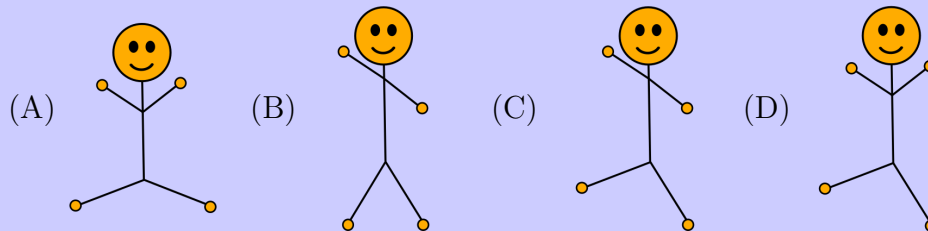
Story

There are five positions in the beaverumba dance. Each position after the first involves moving either exactly one arm or exactly one leg from the position before it. Robert remembers the first position of the dance but forgets the correct order of the other four positions.





Question

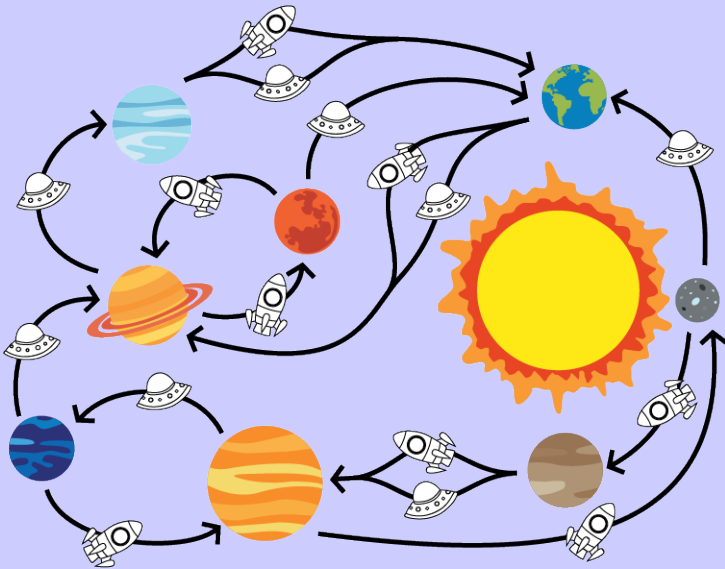
What is the third position of the dance?









Space Travel

Story
















An astronaut's map is shown. It shows all of the possible travel routes between planets. For each route, it shows whether it can be travelled by rocket  or by spaceship , or by both rocket and spaceship.



For example,    is a list of space vehicles that will take the astronaut from  to . Suppose the astronaut wants to travel from  to .

Question

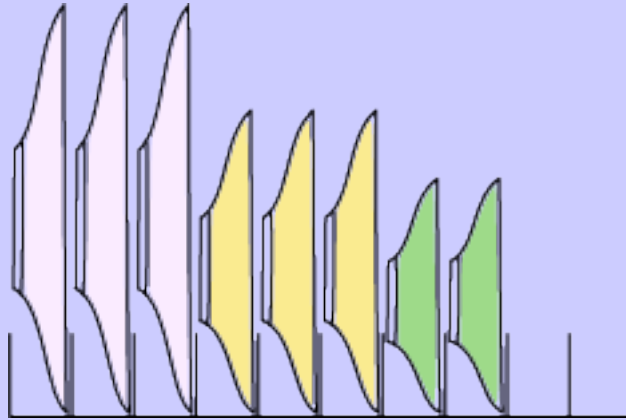
Which of the following is **not** a list of space vehicles that the astronaut could take?

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

Plates

Story

A beaver believes plates are only arranged properly if all the large plates are on the left, followed by all the medium plates, followed by all the small plates. For example, the beaver believes the three large plates, three medium plates, and two small plates shown are arranged properly.



The beaver would like to add a large plate and arrange them properly.

Question

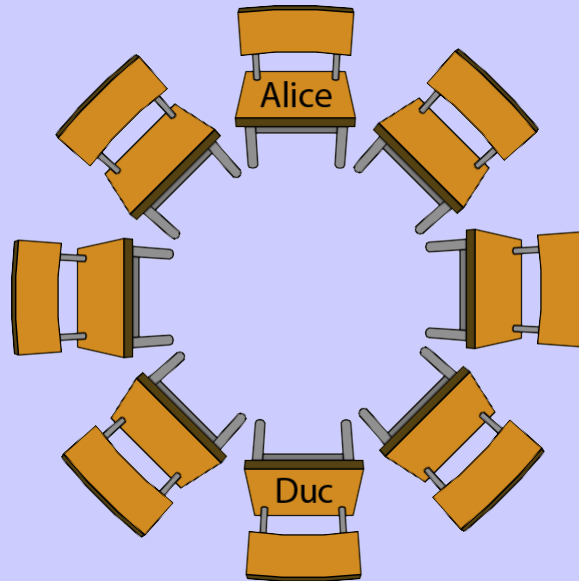
Of the eight original plates, what is the fewest number of plates that must be moved?

- (A) 2
- (B) 3
- (C) 4
- (D) 5

Seating Plan

Story

Berto and seven of his friends are sitting in a circle. They are all facing inwards.



We know the following facts about where the friends are sitting:

1. Alice is sitting directly across from Duc, as shown.
2. Greta and Eugene are both sitting beside Haakim.
3. Franny is not sitting beside Alice or Duc.
4. There is someone who is sitting next to both Greta and Chika.
5. Eugene is beside Duc, on Duc's left.

Question

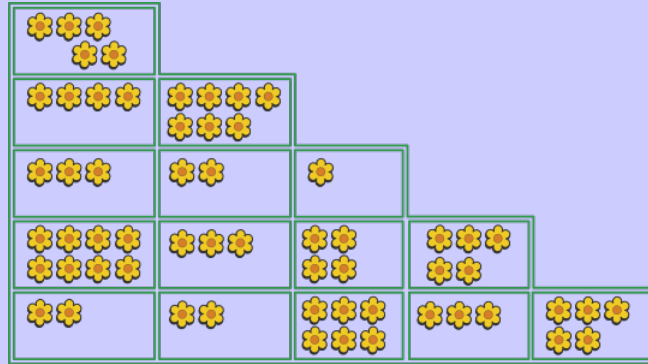
Which of these orders of friends, in a clockwise manner, is correct?

- (A) Alice, Berto, Greta, Duc, Chika, Eugene, Franny, Haakim
- (B) Alice, Greta, Haakim, Eugene, Duc, Berto, Franny, Chika
- (C) Alice, Chika, Franny, Berto, Duc, Eugene, Haakim, Greta
- (D) Alice, Haakim, Eugene, Greta, Duc, Franny, Berto, Chika

Picking Flowers

Story

A beaver visits 9 of the 15 sections in the garden shown. It begins at the top left section and ends at the bottom right section. The beaver only moves down or right and it picks all the flowers in each section it visits.



Question

What is the maximum number of flowers that the beaver can pick?

- (A) 39
- (B) 38
- (C) 58
- (D) 41