Computer
Talent Search

A project of the Institute of IT Professionals South Africa

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TALENT SEARCH 2015

INTERMEDIATE

Grades 8 and 9

Not to be used before 16 March

If you are NOT in grade 8 or 9, please report that you have the wrong paper.
Only when the teacher says "START", may you begin.

1. Write your personal details and your answers on the answer sheet provided.
2. You will have 45 minutes to complete the 15 tasks.
3. You may answer the questions in any order, but it is important to place the answer in the correct line on the answer sheet.

The mark allocation is as is used in Europe for these competitions.
You get 45 marks to start off with.
A section: +6 marks for every correct answer -2 for every wrong answer.
B section: +9 marks for every correct answer -3 for every wrong answer.
C section: +12 marks for every correct answer -4 for every wrong answer.
If you do not answer a question, you get 0 (zero) for that task.
The maximum mark is 180.

Wait for the teacher to say "START".

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A1: Select a Picture

JA1 / IA1

Johnny has 8 photos. He wants to give one to Bella.

He asks Bella three questions to help him select the best picture.

Johnny's Question	**Bella's Answer**
Do you want a photo with a beach umbrella?	Yes
Do you want a photo where I wear something on my head?	No
Do you want a photo where you can see the sea?	Yes

Which photo should Johnny give to Bella? Write down the letter of the picture in the appropriate block on your answer sheet.

A

B

C

D

E

F

G

H

A2: Only Nine Keys

JB1 / IA2

Daniel is sending text messages from his old phone.

For every letter he has to press the proper key once, twice, three or four times, followed by a short pause.

In order to type 'C' he has to press the number 2 key three times because 'C' is the third letter written on this key.

In order to type 'HIM' he has to press the number 4 key twice, followed by the number 4 key 3 times and finally the number 6 key once.

Daniel presses exactly six times to enter the name of his friend.

What is the name of his friend? Is it:

Miriam,

Iris,

Emma,

Ina?

Write down the name of the friend in the appropriate block on your answer sheet.

A3: Log Art

IA3 / SA2 / EA2

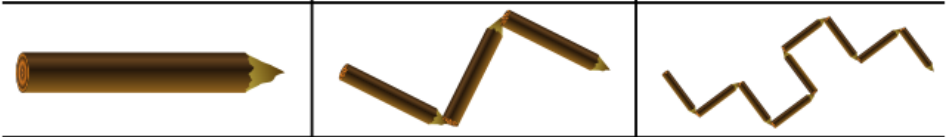
When beavers gnaw on tree trunks they enjoy placing the pieces in a special way.

The beavers start with a single log. In stage one a big log is gnawed into smaller logs. In the next stage each individual log is again gnawed into even smaller logs but always keeping to the starting pattern. This keeps repeating.

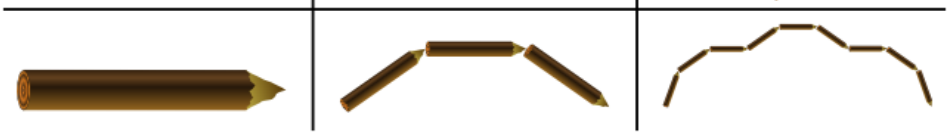
Here are three examples. On each line you see how the beaver started, the result after stage one and the result after stage two.

Example 1

Example 2



Example 3



If the result of the second stage looks like this:

What was the result of the first stage? Write down the letter of the correct answer in the appropriate space on your answer sheet.

A: 

B: 

C: 

D: 

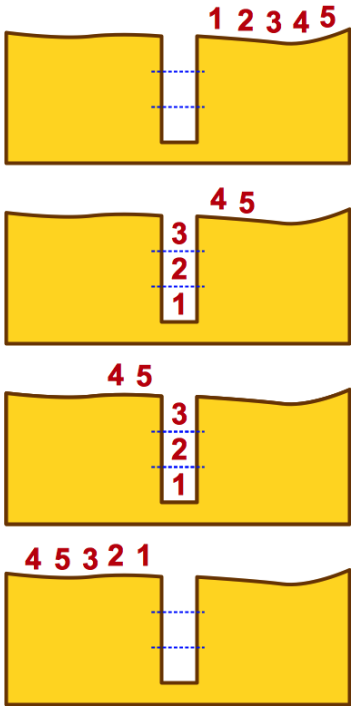
A4: Beavers on the Run

A colony of beavers is travelling through a dark forest. The path is narrow, so they travel in a row without passing each other.

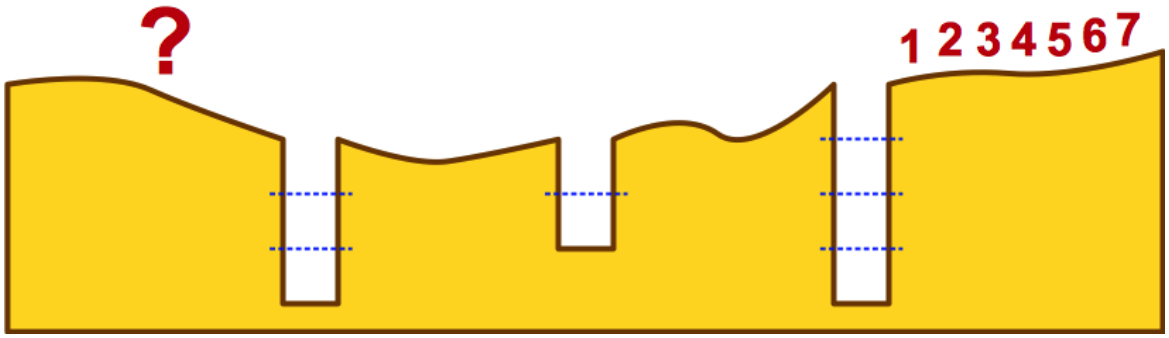
Sometimes there is a hole in the path. A hole is passed in the following manner:

- First as many beavers jump into the hole as can fit in.
- The entire colony will then pass across the hole.
- The beavers that jumped in will then climb out, and join the end of the line.

The images on the right show how five beavers pass a small hole that fits three beavers.



A colony of 7 beavers passed through the forest. They pass over 3 holes. The first hole fits 4 beavers, the second fits 2, and in the last hole fits 3 beavers.



In what order do the beavers find themselves after they have passed the third hole?

Write down the letter of the correct answer only in the correct block on your answer sheet:

A: 4 7 5 6 1 2 3

B: 6 5 7 4 3 2 1

C: 2 1 6 5 3 4 7

D: 5 7 6 1 4 3 2

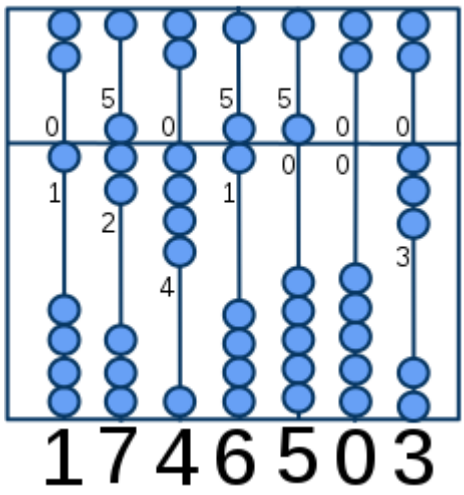
A5: Abacus

JB3 / IA5

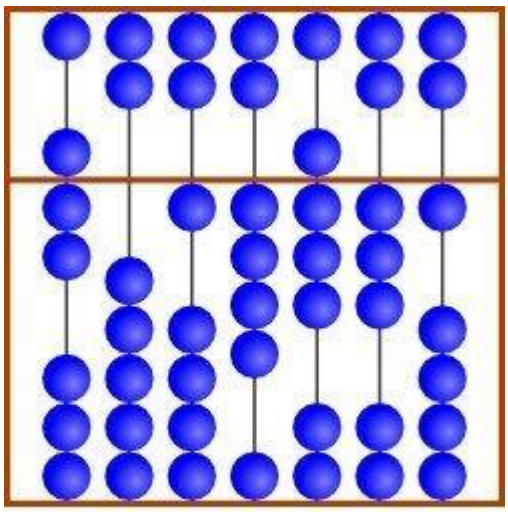
A number is represented on a Chinese abacus by the position of its beads.

The value of a bead on the top part is 5; the value of a bead on the bottom part is 1. The abacus is reset to zero by pushing the beads away from the centre.

To represent the number 1 746 503 the appropriate beads are moved towards the centre of the abacus:



What number does the following abacus represent? Enter the digits in the appropriate block on your answer sheet:



B1: Loading Lisas

JB4 / IB1 / SA4

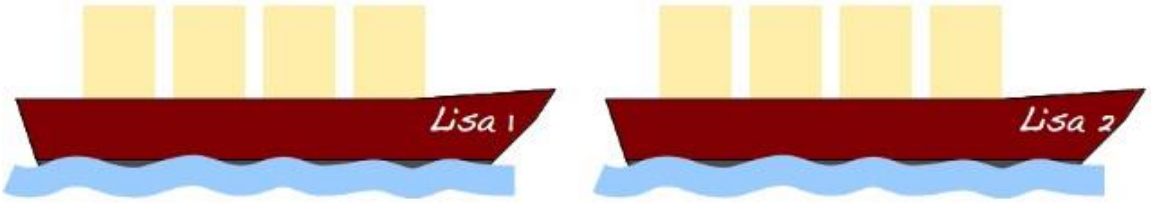
Two fishermen own two boats, named "Lisa 1" and "Lisa 2". Each boat can hold a maximum cargo of 300kg.

The fishermen are given barrels filled with fish to transport. On each barrel is a number that shows how heavy the barrel is in kilograms.

You must transport as much fish as possible, but make sure that neither boat carries more than 300kg.

Write down the number of the boat and the cargo it will carry in the appropriate space on your answer sheet.

Eg: 1 : 130 + 120, 2 : 90 + 90 + 60



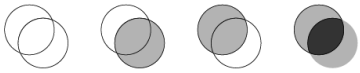
B2: Funny Windows

JC1 / IB2

The rounded windows on a boat are called portholes. The glass in the portholes of a boat is either clear or lightly tinted.

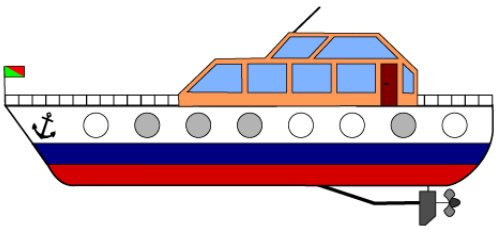
Standing beside the boat you can look through two opposite portholes at once.
Depending on the colours of both windows they will appear to have a new colour:

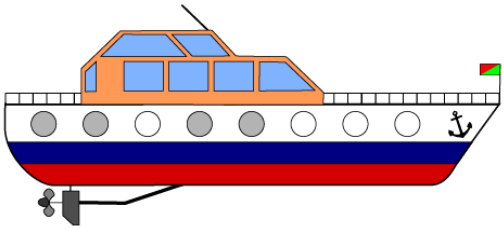
Either no colour when both portholes are clear, or medium when one porthole is tinted and the other clear, or dark when both portholes are tinted.



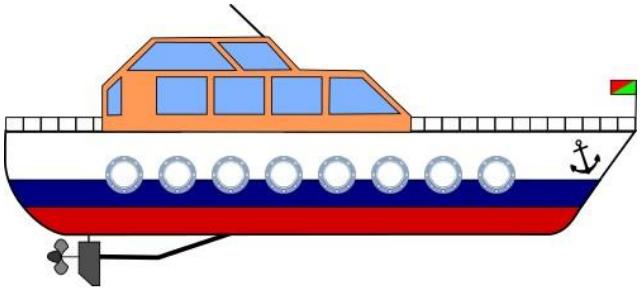
L M M D

Captain Krysta has given you drawings of her boat showing which portholes are clear and which are lightly tinted:





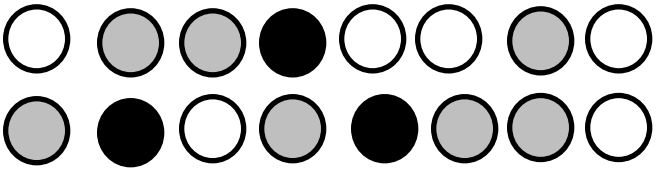
What tinting would you see if you stood beside the boat and looked through opposite portholes?
Put down the letter of the correct answer in the appropriate block on your answer sheet:



A

B

C



D

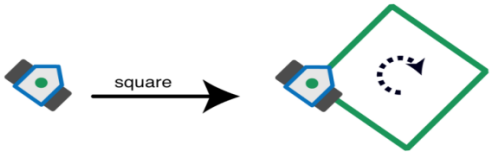
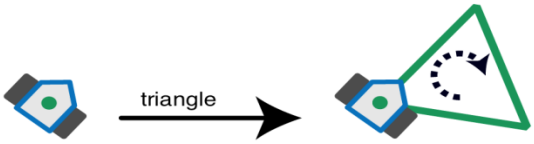
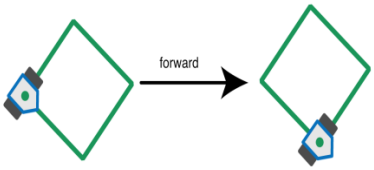
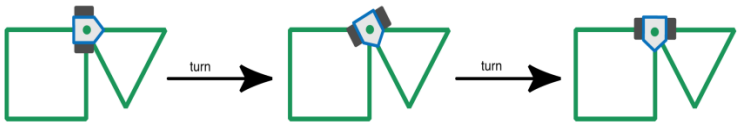
B3: Drawbot

JB5 / IB3

The robot 'Drawbot' can drive and draw at the same time!

You can give Drawbot the following instructions: **square**, **triangle**, **forward**, **turn**.

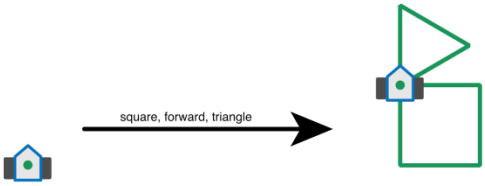
The instructions work as follows:

square: Drawbot draws a square. At every corner he turns right.	
triangle: Drawbot draws a triangle. At every corner he turns right.	
forward: Drawbot drives forward on a line that has been drawn until the next corner.	
turn: Drawbot turns to the right until the next drawn line.	

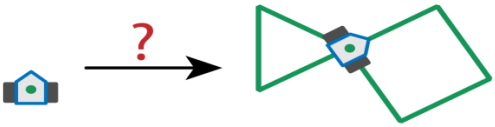
You can also give a sequence of commands to Drawbot:

For instance: **square, forward, triangle**

The image on the right shows what will happen:



Which sequence of instructions causes this to happen?



Write the letter of the correct answer in the appropriate place on your answer sheet.

A: **square, turn, forward, triangle**

B: **triangle, turn, square**

C: **triangle, turn, forward, square**

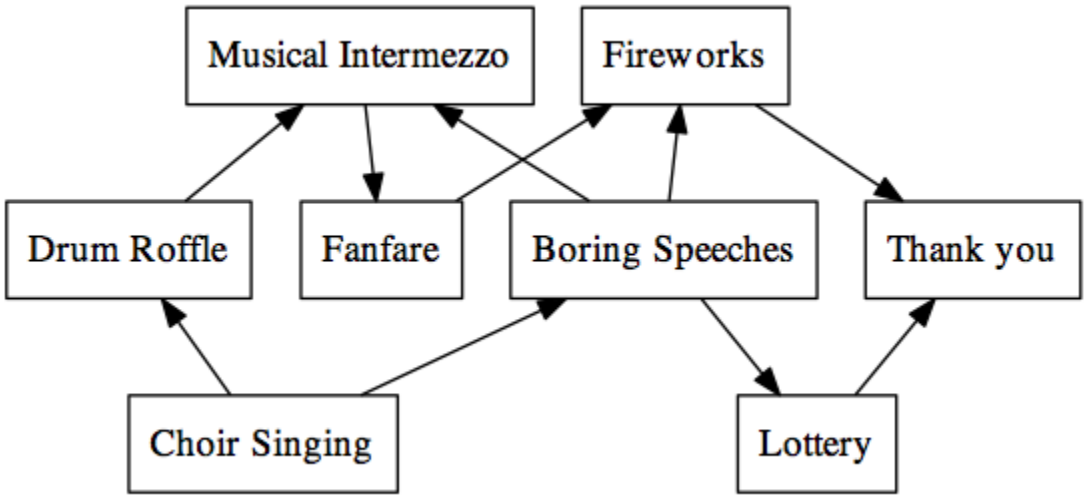
D: **square, forward, square, turn, triangle**

B4: Ceremony

IB4 / SA5 / EA4

Organizing a festive day is a lot of work in Bebras City. All the events on the programme must occur in a specific order.

The diagram shows all the events that must be included. The arrows indicate that an event has to occur before another event. For example, the *Musical Intermezzo* can only happen after both the *Drum Roffle* and the *Boring Speeches* have finished.



In which order must the events come? Place the letter of the correct answer in the appropriate block on your answer sheet:

A: Musical, Fireworks, Drum, Fanfare, Speeches, Thanks, Choir, Lottery

B: Drum, Fanfare, Speeches, Musical, Choir, Lottery, Thanks. Fireworks

C: Fireworks, Lottery, Thanks, Speeches, Drum, Choir, Fanfare, Music

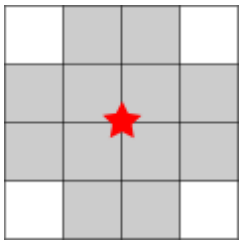
D: Choir, Drum, Speeches, Musical, Fanfare, Lottery, Fireworks, Thanks

B5: Village Network

JC2 / IB5 / SB2

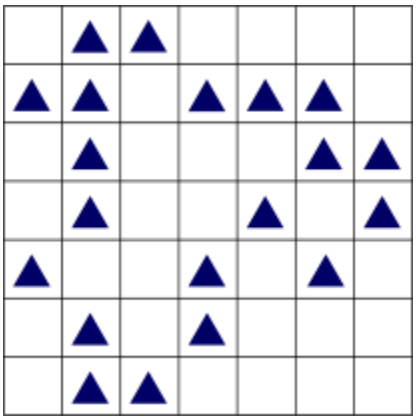
A village is receiving a new wireless network consisting of several network towers. The network will offer WiFi to all the villagers.

Every network tower has the coverage area shown below. The star represents the network tower. Only in the twelve shaded squares surrounding the tower will a house get a WiFi signal.



The picture shows a map of the village divided into squares. Every triangle ▲ represents a house.

A network tower cannot be built inside a square, only on the cross point of the village squares. The coverage areas may overlap.



What is the minimum number of network towers required to provide coverage to every house? Enter the number in the appropriate box on your answer sheet.

C1: Mobile Phones

JC3 / IC1 / SB3

The beaver family have three mobile phones but none of the batteries have any charge.

It takes 1 hour to fully charge a mobile phone but this does not need to be done all in one go.

The beaver family only have two mobile phone chargers in the house.

What is the shortest time they need to fully recharge the three phones? Write down the letter of the correct answer in the appropriate block on your answer sheet.

A: 3 hours

B: 2 hours

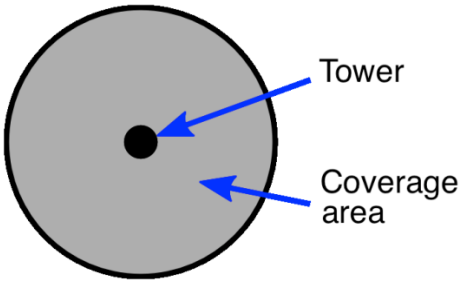
C: 1½ hours

D: 1 hour

C2: Stormproof Network

IC2 / SC1 / EB2

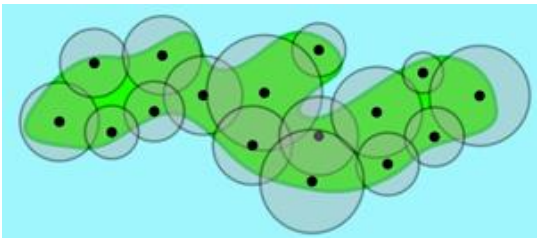
A network of mobile phone towers is set up on a small island. Every tower covers a circular area of the island.



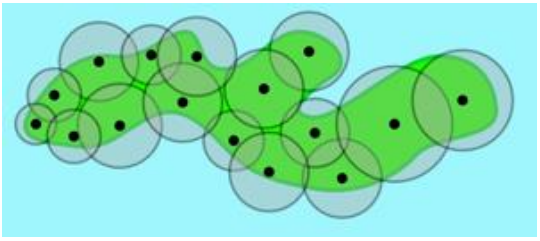
When the coverage area of two towers overlaps the towers are said to be directly connected. Towers can also be indirectly connected if there is a chain of directly connected towers between the two towers.

The operators want to make the network of towers Storm Proof. This means that even if one tower breaks down all other towers must still be connected, either directly or indirectly.

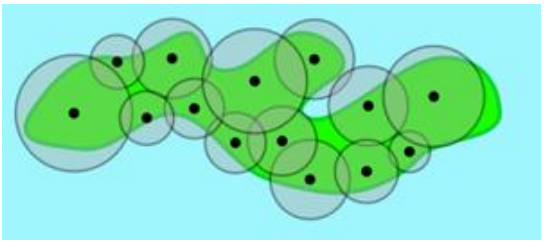
Which is a way to create a stormproof network on the island? Enter the letter of the correct solution in the appropriate block on your answer sheet.



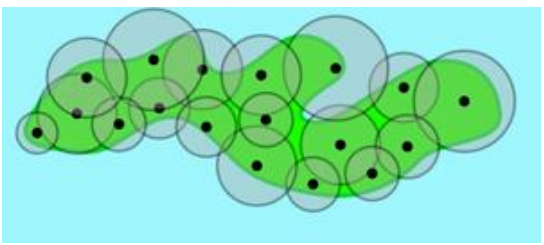
A



B



C

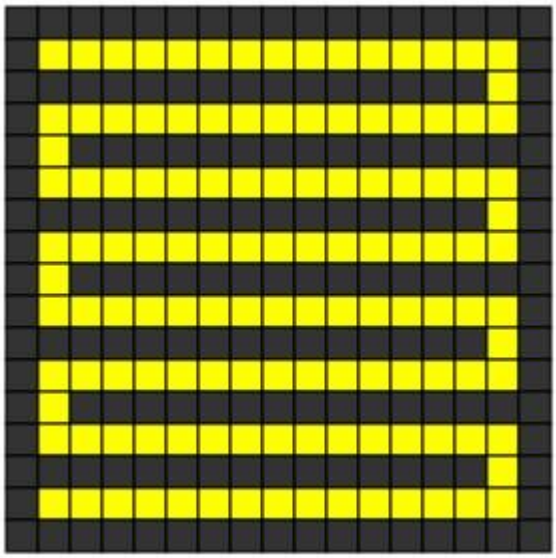


D

C3: Monster

JC4 / IC3 / SC3

A monster lives in a room in the basement under a castle. The rooms in the basement are as shown as yellow/white blocks in the map below:



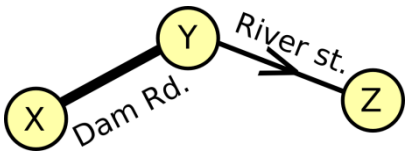
You have to find the monster. Your only help is the old lock-keeper, but when you show him a room on the map, and ask "Is this the right room?" he only answers ""Search towards the first room" or "Search towards the last room".

What is the least number of questions you can ask before you are sure you have the right room? Write down the number in the appropriate block on your answer sheet.

C4: Traffic in the City

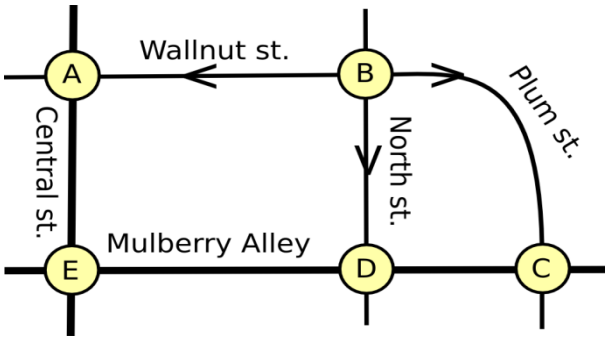
IC4 / SB5 / EB4

In a small village there is a one-way street and a two-way street. In order to help the village taxi driver a table is made to show which routes can be taken. Below is the map and the corresponding table.



		To		
		X	Y	Z
From	X		✓	
	Y	✓		✓
	Z			

Beaversville is a little larger and also wishes to have a table for its taxi drivers:



Which one of the tables below is the correct one for Beaversville? In the appropriate place on your answer sheet, fill in the letter of the correct table.

A

	A	B	C	D	E
A					√
B	√		√	√	
C				√	
D			√		√
E	√			√	

	A	B	C	D	E
A		√			
B			√	√	√
C		√			
D					√
E		√	√		

B

	A	B	C	D	E
A					√
B	√		√	√	
C				√	
D	√		√		
E		√	√		

	A	B	C	D	E
A		√			√
B	√		√		√
C	√			√	
D	√		√		√
E	√			√	

C

D

C5: Clinging Robot

JC5 / IC5

The clinging robot walks along the road, always clinging to one side of the road. The clinging robot knows only four commands:

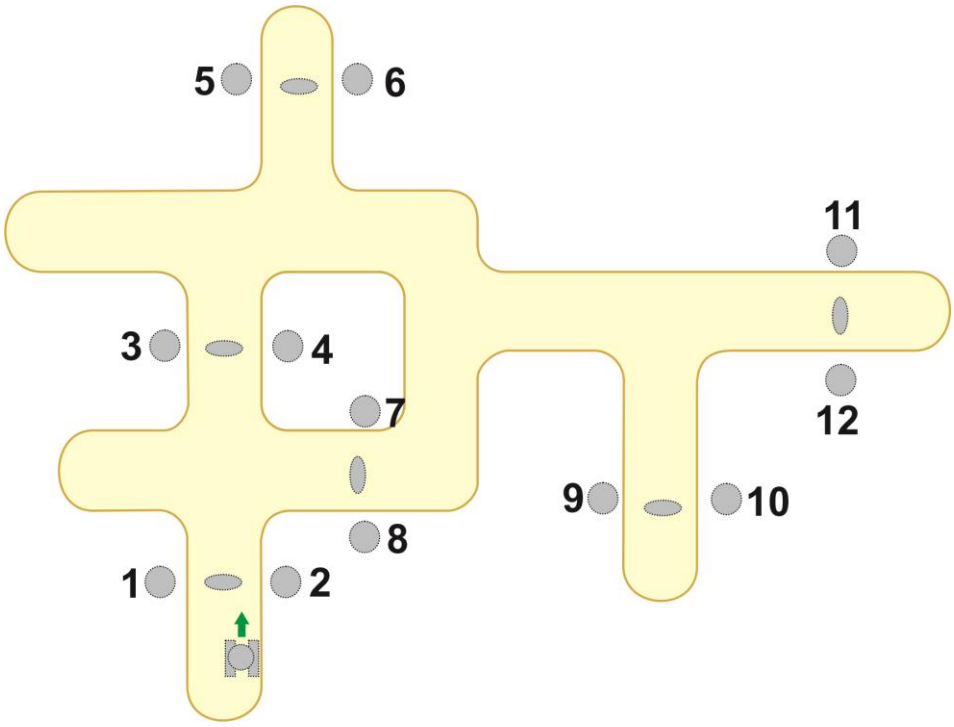
Command	Explanation
START	Start walking along the side where you are standing
CONTINUE	Keep walking along the side where you are walking
SWITCH	Switch to the other side of the road and keep walking
STOP	Stop walking

A command is executed whenever the robot walks across one of the grey oval magnetic strips on the road. All these strips are shown on the map.

The clinging robot is given the following instruction set:

- **START SWITCH CONTINUE CONTINUE CONTINUE STOP**

The robot starts where shown in the picture.



At which number will the robot stop? Write the number in the appropriate space on your answer sheet.