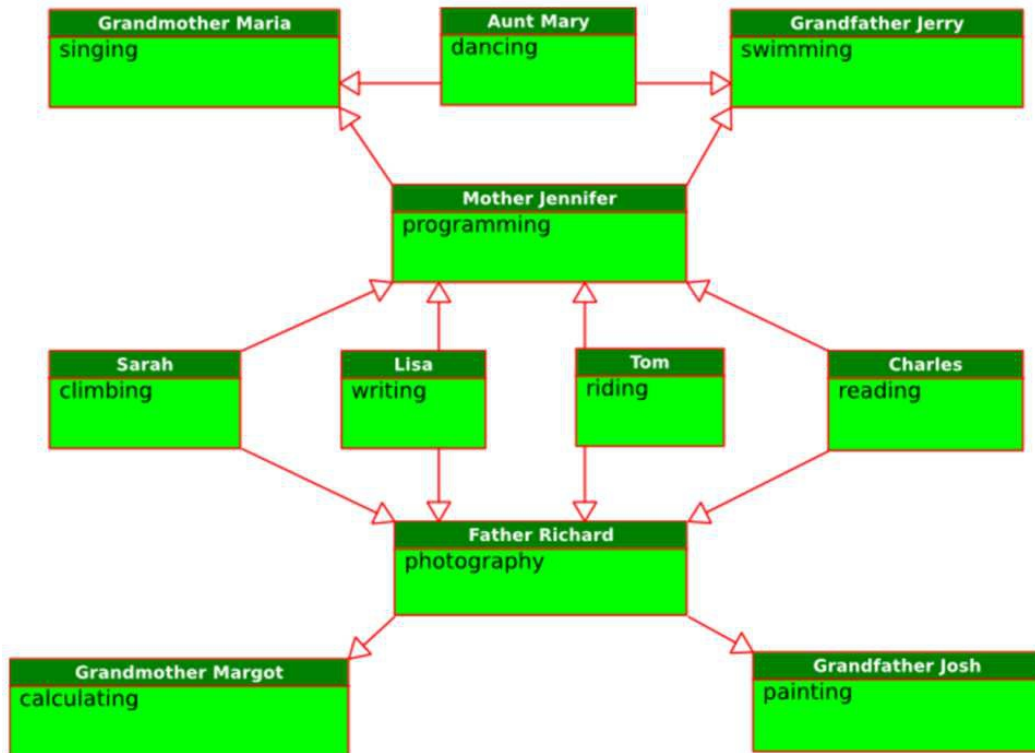


Tasks T1 – T10 carry 3 points each

T1: Super Power Family

In a beaver family all family members have abilities. A daughter inherits all abilities from her mother; a son inherits all abilities from his father. In addition to the inherited abilities, each family member also has one additional ability. The diagram below shows the relationships between the beavers. It also shows for each beaver the additional ability.

In the picture you can see that Mother Jennifer has inherited the ability to sing from Grandmother Maria, and in addition to that she has the ability to program. Lisa inherits from her mother both these abilities, and adds the ability of writing. So she has the ability to write, program and sing.



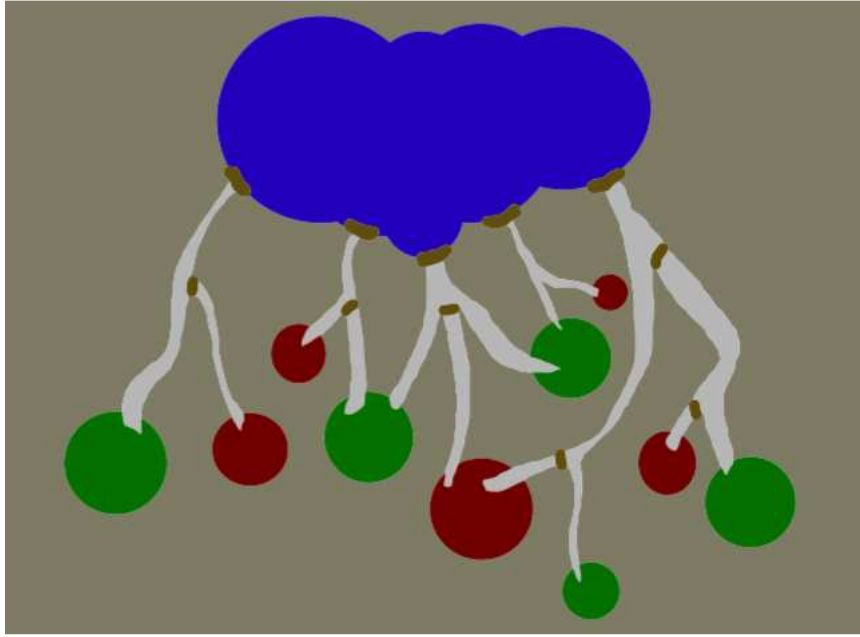
Question

Which statement is correct?

- A) Sarah has abilities in reading, programming and singing.
- B) Tom inherits from Grandmother Margot the ability to calculate.
- C) Aunt Mary has abilities in dancing and swimming.
- D) Tom's abilities are riding, painting and photography.

T2: Beaver Dam

Family Birchtree needs to water their fields. Since not all fields need water at the same time only the green fields should be watered. We can open or close a brown dam. If it is open, water will flow through the canal to the fields.

**Question:**

How many dams do we need to open in order to water all green fields **only**?

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

T3: Electronic devices

Beaver Eric sells electronic devices. The main features of the devices are encoded in a compact way, consisting of a sequence of 0 and 1. A 0 means that the device does not have the feature, whereas a 1 means it has the feature.

The four main features considered by Beaver Eric are:

- Is recyclable;
- Can be connected to the WiFi;
- Has a screen;
- Has remote control.

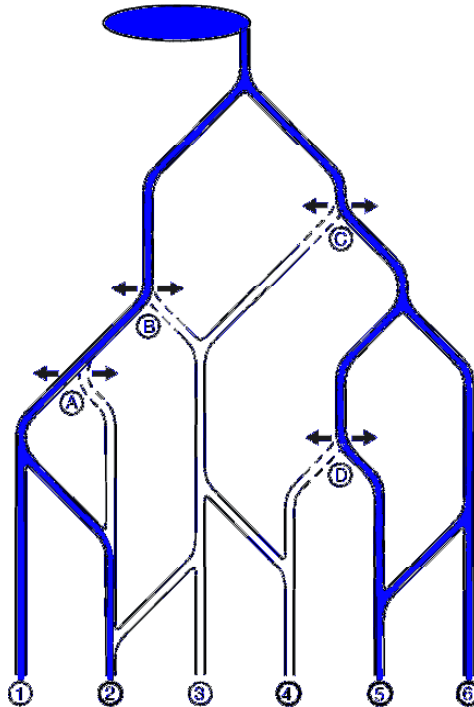
For example, the code 1010 means that the device is recyclable and has a screen, but cannot be connected to the WiFi and does not have remote control.

Question

You are interested in a device that either has a screen or can be connected to the WiFi and has remote control. Which one of the following device will you certainly not buy?

- A) 0110
- B) 0111
- C) 1101
- D) 1100

T4: Irrigation system for fields



The beavers have created a nifty irrigation system for their fields. The water flows from a lake at the top of the hill all the way down to the fields 1 to 6 at the bottom.

Along the water canals, the beavers have installed four water gates A to D, where the water can only flow either to left (←) or to right (→).

Question

What is the correct configuration for the water gates to irrigate only fields 2, 4, 5 and 6?

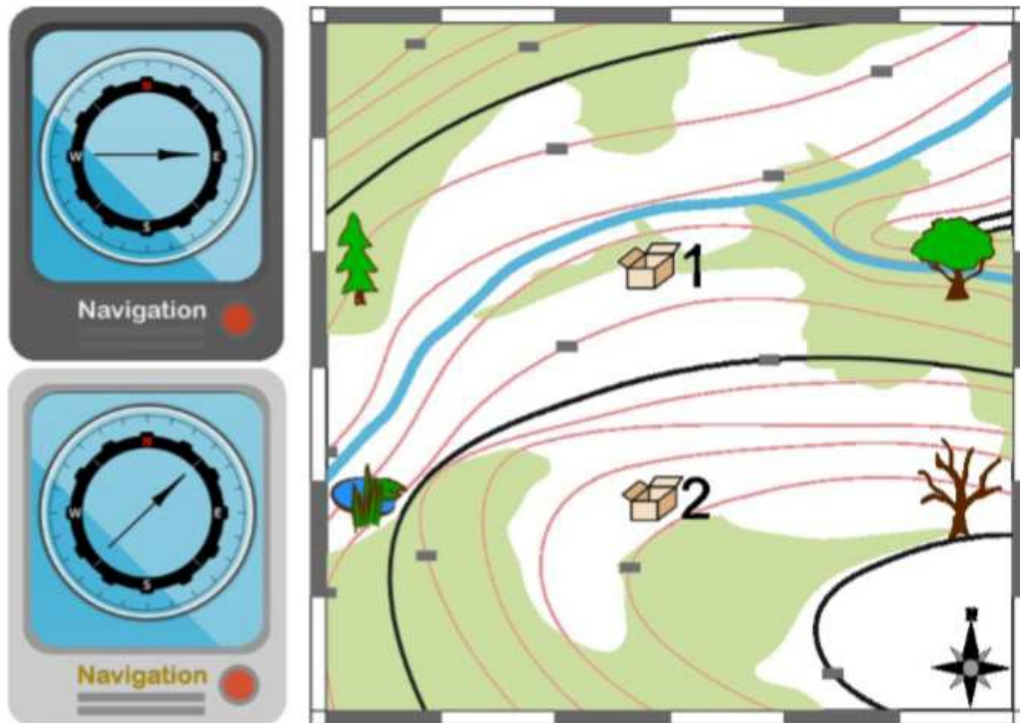
- A) A: ← B: ← C: → D: ←
- B) A: → B: ← C: ← D: →
- C) A: → B: ← C: → D: ←
- D) A: ← B: → C: → D: →

T5: Geocaching

Two friends are seeking caches, small boxes hidden somewhere in a landscape. These friends have an application in their smartphones, which shows them the direction to the chosen cache.

There are two caches in the landscape. Anna is seeking cache 1 and Bob is seeking cache 2. The friends are standing at the same place.

In the picture, you can see their devices (on the left) and map with the caches. We don't know which device is whose.



Question

On which place are Anna and Bob standing?



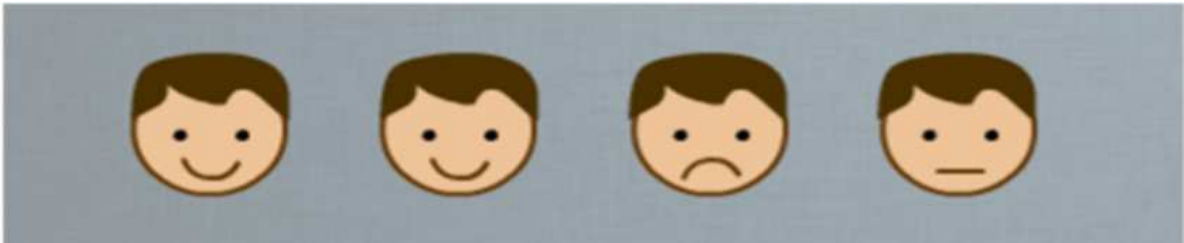
T6: Faces and Glasses

All face expressions given below are assigned to different glasses.



Question

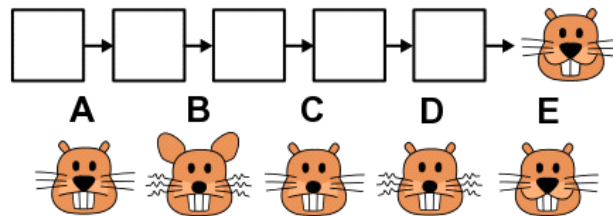
With the same token, look at the face expressions given below and find the matching order of glasses among the given options if only one person has wrong glasses?



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

T7: Animation

B-taro is planning an animation, which shows a sequence of pictures of a face. The animation should run smoothly. Therefore, the order of the pictures is correct, if only one attribute of the face changes from one picture to the next. Unfortunately, the pictures got mixed up. Now B-taro must find the correct order again. Luckily, he knows which picture is last. He labels the five other pictures with letters A to E.



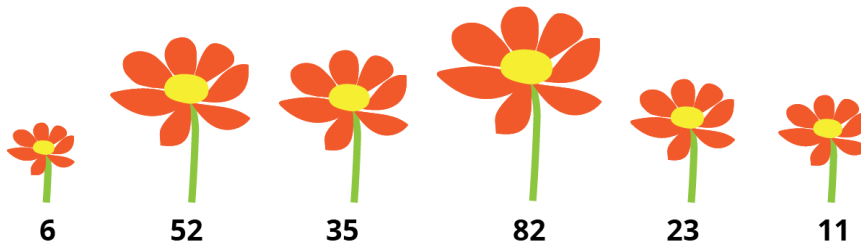
Question

What is the correct order of the five other pictures?

- A) D → B → E → C → A B) C → B → D → A → E
 C) D → B → C → E → A D) B → D → C → A → E

T8: A field of flowers

Beever flies to a field of flowers to collect pollen. On each flight, he visits only one flower and can collect up to 10mg of pollen. He might return to the same flower more than once. The initial amount of pollen in each flower (in mg) is shown below.



Question

What is the maximum total amount of pollen that Beever can collect in 20 flights?

- A) 192 mg B) 196 mg
 C) 197 mg D) 199 mg

T9: Line Drawing Robot

Tom built a drawing robot that can draw vertical and horizontal lines.

The robot is programmed by a sequence of numbers.

- The first number is the length of a line that the robot has to draw vertically (upwards if positive, downwards if negative).
- The second number is the length of a line that the robot has to draw horizontally (to the right if positive or to the left if negative) from the position where the first line ended.
- The third number describes another vertical line, the fourth number another horizontal line and so on...

For example this sequence of numbers

2, 1, -1, 1, 1, 1, -2

makes the robot to draw this figure:

Question

Which of these sequences **does not** make the robot to draw a square?

- A) 1, 1, -1, -1 B) 1, -1, -1, 1
 C) -1, 1, -1, 1 D) -1, -1, 1, 1

T10: Lights

There are three spotlights illuminating the stage in the Beaver City Theatre, one is red, one is green and one is blue. The stage color depends on which lights are switched on as shown below:

| Red light | Green light | Blue light | Stage color |
|-----------|-------------|------------|-------------|
| on | off | off | red |
| off | on | off | green |
| off | off | on | blue |
| on | on | off | yellow |
| on | off | on | magenta |
| off | on | on | cyan |
| on | on | on | white |
| off | off | off | black |

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Time Allowed: 180 minutes

From the beginning of the performance, the lights will be switched on and off in this manner:

- The red light repeats the sequence: one minute off, one minute on.
- The green light repeats the sequence: half minute off, half minute on.
- The blue light repeats the sequence: two minutes on, two minutes off.

Question

After 1 minute from the beginning of the performance, what will be the color for the next half minute?

- | | |
|----------|------------|
| A) red | B) green |
| C) white | D) magenta |

Tasks T11 – T20 carry 4 points each

T11: Telephone book

Grandfather Max is searching for a telephone number of a former schoolmate. Unfortunately the telephone book is only available electronically. He is not sure how her name is spelled so he has to use a special feature of the electronic telephone book. If you do not know how to spell a name correctly you can insert special characters to enhance the search result:

- ? is used when exactly one character is not known
- & is used when exactly two characters in a row are not known
- % is used when the rest of the name is not known

For example a search The% would bring the results Theresa, Theodor, etc.

Grandfather Max inputs in the electronic telephone book: **S?rah B&chtr%**

Question

Which name could Grandfather Max be searching for?

- | | |
|--------------------|--------------------|
| A) Sirah Birchman | B) Sara Bilchdrain |
| C) Sarah Birchtree | D) Billy Beachtram |

T12: Questions and answers

A supercomputer gives answers to difficult written questions (e.g. "What is the meaning of life?", "Does extraterrestrial life really exist?"). Every question ends with a question mark (?) and every answer ends with an exclamation mark (!). A supercomputer can work on several questions together, simultaneously.

A record of its communication is saved in a database but it is enciphered so we can analyze the communication only from last characters of the sentences.

Example: ?????!! means that a supercomputer first received 4 questions and then gave 2 answers. A supercomputer is broken when giving answers without receiving questions.

Question

Only one of these supercomputers is NOT broken. Which one?

- A) !????!?!?
- B) ??!?!?!?
- C) ????????
- D) ?!?!?!??

T13: Draw a maze

The command



draws a grid of squares with 2 rows and 5 columns.

The command

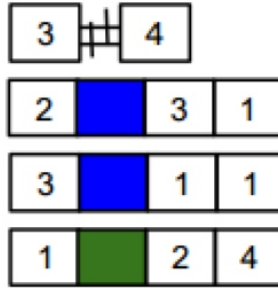


changes the color of 2 squares in a row starting at the 1st row the 3rd column into red.

After executing the two commands we get this grid:

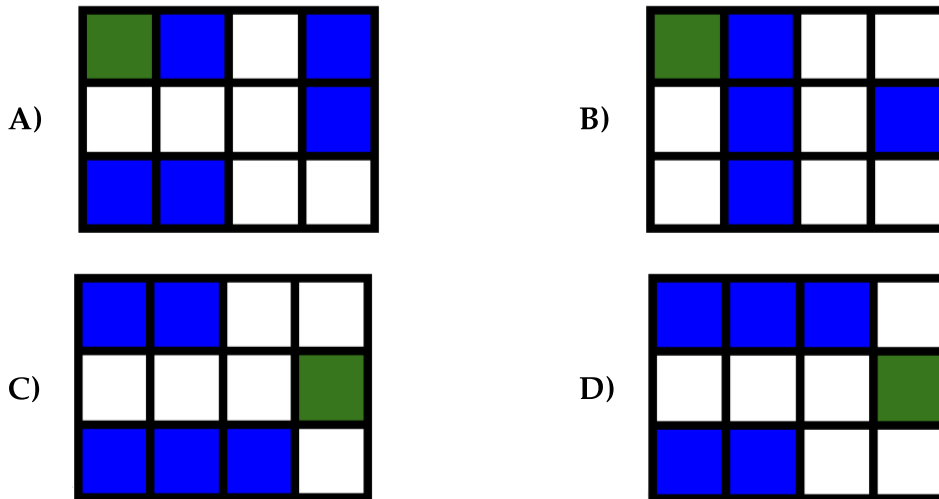


We used the following sequence of commands:



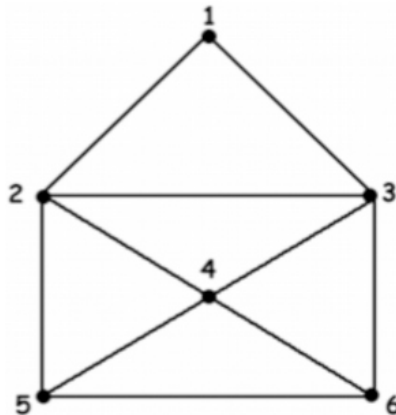
Question

What was the result?



T14: Drawing envelope

Beaver Bilal is proposing that he can draw the figure shown below, without lifting up his pencil and without going twice over the same path.



Question

Which of the following paths will help Beaver Bilal to accomplish his task?

- A) 5 2 1 3 2 4 6 5 4 3 6
- B) 4 2 1 3 2 4 6 5 4 3 6
- C) 1 3 2 4 6 5 4 3 6 4 2
- D) 3 1 2 4 6 5 4 3 6 4 3

T15: Encrypted e-Mail

Beaver wants to send an e-mail to a friend. In the message, Beaver uses numbers in place of vowels to make his message less detectable to automatic filters. Beaver changes his messages according to the resemblance of the character with numbers. For example, Beaver sends ``I D1D MY H0M3W0RK 4G41N'' in place of ``I DID MY HOMEWORK AGAIN''

Question:

What is the text that Beaver sends for the text "I will be late for tomorrow's lesson"?

- A) I w1ll b8 l8te f9r t9m9rr9w's l8ss0n
- B) I w1ll b3 l4t3 f0r t0m0rr0w's l3ss0n
- C) I w1ll be l4t8 f6r t6m6rr6w's l8ss6n
- D) I w1ll b3 l8t3 f0r t0morr0w's l8ss0n

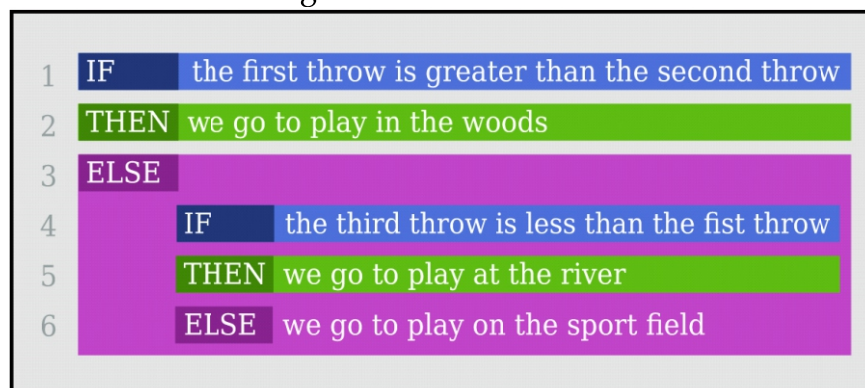
T16: Throw the dice

After school the young beavers are used to play together.















To avoid quarrels, where to play, they throw a dice with sides from 1 to 6.

The decision is found according to this rule:



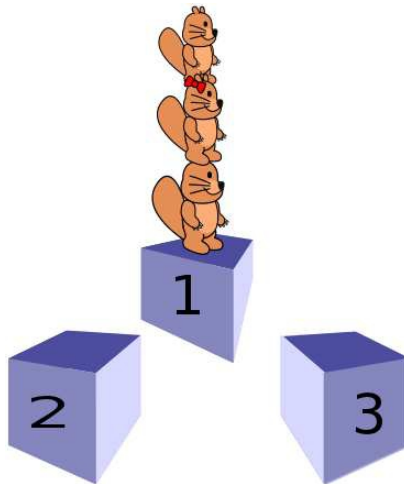
Question

Which sequence of throws will send the young beavers to the sports field?

- A) First throw , second throw , third throw 
- B) First throw , second throw , third throw 
- C) First throw , second throw , third throw 
- D) First throw , second throw , third throw 

T17: Acrobats

The beaver-acrobat family (father, mother, child) has a new stunt. There are 3 platforms. First the family is standing on the first platform, one on the others shoulders.



To jump from one platform onto the other there are 2 rules:

- Only a beaver at the top can jump
- A beaver can only hold a smaller beaver on the shoulders:
 - The father can hold everybody,
 - The mother can hold the child, but cannot hold the father,
 - The child cannot hold anyone.

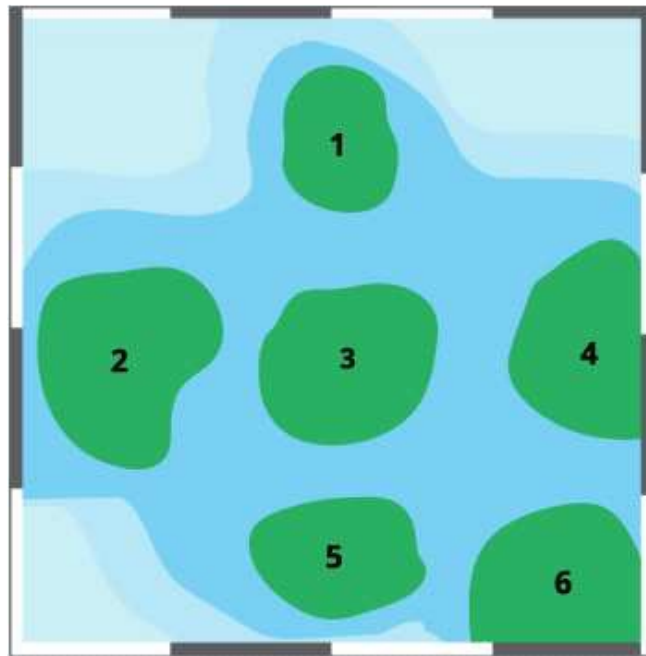
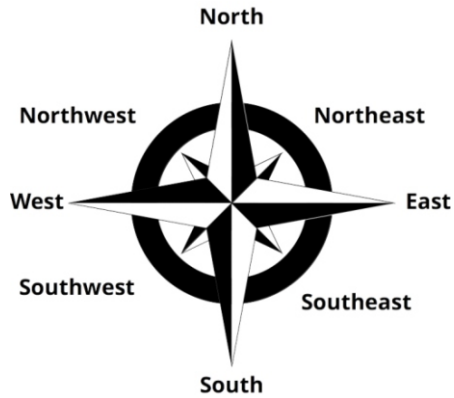
Question

What is the minimum number of jumps needed for the whole family to stand on the third platform?

- A) 5
- B) 6
- C) 7
- D) 8

T18: Compass Rose

On the map below, the numbers represent islands. A compass rose is provided to indicate North, South, East and West.



The names of the islands are A, B, C, D, E and F but we do not know the positions of the islands. We are given the following information:

- C is South of A and Southeast of D.
- B is Southwest of F and Northwest of E.
- D is South of F.

Question

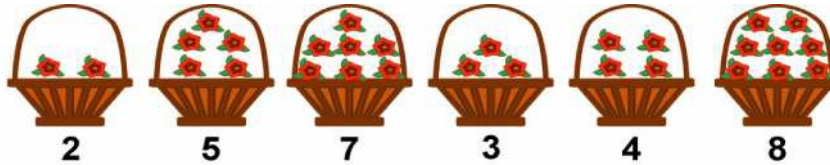
Which island is at position 6?

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

T19: Flowers on the path

There is a park in Beaver City.

The gardener has left baskets with flowers to decorate a path:



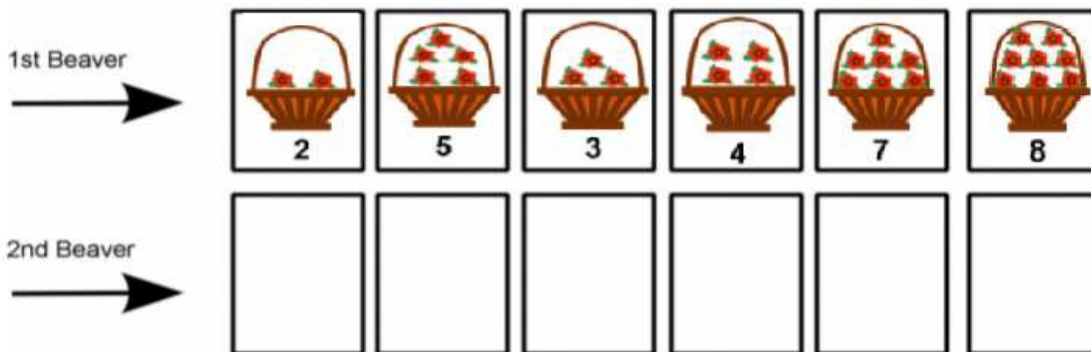
A group of young beavers have realized that the gardener has left the baskets randomly and they would like to place them along the path orderly, according to the number of flowers that are in each basket.

They have decided to order the baskets in the following way:

- A beaver goes walking along the path watching the baskets one by one.
- If a basket (A) that the beaver finds has fewer flowers than the previous one (B), the beaver takes it (A), changes them (A ↔ B) and continues walking (from the place where basket A was).
- If not, the beaver continues the way. The young beavers go along the path one after another, until one sees that the baskets are sorted correctly.

Question

Below you can see the order of the flowers after the first Beaver goes through the baskets arranging them in order. What is the order of the flower baskets after the 2nd Beaver goes through them?



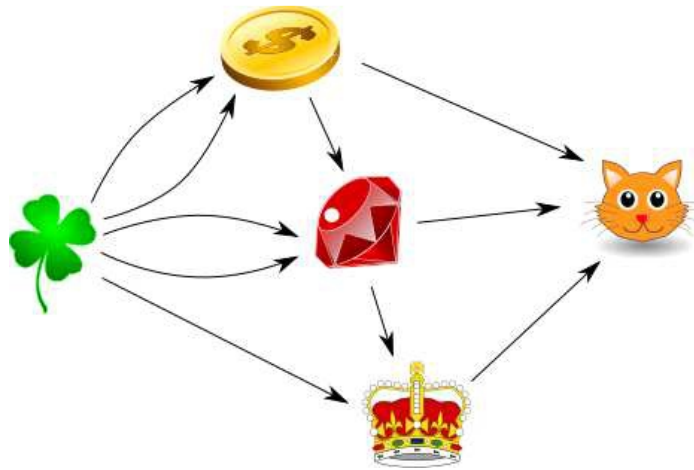
- A) 2, 5, 3, 4, 7, 8 B) 5, 2, 3, 4, 7, 8
 C) 2, 3, 4, 5, 7, 8 D) 2, 3, 5, 4, 7, 8

T20: Beaver the Alchemist

Beaver the Alchemist can convert objects into other objects. He can convert:

- Two clovers into a coin
- A coin and two clovers into a ruby
- A ruby and a clover into a crown
- A coin, a ruby, and a crown into a kitten.

After objects have been converted to another object, they disappear.

**Question**

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

- | | |
|-------|-------|
| A) 2 | B) 10 |
| C) 11 | D) 12 |

Tasks T21 – T30 carry 5 points each

T21: License number

All cars in beaver city have license plates composed of numbers. The Beaver car mechanic Tim has thought of a solution to find the license numbers of his customers faster than before. He uses a table with entry numbers. To calculate the entry number for a specific license number, he simply sums up the first two digits and inserts the full license number in the field with this entry number. If this field is taken already, he takes the next free field below (with a higher entry number).

The table initially contains the entry for a Ford Mondeo type car with license number 357900. According to his entry rule it is stored at entry number 8, since $3+5=8$.

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Time Allowed: 180 minutes

Question

Here is a picture of the table of entries after 7 more license numbers have been inserted.

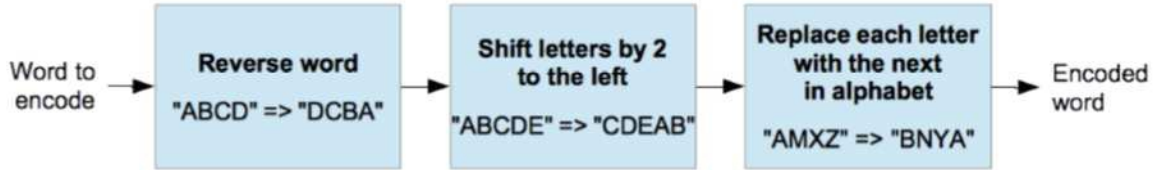
| | | |
|----|--------|----------------|
| 0 | | |
| 1 | 011234 | Toyota Camry |
| 2 | 115678 | VW Golf |
| 3 | 209874 | Ford Focus |
| 4 | 113598 | Toyota Corolla |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | 357900 | Ford Mondeo |
| 9 | 093366 | Kia Rio |
| 10 | | |
| 11 | 561478 | VW Jetta |
| 12 | 652147 | Ford Fiesta |

Which of the following sequences could have been the order in which the license numbers were inserted?

- A)** 115678 VW Golf
011234 Toyota Camry
561478 VW Jetta
652147 Ford Fiesta
093366 Kia Rio
209874 Ford Focus
113598 Toyota Corolla
- B)** 115678 VW Golf
011234 Toyota Camry
561478 VW Jetta
113598 Toyota Corolla
652147 Ford Fiesta
093366 Kia Rio
209874 Ford Focus
- C)** 652147 Ford Fiesta
209874 Ford Focus
115678 VW Golf
561478 VW Jetta
011234 Toyota Camry
093366 Kia Rio
113598 Toyota Corolla
- D)** 093366 Kia Rio
115678 VW Golf
652147 Ford Fiesta
561478 VW Jetta
209874 Ford Focus
113598 Toyota Corolla
011234 Toyota Camry

T22: 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 according to the following steps:

"BEAVER" => "REVAEB" => "VAEBRE" => "WBFCSF"

Question

Beaver Betty receives the message "PMGEP" from Beaver Alex. What did Alex want to say?

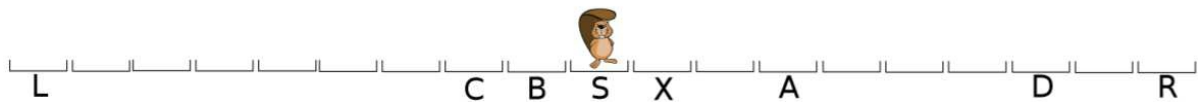
- | | |
|----------|----------|
| A) LODGE | B) RIVER |
| C) FLOOD | D) KNOCK |

T23: Jumping

A beaver moves in strange ways.

He will make exactly 5 moves.

He starts at position S, and will move alternately between R and L: that is, first he moves towards R, then toward L, then towards R, then towards L, and finally, towards R.



When the beaver makes a move, he can move either 1, 2, 3, 4 or 5 spaces. However, once he has moved one of those numbers (1,2,3,4,5), he cannot move that amount on any other move.

For example, the beaver can end up at the space labelled X by:

- moving one space toward R
- moving two spaces toward L
- moving three spaces toward R
- moving five spaces toward L
- moving four spaces toward R

Question

Which of these positions can the beaver not finish on?

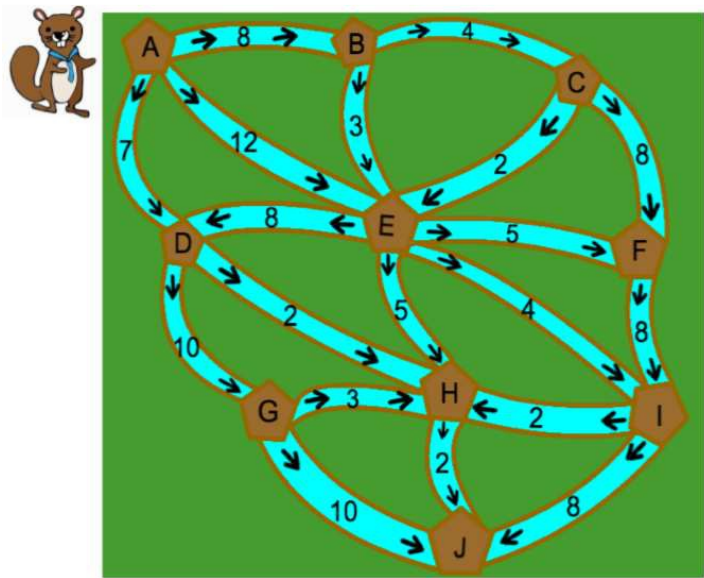
- A) Space labelled A
- B) Space labelled B
- C) Space labelled C
- D) Space labelled D

T24: Collecting Branches

Building dams is the most important annual task for beavers. They collected a lot of branches from the forest for the construction. In order to transport those heavy branches, smart beavers utilize the river system, based on the following rules.

1. Beavers chop down branches and put the branches into the river.
2. Based on the width of the river, each river can only take up to a certain amount of branches floating on the surface.
3. Beavers sail a boat with a flat bottom to pick up the floating branches. To save the transportation cost, the boat will only go down the rivers.

The beavers must find the best route to collect the most branches before sailing the boat.



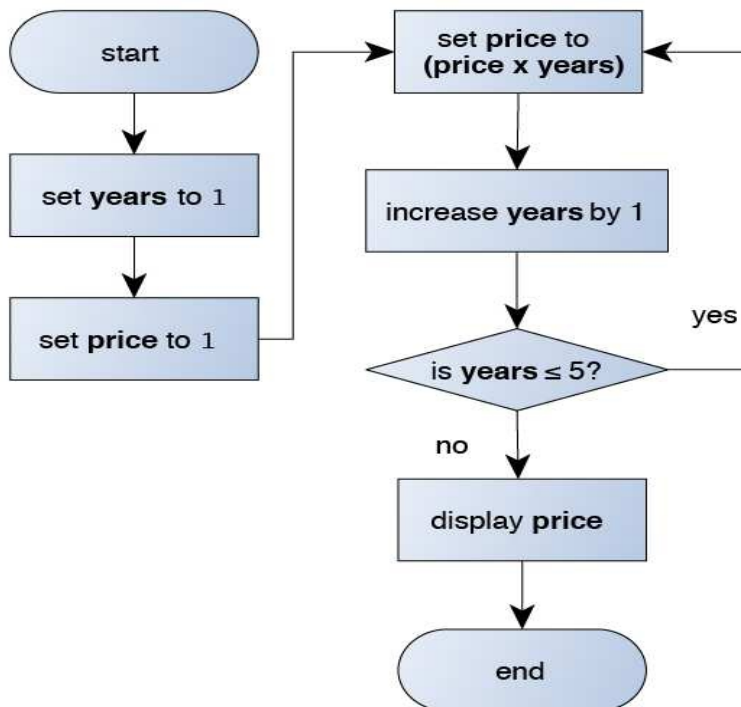
Question

The above map shows the river system with the amount of branches each river can take. The arrows indicate the flow directions. If a beaver starts sailing from A and wants to reach J, **how many branches at most** can the beaver collect within one trip?

- A) 36
- B) 39
- C) 40
- D) 42

T25: Price of cheese

The price of cheese in Beaverland changes depending on how old it is. In order to calculate the price, we can use flowcharts, which are diagrams used to explain a process. Below is the flowchart to calculate the price of a piece of cheese after 5 years have passed. The cheese starts out with the price of 1.

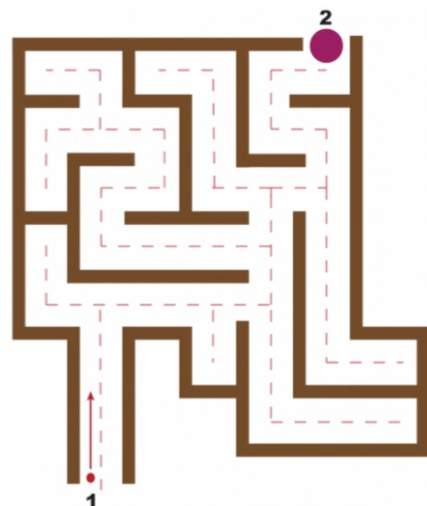
**Question**

What is the price displayed at the end?

- | | |
|--------|--------|
| A) 105 | B) 110 |
| C) 115 | D) 120 |

T26: The Intricate Labyrinth

Anna, Bert, Carlo, and Dora want to walk through a labyrinth from the entrance (1) to the exit (2). Each person has its own rules for finding the exit. They repeatedly apply their rules until they reach the exit. Each one tried their rules on a different small example labyrinth.

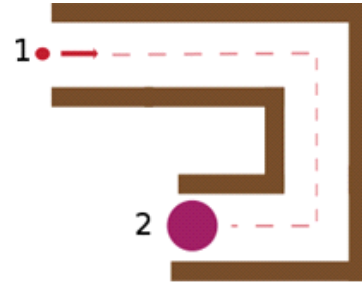


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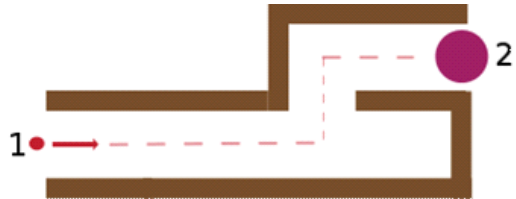
Time Allowed: 180 minutes

Below are the rules and the example labyrinths:

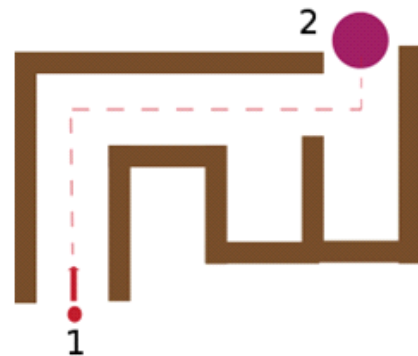
Anna *If I do not face a wall, I go straight.
If I face a wall, I turn right.*



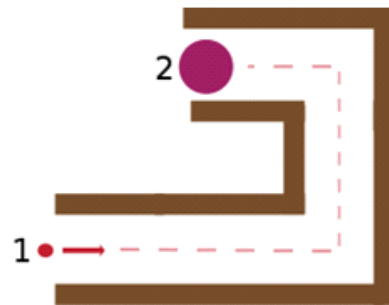
Bert *If there is no wall on the left side, I turn left and go straight.
Else, if I face a wall, I turn right.
Else, if I do not face a wall, I go straight.*



Carlo *If I do not face a wall, I go straight.
If I face a wall, I turn right and go straight until I face another wall where I turn left and go straight.*



Dora *If I do not face a wall, I go straight.
If I face a wall I turn left.*



Question

Which person will find the exit from this labyrinth?

- | | |
|----------|---------|
| A) Anna | B) Bert |
| C) Carlo | D) Dora |

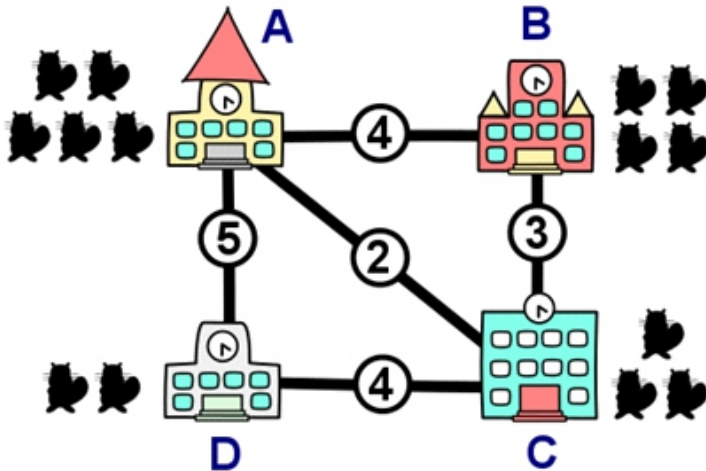
T27: Meeting

There are four schools in Bebras Town. A meeting will take place and several teachers from each school have to attend.

Five teachers from school A will attend; four teachers from school B; three teachers from school C; and two teachers from school D.

The picture shows the location of the four schools. It also shows which bus lines there are between schools and what the fare per beaver is for each bus.

The meeting will take place in one of the schools. The beavers from the other schools will travel by bus to this school and have to pay for their ticket. Note that sometimes a beaver has to take two buses to get to another school.



Question

You have to plan the meeting and you want to minimize the total amount of money that has to be spent on bus tickets. In which school should you hold the meeting?

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

T28: Entrance of Beaver’s Amusement Park

Ninety elementary school beavers, whose student ID numbers are from number 10 to 99, went on a field trip in the Beaver’s Amusement Park. Interestingly, there is a special rule for entering the park:

Welcome to the park! Everyone has to pass through two gates before entering the park. Please follow the following steps. Have fun!!

INTERNATIONAL BEBRAS INFORMATICS CONTEST 2015

Time Allowed: 180 minutes

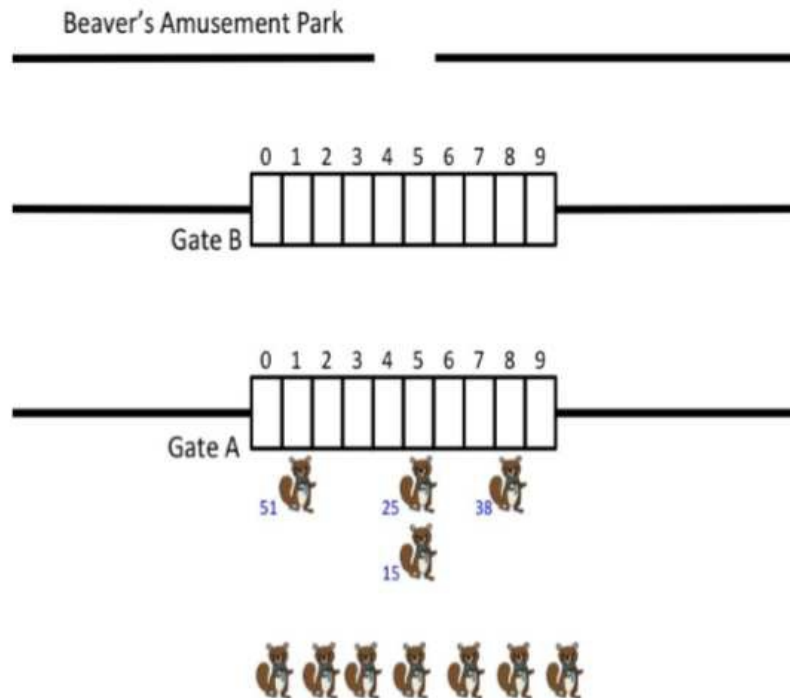
Step 1: Go to Gate A. Find the corresponding door with the number as the right-digit of your student ID number. Line up in front of the door.

Step 2: Wait until everyone finishes lining up in front of Gate A.

Step 3: Starting from the beavers in line of door 0, find the corresponding door of Gate B with the number as the left digit of your student ID number and line up. After the beavers from one door of Gate A finish lining up in front of Gate B, the beavers at the next door to the right begin to line up in front of Gate B by the same rule.

Step 4: Wait until everyone lines up in front of the Gate B.

Step 5: Starting from the beavers in line of door 0, go directly into the park one by one. After all beavers from one door of Gate B enter the park, the beavers at the next door to the right begin to enter one by one.



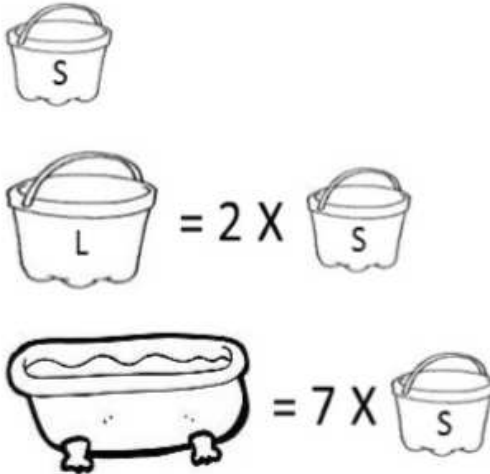
Question

All beavers followed the rules and went into the park. Which student was the tenth beaver to enter the park? Please choose his or her student ID number.

- A) 19
- B) 20
- C) 90
- D) It's impossible to determine.

T29: Taking Water

The governor has implemented a mandatory water restriction due to the drought. Residents in the water-restricting area have to gather water from a water station. Sam's house is in the water-restricting area. Every day after school, he is in charge of filling the bathtub with water.



Sam's family has two buckets. The big bucket can hold twice the water as the small bucket. The bathtub can hold seven small buckets of water. When Sam walks with a large bucket full of water, he has to take a rest for 1 minute after every 1 minute of walking (except when Sam arrives home; then, no rest is needed). When he walks with a small bucket full of water, he has to take a rest for 1 minute after every 2 minutes of walking.

Question

It takes Sam 3 minutes to walk from his home to the water station with an empty bucket, large or small. How long **at very least** does Sam need to fill the bathtub with water from the water station?

- | | | | |
|----|------------|----|------------|
| A) | 24 minutes | B) | 31 minutes |
| C) | 32 minutes | D) | 37 minutes |

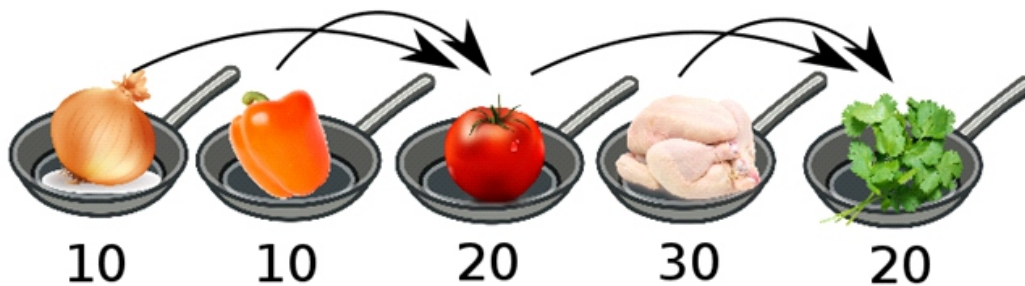
T30: Chakhokhbili

Beaver Sergo loves to cook. His favorite meal is Chakhokhbili.

When cooking in the garden he uses a single burner. He performs the following actions after each other:

| | | |
|---|--|------------|
| 1 | Cook an onion | 10 minutes |
| 2 | Cook a bell pepper | 10 minutes |
| 3 | Combine the cooked onion and cooked bell pepper, add a tomato and cook this together | 20 minutes |
| 4 | Cook a chicken | 30 minutes |
| 5 | Combine everything from steps 3 and 4, add some spices, and cook it all. | 20 minutes |

In total Sergo needs 90 minutes to prepare his Chakhokhbili.

**Question**

When Sergo cooks at home he has many burners available. He uses more burners so his meal is ready sooner. Which of the following statements is **NOT** correct?

- A) With 2 burners it is possible reduce the cooking time by 10 minutes
- B) With 2 burners, it is possible to reduce the cooking time by 30 minutes
- C) With 3 burners, it is possible to reduce the cooking time by 40 minutes
- D) With 4 burners, it is possible to reduce the cooking time by 50 minutes