



Seventh International contest of logical problems

(Organized by the Ludomind society)

Welcome to the seventh international contest of logical problems, organized by the Ludomind Society (<http://www.ludomind.gui.pro.br/>). It's a difficult contest. All your answers must be clearly explained (the explanation is never long). The questions are culture fair and don't need high knowledge in mathematics.

The questions and answers to the six firsts contests can be find at

http://www.lulu.com/product/ebook/ten-years-of-ludomindscontests/17570557?productTrackingContext=author_spotlight_47385 or at http://www.lulu.com/product/couverture-souple/ten-years-of-ludominds-contests/14605013?productTrackingContext=author_spotlight_47385



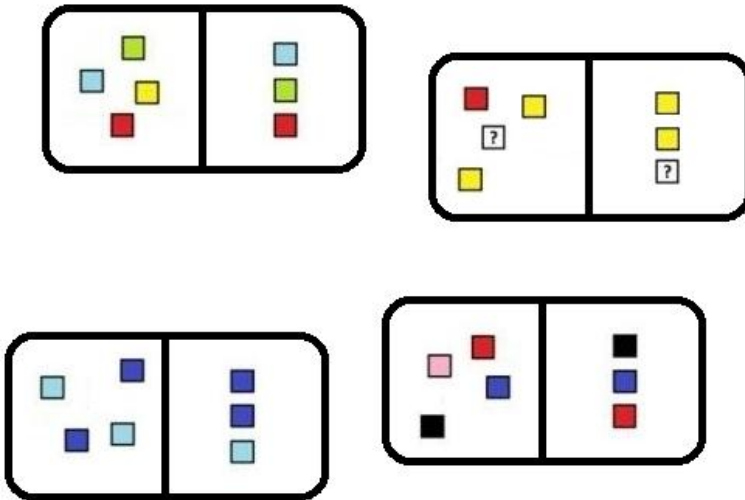
The winner, if he has a minimum score of 15/20 will be admitted as a provisional member of Ludomind, and will have three months to create two puzzles enabling him to become a member.

The value of each question is one point, except question 4 which is worth three points.

Send your answers in one single mail before end of April 2012! to albert.frank@skynet.be (Subject: international contest)

1)

COLORED SQUARES



The picture above shows 4 groups of small colored squares.

The colors of the small squares are only the following 7: green , yellow, pink, blue, turquoise, red, black. There is no multicolor square.

The squares with a question mark are 'unknown squares': you don't know their color. In each group, the 3 colored squares of the right subgroup are sorted by color (according to a certain classification that you don't know) and they are a subset of the ones in the corresponding left subgroup: The missing colored square would occupy, in the right subgroup, always the same position (according to the mentioned classification), regardless of the group.

For each unknown square, determine the list of its possible colors.

2) A jeep in the desert

Thomson and Thompson are lost in the desert near a rock named Castafiore.

Their jeep can of course measure distances and has a perfect compass. They have also a classical dice with 6 faces.

Not knowing how to get out of the desert, they choose to rely on chance and decide to move in stages by adopting the following method :

a. Beginning of stage

b. Launch of the dice

c. Drive straight ahead with the jeep for a number of kilometers equal to the number indicated by the dice

d. If this number is odd, turn right (90 degrees) at the end of the stage, if this number is even, do not turn

e. End of stage

Knowing that the jeep points northward at the beginning of the first step, and knowing that, after 18 stages, Thomson and Thompson are back to the Castafiore, what is the probability that their jeep points northward again at the end?

N.B. : the desert is considered as infinitely large and flat, the curvature of the earth will be neglected .

3) The three sailors.

Captain Haddock, Captain Nemo and Popeye are trapped on an oil platform in the ocean, thousands of kilometres from the nearest land.

Aliens arrive and offer to release our three sailors if they succeed in performing a task: successful event. The conditions are:

- The aliens will provide each sailor with a boat. These boats are very special:
 - o They always have a constant speed of 20 km / h.
 - o They can only take 6 directions, at the choice of the sailor: 0 °, 60 °, 120 °, 180 °, 240 ° or 300 ° (0 ° means "toward the North, 60 degrees means" between North – East and East ", ..., 180 degrees means" South ", ...)
 - o A change of direction can take place only once per hour, at the exact hour 15h00 (3.00 pm), 16h00 (4.00 pm), ...
- The 3 sailors can talk together before the beginning of the test, no communication is allowed once the test has started.
- At 1.00 pm , the first sailor starts in the direction he chooses.
- Each boat must start at a different time, but each departure must take place at an "exact hour" (2.00 pm, ..., 5.00 pm, ...).
- With the single exception of the common starting point (the oil platform), the 3 routes can have no common point. It is also forbidden to cross its own route.
- From 4.00 pm on, (and until the sailors will pass the test), the aliens will, every hour, take an aerial photography with the position of the 3 boats.

To pass the test, our 3 sailors must, on a photo:

- Have the 3 boats lined in a row
- The distance between the platform and any boat may never be a whole number of kilometres.
- The ship of Captain Haddock must be closer to the platform than the boat of

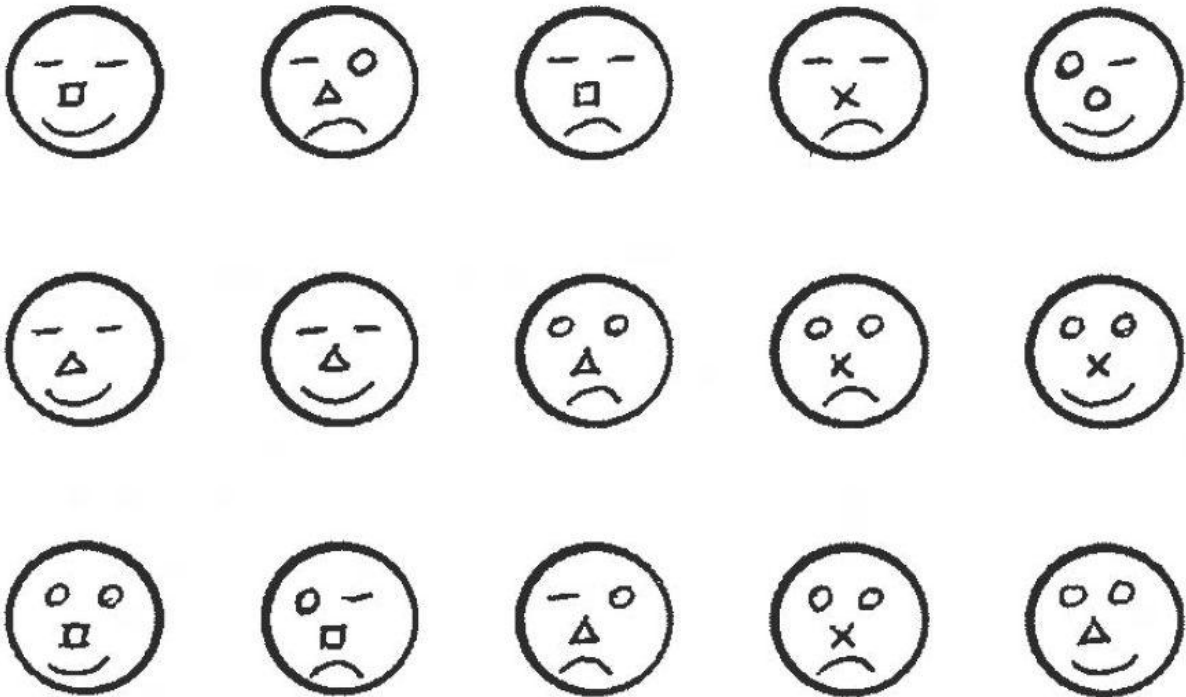
Captain Nemo and Popeye's boat must be further away from the platform than the boat of Captain Nemo.

- The distance between Popeye's boat and the platform must be as small as possible, taking into account the 3 conditions above.
- The 4 above conditions must absolutely be achieved in the shortest possible time.

At what time will our 3 sailors have succeeded the test ? And how far will each one be from the oil platform (with a precision of 0.1 km)?

NB: we neglect the curvature of the earth (the sea surface is considered flat); the platform will be considered as a point.

4) Explain the following drawing (This question has a value of 3 points):



5) The liar puzzle

As in an old easy problem, you are at a bifurcation of two roads (one leads to Paris - where you want to go - , the other elsewhere.) At the bifurcation, there is a house, in which live two brothers. You know that AT LEAST one of them is a liar (which always lies.) You speak to one of the brothers (you don't know which one). You have the right to ask him only one question of maximum 8 words. What question will you ask? (notes : 1. The other brother is not present. 2. You keep your hands in your pockets).

6) In question 5), assuming the two brothers are very clever, one could think that two words (instead of maximum eight) could be enough. Unfortunately, this “Two words sequence” would not help you. Give the “two words sequence” and explain why it’s useless.

7) The road

This puzzle is based on the real world. It does not need academic knowledge to be solved but only observation and common sense.

Santa Ana village is a small town with a nice weather, plenty of sunny days with calm wind. In the little village there is a narrow street call Long Street, which connects two points A and B. The distance between A and B is approximately 1 km. Long Street is a one-way road; cars always go from A to B. At both sides of the street there are apartment buildings all the way from A to B. Most of the apartments have flowers in the balcony. There is no other street crossing Long Street by the left or by the right. The children of the neighborhood often play there. There are always plenty of cars passing through Long Street, so there is a speed limit of 20 km/hour for safety reasons.

The middle between A and B, M, is known to the villagers as “the middle point”. The curious thing about this point is that it separates the half of the road that has mostly unhealthy and small flowers, A to M from the half of the road that has plenty of beautiful and healthy flowers.

It is known that the owners of the flowers of the segments AM and MB all take the same care of their flowers. All the flowers were grown from seeds of equal quality and get approximately the same solar radiation. Also, there is not traffic jam between A and B and everybody respect the speed limit of 20 km/h and drives normally.

Within the context, what can you say about Long Street, the road that goes from A to B?

8) 2, 7, 1, 6, 4, 1, 1, 2, 5, 7, 2, 9, ?

9) 6, 3, 2, 7, 10, 9, 7, 6, ?

10) 2, 1, 2, 2, 1, 6, 0, 6, 6, 1, ?

11)

1 2 2 3 3 3 2 3 ?

2 1 3 3 3 3 5 3 ?

2 3 2 4 5 4 2 4 ?

2 3 1 3 3 5 5 7 ?

2 3 5 2 6 3 7 4 ?

2 3 5 7 4 6 3 5 ?

?? ? ? ? ? ? ? ?

12) 3, 3, 3, 5, 5, 7, 3, 13, 5, 19, ?, ?

13) 0000, 1101, 1101, 1011, 101110, 0111, 10101011, 0101, 101110100, 0011, 101111101, ?, ?

14) 1,3,6,7,8,16,10,15,21, ?

15) 0, 0, 0, 0, 3, 0, 0, 8, 0, 0, 10, 0, ?, ?

16) 12 33 37 ? 65 74 88 92

17) 12 52 8 ? 60 40 60 40

18) 2, 0, 3, 0, 4, 8, 1, 5, ?
