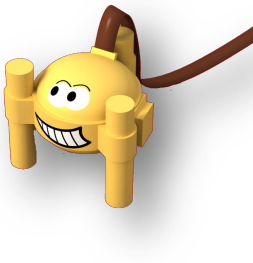
2021-2022

namazu contest



Episode 2 – Questions issued on 12/11/21 ; answers due on or before the 15/01/22 to namazu@geoazur.unice.fr

Part I - Questions to Know All About InSight!

To celebrate InSight's 3-year anniversary on the Martian surface, Part I will be 100% InSight ... it's up to you to test your knowledge of the mission by answering the short questions below.

Q1. On what specific day did InSight land on the Red Planet?
- November 11, 2018
- November 26, 2018
- December 1, 2018
- December 21, 2018

Q2. The 3 years celebrated correspond to earth years. Knowing that a Martian soil (= duration of a day) is 24 hours and 39 minutes and knowing that Mars needs 668.6 sols to make a revolution around the Sun, in how many soils InSight will celebrate its 3 years, in Martian years?

Answer : _____

Q3: On his 3rd birthday in Martina years, what will the date be on Earth?

Answer : _____

Q4. What is the name of the scientist who is the scientific manager of the seismometer of InSight ?
- Philippe Lognonné
- Tilman Spohn
- Elon Musk
- His identity is kept secret.

Q5. Which of these countries participate in the organization of the InSight adventure?
- France
- United States
- Swiss
- Germany

Q6. Thanks to the "cleaning" of the solar panels, InSight had enough energy to record two earthquakes of magnitude 4.2 and 4.1 on August 25 and another of magnitude 4.2 on September 18.
Scientists are very satisfied because previously the largest recorded earthquake was only 3.7 magnitude.

From the document below, indicate by how much the energy was multiplied between the marsquake of magnitude 3.7 and the one of magnitude 4.2.

Magnitude difference	0,2	0,3	0,5	1	2
Ratio of released energies	2	2,81	5,62	31,62	1000

Answer : _____

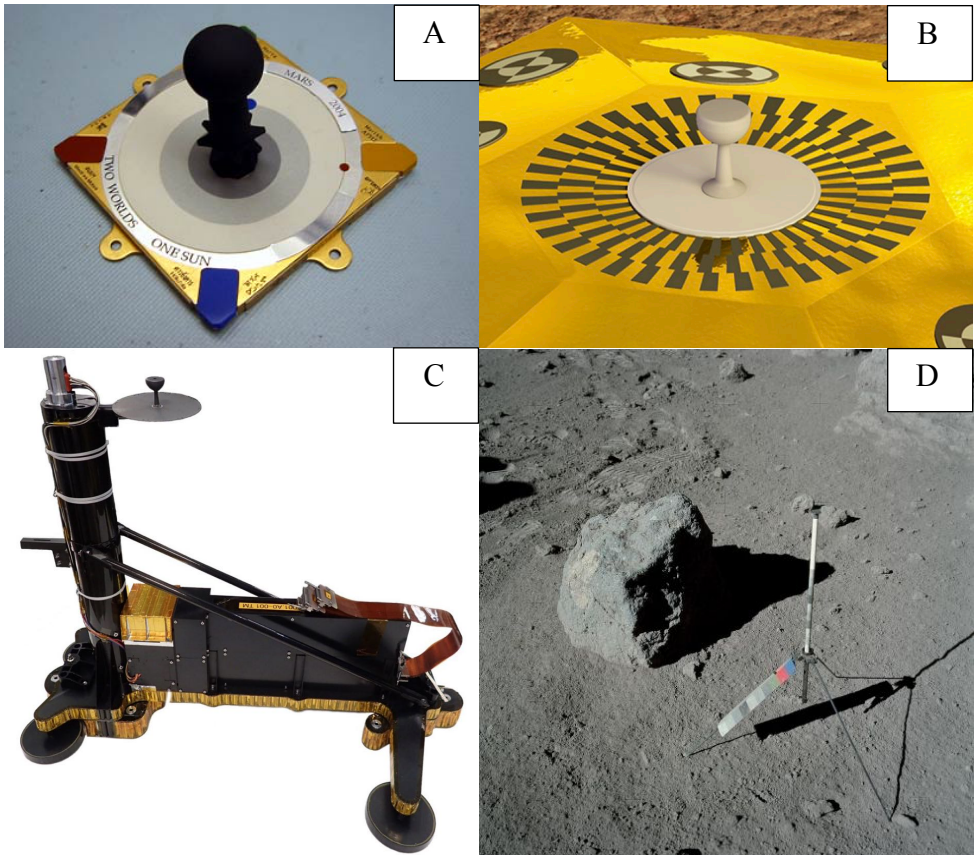
Q7. On Earth, the earthquake recorded with the strongest magnitude was located in Chile in 1960 with a magnitude of 9.5. How many times greater was the energy released than the 4.2 marsquake?

Answer : _____

Q8. The main purpose of the study of earthquakes on Mars is:
- the search for underground water
- the search for life
- knowledge of the internal structure of Mars
- knowledge of volcanism on Mars

Q9. In order to locate the marsquakes, the researchers had to locate the north on Mars. However, there is no magnetic field and a compass cannot help. They therefore had the idea of using a gnomon which is an instrument which visualizes the movements of the Sun by its shadow.

What photo is InSight's gnomon?
- A
- B
- C
- D



Help : https://www.youtube.com/watch?v=bHNEoIF6UrU&t=1052s

Part II - Listening in the Martian Wind

In February 2021, NASA shared a recording of the Martian wind from the Perseverance rover. The latter has two microphones: one on the SuperCam instrument and another located on the side of the rover. It is this one that allowed this recording of the Martian wind.

In December 2018, NASA also released a recording of the Martian wind thanks to InSight. However, InSight does not have a microphone and the recording was done using air pressure sensors.

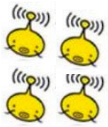
In both cases, the raw recordings are difficult to hear for our ears and the engineers had to work to isolate the wind noise (case of the Perseverance recording) or to modify the frequency and speed of the soundtrack (case of InSight registration)

For the curious, the recordings have been put online by NASA at the following addresses:
https://mars.nasa.gov/resources/25629/nasas-perseverance-rover-microphone-captures-sounds-from-mars/
https://mars.nasa.gov/resources/22204/sounds-from-insights-pressure-sensor-on-mars/?site=insight

In order to work like the NASA researchers, Namazu gave you a little surprise and made two recordings for you, which you can download on the competition page.
https://insight.oca.eu/fr/namazu-contest

Thanks to the Audacity software that you will have to use (download: https://audacity.fr.softonic.com/), you will have to discover the messages contained in these apparently incomprehensible recordings.
To do this, you will be able to analyze the spectrum of the recording:
"Analysis" then "Draw the spectrum"

Then, you can eliminate a parasitic frequency using the option: "Effects" then "Band cut filter"



After eliminating the parasitic frequencies, you will be able to understand Namazu's messages.
What are they ??

Good luck and good ears to you!

Part III - InSight between mystery and challenge

Mystery videos!

As in every episode now, a researcher sends you a video. It's up to you to discover the mystery instrument presented.

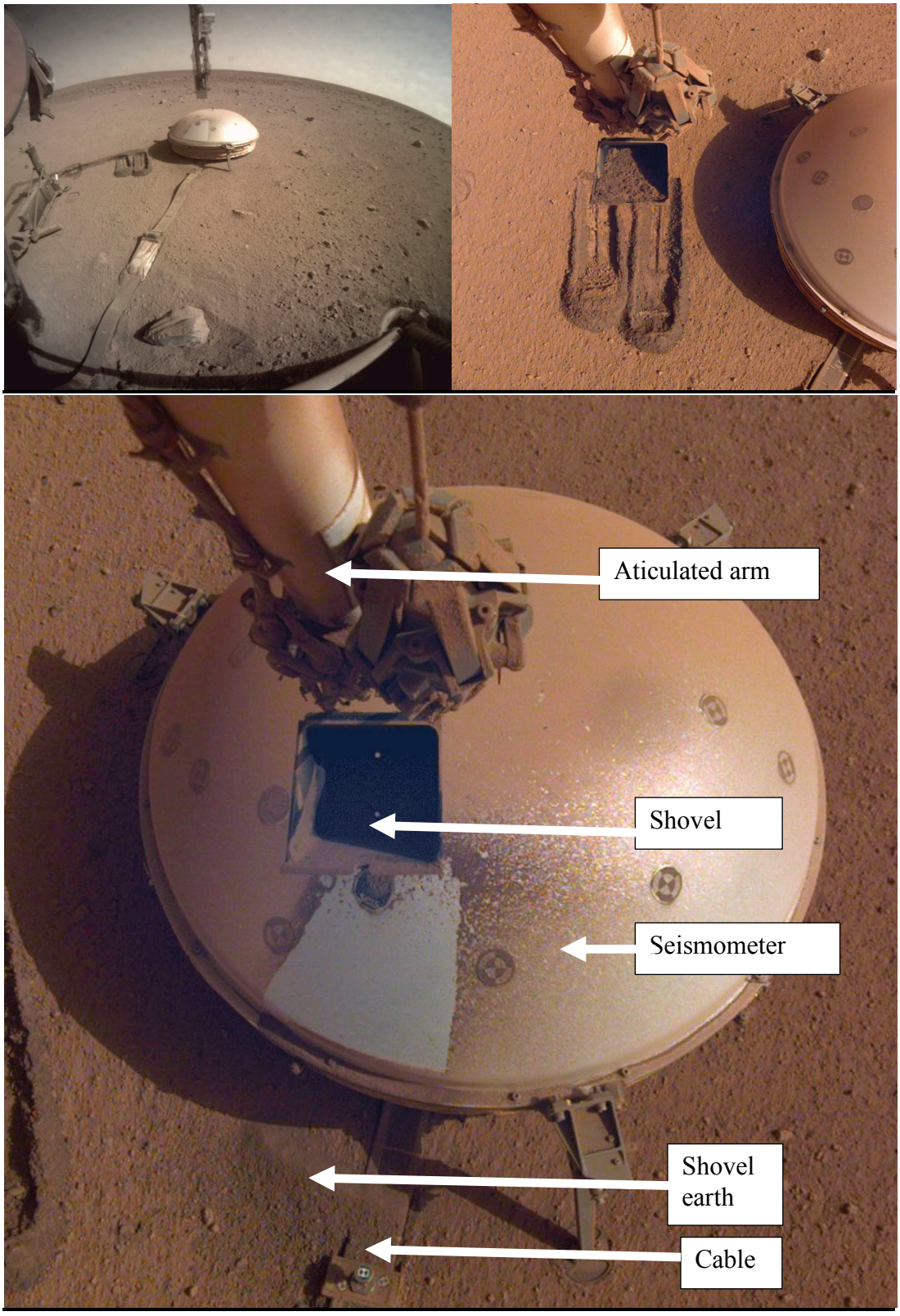
Link to the youtube video: https://www.youtube.com/watch?v=E1v5bPI6bFg

Video presented by Rémi Lapeyre, InSight SEIS / APSS Payload Operations. Plesae use automatic subtitles ☺

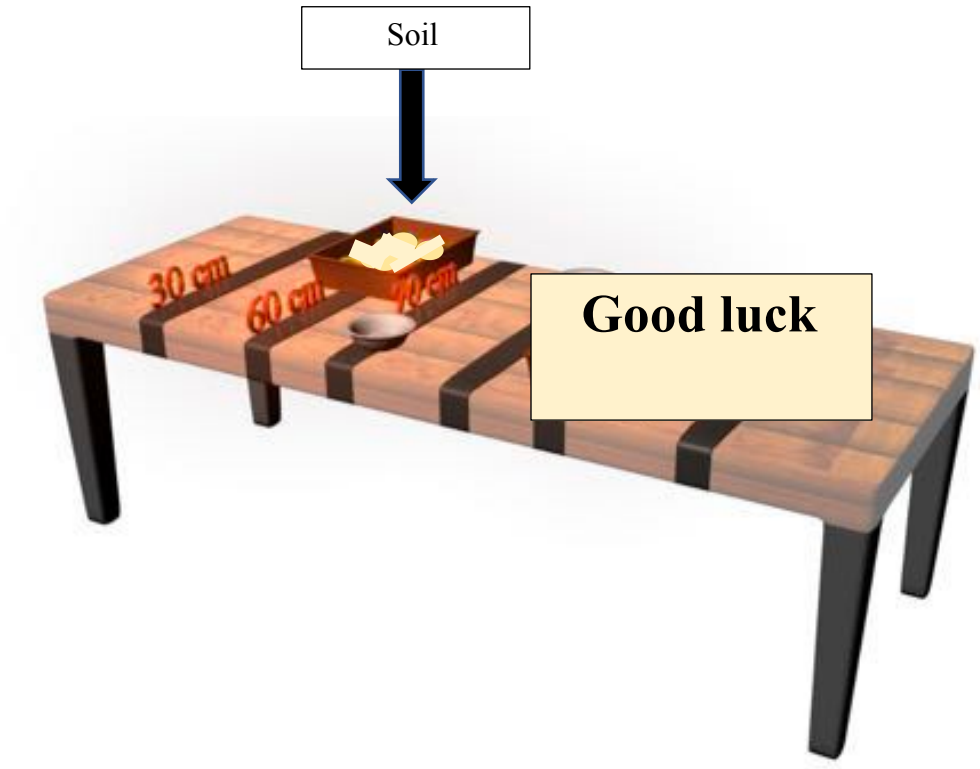
Now it's up to you to tell us what this mystery object is?

Challenge!

Target: On March 14, 2021, InSight used its articulated arm with shovel to cover the seismometer cable with soil. The purpose of this operation was to insulate the cable from wind and temperature variations and thus allow easier recording of earthquakes by the SEIS seismometer.

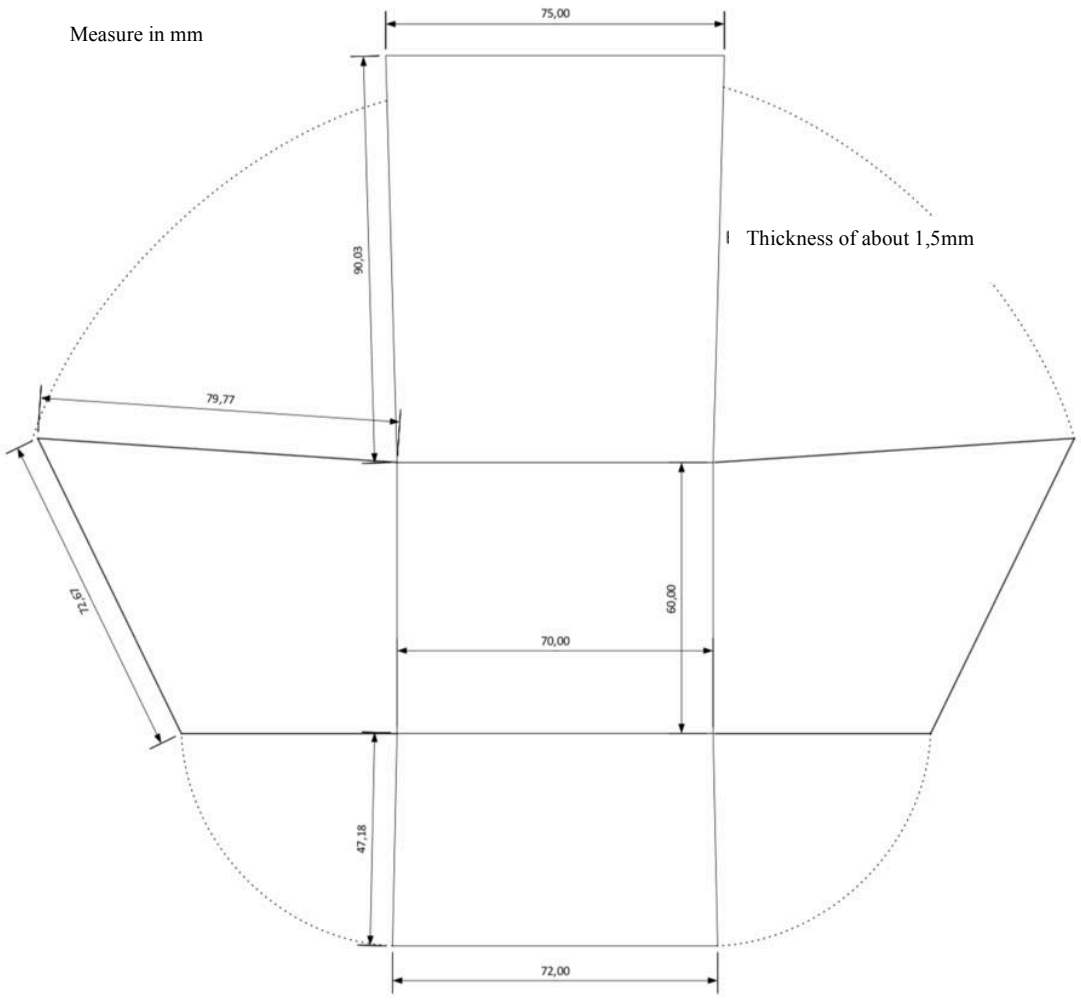


During this activity you will need to step into the shoes of InSight engineers and create an articulated arm with a shovel capable of transporting dirt / sand from one place to another.



Representation of a long table with two strategic locations for the shovel arm challenge. The goal is to use a student-designed robotic arm to move dirt / sand from the rectangular container (60cm line) to a container placed at the 70cm line without any part of the body sticking out the line of 30 cm.

You will need to build a replica of the InSight shovel using the actual ribs provided. It must be as faithful as possible to reality in terms of dimensions. You can use the material of your choice to make it (paper, cardboard, wood, plastic, etc.)



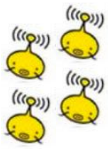
Shovel mesures located at the end of the InSight arm

JUNIOR LEVEL

Other possible material:
Tape
Scotch
Bowls
Paper clips
String
Elastic
Notepads
BBQ skewer
Pipe cleaner caterpillar
Parisian ties
Cartons
And any other construction material needed

EXPERT LEVEL (if you have the equipment available)

Same requirements as for the JUNIOR level but you will have to use Lego Mindstorms bricks, Arduino or any other programmable support in order to make your robotic arm autonomous in its task.

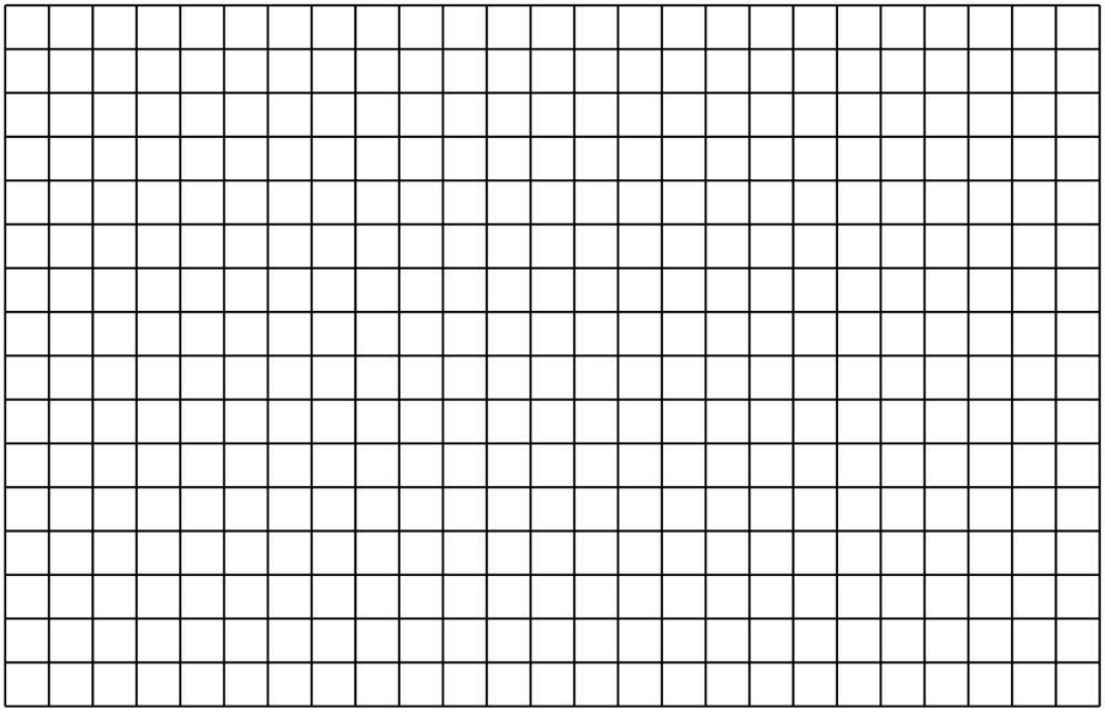


For this question, you will have to film the use of your arm equipped with the shovel ... and accompany your answer with a technical sheet of assembly of the imagined and tested arm. The video will need to be uploaded to a file transfer site so you will provide the link.

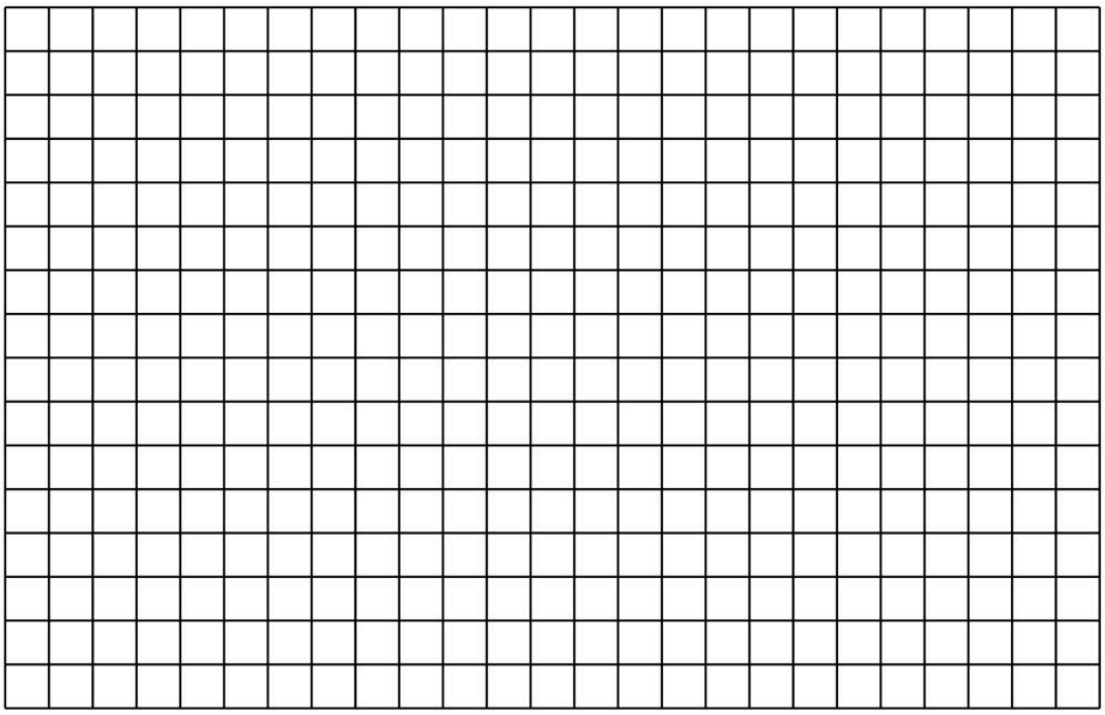
Part IV - Pixels and post-it notes!

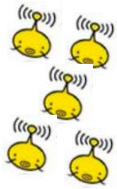
To start this year of challenges, an artistic challenge awaits you.
You will have to represent Perseverance and Mars2020 in pixel art: You will have to use the grids below and color the number of squares of your choice the color you want, in order to represent in one Perseverance grid and in another InSight grid.

Perseverance Grid:



InSight grid :





Once the charts have been completed, you will need to reproduce them in Post-it ™ (or equivalent) on a window in your school.
You will have to attach the photos of your achievements and of course, Namazu is waiting to see you in the photos in front of your productions.

All the feedback will be put on the internet and a public vote will decide which model is the most successful. Internet users will be invited to judge according to realism, technicality and creativity.

BONUS point:

1st prize: 3  2nd prize:  3rd prize: