

Colégiul National Emil Racovita de Cluj (Romania)



72 students supervised by Ariana-Stanca Văcărețu, Alexandrina Cruceru, Valentina Vasilescu, Adrian Magdaș, Vasile Andrea, Felicia Marincaș, Ioana Nendrean, Anca Lăpuștea and followed by Adela Lupescu (Universitatea Babeș – Bolyai, Cluj-Napoca)

High School Altitude Briançon (France)



40 students supervised by Hubert Proal Mickaël Lissonde Pierre Granouillet, William Faux, Noëlle Trovato and Stephan Colas and followed by Camille Petit (University of Fribourg - Switzerland) and Yves Papegay (INRIA Sophia Antipolis - France)

Common scientific communications



Mathematical understanding through different languages

Volunteer students from both high schools are working on topics proposed by researchers in mathematics. They exchange their ideas in seminars, they present their results during the conference and prepare their work for publication. This is also an opportunity for young people to meet and talk with researchers and enhance their work in various scientific events.

The collage includes a line graph with two oscillating lines labeled 'Nombre de voitures sur la route D' and 'Nombre de voitures sur la route C'. Below the graph are two photographs: one of a student sitting at a desk with a laptop, and another of a student standing and presenting to a group of people seated at computers. Four arrows (blue, yellow, red, blue) point towards the central images.

<http://matlanproject.weebly.com/>



MatLan

Learning mathematics and languages through research and cooperation



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**Project between
Colegiul Național Emil Racoviță
of Cluj-Napoca (Romania)
and
High School Altitude Briançon
(France)**



Erasmus+

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Learning mathematics and languages through research and cooperation:



research work on common issues



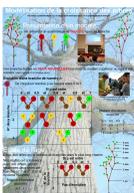
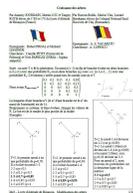
exchange of ideas, methods, results ...



meetings between high schools



joint presentations at conferences or other scientific events



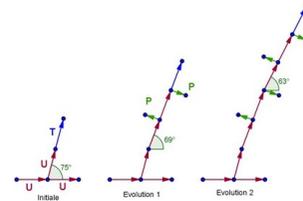
the drafting of common items

Topics list

- Fem

We have a two-letter alphabet: B (bud) and F (stem) We define two rules:

$B \rightarrow F[+B][-B]FB$ and $F \rightarrow FF$
Study what happens when we start with a B.

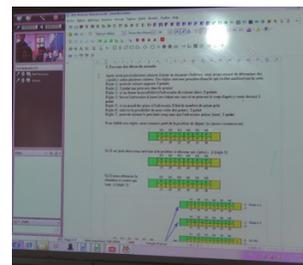
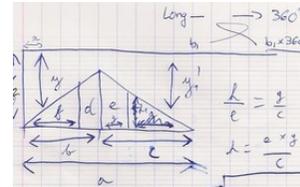


- Modelling plant growth

Study tree leaves, flowers or snail shells to propose a model of evolution of the L-type systems.

- The bicycle wheel

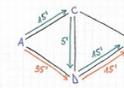
Imagine a shaped serrated road. What shape should we give to the bike wheels for the rider not to notice this problem?



- Mancala

Understand how to formalize the course of Mancala game in order to program it, and how we define strategies to implement the behavior of a player.

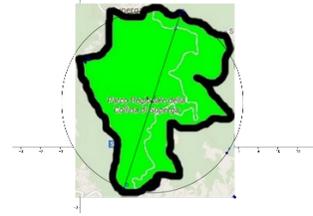
Time scheme:



Conclusion:

• the 2000 divisions who take the way $A \rightarrow C \rightarrow B$ will arrive in B in $45 + 5 + 45 = 95$ minutes;
• the 2000 divisions who take the way $A \rightarrow B$ will arrive in B in $35 + 45 = 80$ minutes.

- The paradox of Braess
Model the flow of 4000 cars on two routes and determine the distribution that minimizes the average time.



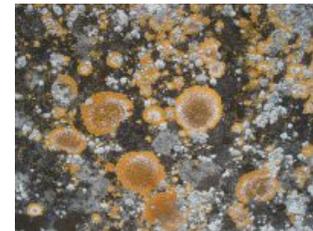
- Counting boars

How to count wild boar population over a large area?

Image de départ

0.00	0.07	0.41	0.70	0.81	0.81	0.28	0.17	0.00	0.19	0.30	0.17	0.51	0.82	0.29	0.01
0.12	0.25	0.22	0.28	0.51	0.43	0.57	0.59	0.77	0.37	0.53	0.41	0.59	0.15	0.03	0.13
0.12	0.25	0.02	0.44	0.44	0.27	0.09	0.01	0.34	0.33	0.37	0.53	0.10	0.26	0.71	0.35
0.46	0.10	0.83	0.02	0.18	0.09	0.29	0.07	0.12	0.04	0.00	0.17	0.06	0.25	0.22	0.93
0.14	0.20	0.70	0.00	0.03	0.91	0.93	0.56	0.10	0.97	0.97	0.98	0.51	0.76	0.71	0.05
0.21	0.63	0.77	0.10	0.62	0.57	0.11	0.15	0.55	0.11	0.18	0.25	0.07	0.47	0.35	0.27
0.00	0.30	0.17	0.78	0.06	0.09	0.22	0.72	0.56	0.60	0.46	0.75	0.53	0.88	0.47	0.64
0.30	0.35	0.70	0.55	0.04	0.81	0.36	0.01	0.20	0.31	0.53	0.83	0.29	0.76	0.74	0.78
0.29	0.18	0.00	0.03	0.08	0.81	0.12	0.37	0.04	0.56	0.73	0.13	0.05	0.49	0.74	0.01
0.56	0.48	0.21	0.01	0.21	0.99	0.12	0.11	0.53	0.41	0.32	0.22	0.06	0.00	0.06	0.79
0.09	0.78	0.44	0.04	0.06	0.20	0.37	0.56	0.13	0.78	0.10	0.20	0.01	0.33	0.51	0.68
0.00	0.75	0.19	0.27	0.61	0.11	0.33	0.37	0.45	0.52	0.21	0.41	0.37	0.97	0.01	0.49
0.71	0.74	0.91	0.56	0.00	0.11	1.00	0.25	0.14	0.00	0.34	0.31	0.09	0.15	0.07	0.77
0.71	0.60	0.64	0.30	0.23	0.57	0.88	0.58	0.58	0.24	0.56	0.09	0.19	0.60	0.68	0.68
0.76	0.64	0.64	0.09	0.05	0.45	0.54	0.09	0.04	0.95	0.25	0.61	0.97	0.01	0.41	0.42
0.10	0.76	0.67	0.37	0.51	0.11	0.83	0.76	0.57	0.36	0.70	0.41	0.50	0.72	0.10	0.60

- Image Processing
What happens when we change an image several times according to the same process?



- Dating the lichen

How to use the lichen growth to date certain events.

- Athletics

Is there a link between the world records in running over all "official" distances (100m, 200m, 400m, ..., half marathon, marathon, 100km)?