The importance of code literacy cannot be understated in our digital world. While numerical tools introduction and use is encouraged, and championed in some science class syllabi at the European Schools, the impact it has on students know-how is limited to the tools presented (mostly the TI-Nspire calculator). With the current and future syllabi in Maths and Sciences, time cannot be allotted by teachers to go beyond these tools into actual coding practices. In S6/S7, ICT classes are impactful for students that can manage to have them in their schedule. Most science-profile students cannot attend those classes, due to limitation in schedule, and time conflicts.
With the help of the APEEE and our school management, we would like to setup a pilot program aimed to develop S6/S7 students' code literacy through applications to Numerical Analysis (Maths) and Modelling (Physics). According to us, this is the simplest method of achieving our goal, without having to redefine syllabi, or create a new course entirely, which would involve the Bureau Central, and take years in the making. In this proposal we will describe our goal and its potential impact, the pilot program envisioned, two examples of projects, the practical requirements, and how APEEE could help us set up our club.

Our goal is to create a club through which students would engage in projects and challenges aimed to explore algorithms at their most fundamental level. Student work would be related to concepts in their regular Maths, ApproMaths, Physics and LabPhysics classes, but would go beyond the limitations of their calculators for instance. By breaking down numerical methods to their core ingredients, and implementing them from the ground up, students would actively learn coding and develop their understanding of fundamental Maths and/or Physics. Creating clean code will force students to turn high-level concepts (*e.g.* vector spaces, Potential Energy) into other layers of abstraction (variables, objects, functions), and understand how to relate those to the basic building block of manipulating numbers.

We would first open this club to 20 S6/S7 students, to keep the level consistent such that two teachers can have a direct impact on the projects. Our first estimate, in order to complete about 15 challenges through a school year, plans for one double-period per week of meetings in an ICT class. Most likely, given the intricacies of time scheduling, the club could open after hours. At first, interactions with students would be in EN and FR, hoping to attract students from all language sections. The first 6 weeks would be crash courses to get accustomed with our preferred coding environments of MatLab and P5.js. The rest of the school year would alternate between project work, presentations, and small tutorials into code, Maths, or Physics, mainly by students for students (always guided by teachers of course).

In Mathematics students would see how calculus algorithms for differentiating and integrating functions can be developed or how codes to describe and solve analytical 3D geometry problems can be written, such as intersecting planes and spheres. Early on in the year, a project in Physics could be to get the students to code more complicated types of motion. Those that go beyond simple constant velocity, constant acceleration or circular motion, seen in S4/S5, and again in S6/S7 if they are taking the option. Depending on the level of the groups, or individual students, one could first start with 1D, but obvious extensions for more advanced groups are plentiful (3D, damping, interaction with surfaces, etc.). This would also tie in with their introduction to calculus in their

Math classes. Getting the students to present their work will force them to think about visualisation, and oral skills.

In order to set-up the club, we will need access to an ICT class. We also need to buy the high school license for MatLab (399 Euros), and some help from the technicians in order to have access to the program in the booked ICT class. We have looked into those matters with the school management and …Financial incentive for teachers to get involved should also be phased in as the project expand, and this is where we need the help from APEEE. Since this club is not following any European Schools' syllabus, school management doesn't have a budget for such activities from teachers. Our initial estimate calls for 50 euros for a double-period session. Apart from financial help, APEEE could help us in advertising this opportunity to students and parents, as well as helping us recruit new teachers if this pilot project is successful.

By the end of next school year, we would like to have APEEE help us analyse the impact of the club on the school community. We could organise a *Code!* day/evening to invite students and parents from outside the club to discover our activities, where club students would present some of their project, and get others to interact with their algorithms. We also would set up an anonymous survey to participating students, and parents. We would also setup a survey to Maths and Science teachers having club members in their classes (to see impact if any, the club might have into regular classes).