

BIOINFORMATICS. AN INTRODUCTION TO MATLAB PROGRAMMING

The course will take place in five classes. Every day a sheet of exercises will be given to be solved in the class. In each sheet there will be some mandatory exercises that must be sent to jklett@cbm.uam.es and acortes@cbm.uam.es. These problems will be explained during the classes, and there will be enough time to complete them. Students are strongly encouraged to do all problems.

Please, before sending the exercises, note:

- Programs should be sent by e-mail in separate .m files with the original exercise name.
- Student name should be the first line of the program as a comment. Comments in the programs and text messages may be in English or Spanish.

Once the exercises are corrected, a second deadline will be available for fixes. These exercises will be evaluated as passed/non-passed. All exercises must be passed in order to continue with the bioinformatics course.

At the end of the classes period, all student must perform a project related with the theoretical part of the bioinformatics course. Details on project evaluation will be discussed with the project list.

Day 5 problems

1. **Affinity_efficient.** Modify the problems of the fourth day, so that they run as efficiently as possible.
2. **FindCenter.** Write a function that opens the image manchaca.tif and finds the center of the shadow. Calculate the center in two different ways: as the center of mass of the pixels, using their grayscale level as "mass", and by setting a threshold and finding the center of the region with pixels above the threshold.
3. **Integrator.** Write a function that finds the area under the curve $y = x + x \cdot \sin(x)$, between $x=0$ and $x=4\pi$. This area must be approximated by the sum of the areas of rectangles that fit under the curve. Decrease the width of these rectangles to increase precision. The algorithm must finish when three consecutive iterations have not increased precision more than 10^{-5} . Write this program as efficiently as possible.