Computational Molecular Biology
Biologia Computazionale

Romeo Rizzi

aims of the course

The course is meant as an introduction to the field of Computational Molecular Biology and as an opportunity to get in touch with the very spirit and the methods in Algorithms and Combinatorial Optimization.

The main aims of the course, in order of priority, are:

1. Motivate the study of Algorithms and Discrete Mathematics techniques with applications in Molecular Biology;
2. Elucidate the role of algorithms in the current practice and research in Molecular Biology.

period

April 2003.

reference book

- João Setubal and João Meidanis. **Introduction to Computational Molecular Biology.** *PWS Publishing Company* ITP An International Thomson Publishing Company.
  ISBN 0-534-95262-3

You can ask for zerox-copies of the above book at the apposite office (Faculty of Science, close to the Library).

Puoi richiedere le fotocopie del testo consigliato qui sopra all'apposito ufficio fotocopie (Facoltà di Scienze, vicino alla biblioteca).

program

1. Sequence Comparison;
   - 1.1 Local, global and semi-global comparison;
   - 1.2 Sparing time;
   - 1.3 Sparing memory;
2. Suffix Trees;
   - 2.1 Building a Suffix Tree;
   - 2.2 Selected applications of Suffix Trees;
3. Phylogenetic Trees;

3.1 The Perfect Phylogeny Problem;
3.2 Some open phylogeny problems;

4. Physical Mapping of DNA;
   4.1 The Interval Graph Model;
   4.2 The Consecutive Ones Property;
5. Genome Rearrangements;
   5.1 Signed Sorting by Reversals;
   5.2 Unsigned Sorting by Reversals;

language

Elementary English with Italian gesture. Everybody is welcome.

lingua

Faremo ogni sforzo affinchè quello della lingua non risulti essere un problema per nessuno.

prerequisites

You know that living beings are made up of cells. You know what an algorithm is. You are interested in Discrete Mathematics. After this, still you will need your own motivation and curiosity to enjoy your participation to the course.

timetable (calendario delle lezioni)

Lunedì 7	15:30 - 17:30	aula 7	Romeo Rizzi	string matching, edit distance
Mercoledì 9	15:30 - 17:30	aula 7	Pavel	suffix trees
Giovedì 10	15:30 - 17:30	aula 7	Pavel	suffix trees applications
Martedì 15	15:30 - 17:30	aula 7	Marco Rospocher	phylogenetic trees
Giovedì 17	15:30 - 17:30	aula 7	Marco Rospocher	phylogenetic treesphysical mapping
Martedì 22	15:30 - 17:30	aula 7	Claudio Eccher	physical mapping
Mercoledì 23	15:30 - 17:30	aula 7	Maria Serafini	genome rearrangement I
Giovedì 24	15:30 - 17:30	aula 7	Maria Serafini	genome rearrangement I
Martedì 29	16:30 - 18:30	aula 13	Alberto Caprara?	genome rearrangement II
Mercoledì 30	16:30 - 18:30	aula 13	Romeo Rizzi	open

exam

Either you face an oral exam or you prepare a set of lectures in which you present some further topic to the class. The teacher will help you entering this topic.

web site

The following is the web-site we built up for a similar course in spring 2002.

`http://brenta.dit.unitn.it/~rrizzi/classes/BioComp2003/index.html`