

Bioinformatics

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0. Scientific literature

PAPER: Jensen: Literature mining for the biologist: from information retrieval to biological discovery;

place: http://falco.elte.hu/bioinfo/english/books_papers/01_Jensen-Literature_mining_for_the_biologist.pdf

1. Introduction

SLIDES:

http://falco.elte.hu/bioinfo/english/slides/011_What_is_bioinfo.pdf

http://falco.elte.hu/bioinfo/english/slides/01p_Computers.pdf

BOOK: Attwood & Parry-Smith: Introduction to bioinformatics:

Overview: xv-xx p. (pdf: 7-10)

Introduction: 1-17 p. (pdf: 10-18)

place: http://falco.elte.hu/bioinfo/english/books_papers/02_Attwood-ParrySmith-Introduction_to_bioinformatics.pdf

2. Databases

SLIDES:

http://falco.elte.hu/bioinfo/english/slides/021_Molecular_biological_databases.pdf

BOOK: Attwood & Parry-Smith: Introduction to bioinformatics:

Information networks: 25-31, 34 p. (pdf: 22-25, 27)

Structure classification databases: 62-66 p. (pdf: 41-43)

Genome information resources: 69-78 p. (pdf: 44-49)

DNA sequence analysis: 81-89 p. (pdf: 50-54)

place: http://falco.elte.hu/bioinfo/english/books_papers/02_Attwood-ParrySmith-Introduction_to_bioinformatics.pdf

NCBI Entrez:

<http://www.ncbi.nlm.nih.gov/books/NBK3837/>

UniProt:

<http://www.uniprot.org/demos/diabetes>

Ensembl:

The Ensembl Genome Browser: <http://www.ensembl.org/Help/Movie?id=188>

Comparative Genomics: <http://www.ensembl.org/Help/Movie?id=209>

Introduction to BioMart: <http://www.ensembl.org/Help/Movie?id=189>

3. Sequence alignment

BOOK: Mount: Bioinformatics - Sequence and Genome Analysis

Alignment of Pairs of Sequences:

Introduction: 53-57 p. (pdf: 54-58)

Dot matrix sequence comparison: 59-64 p. (pdf: 60-65)

Dynamic programming algorithm for sequence alignment:
64-74 p. (pdf: 65-75)

Use of scoring matrices and gap penalties in sequence alignments:
76-89 p. (pdf: 77-90)

Gap penalties: 92-94 p. (pdf: 93-95)

Multiple Sequence Alignment:

Introduction: 140-144 p. (pdf: 141-145)

Progressive methods of multiple sequence alignment:
152-157 p. (pdf: 153-158)

place: http://falco.elte.hu/bioinfo/english/books_papers/03_Mount-Bioinformatics-Sequence_and_genome_analysis.pdf

4. Sequence similarity searching

BOOK: Mount: Bioinformatics - Sequence and Genome Analysis

Database Searching for Similar Sequences:

Introduction: 282-289 p. (pdf: 283-290)

Basic local alignment search tool (blast):
300-307 p. (pdf: 301-308)
309-314 p. (pdf: 310-315)

place: http://falco.elte.hu/bioinfo/english/books_papers/03_Mount-Bioinformatics-Sequence_and_genome_analysis.pdf

NCBI BLAST:

Interface: <http://blast.ncbi.nlm.nih.gov/about/>

Output: <http://www.ncbi.nlm.nih.gov/books/NBK21097/#A615>

5. Protein structure

BOOK: Mount: Bioinformatics - Sequence and Genome Analysis

Protein Classification and Structure Prediction:

Introduction: 382-398 p. (pdf: 383-399)

Viewing protein structures: 400-403 p. (pdf: 401-404)

Alignment of protein structures: 403-419 p. (pdf: 404-420)

place: http://falco.elte.hu/bioinfo/english/books_papers/03_Mount-Bioinformatics-Sequence_and_genome_analysis.pdf

PAPER: O'Donoghue: Visualization of macromolecular structures

place:

http://falco.elte.hu/bioinfo/english/books_papers/http://falco.elte.hu/bioinfo/english/books_papers/

6. Phylogenetic analysis

BOOK: Mount: Bioinformatics - Sequence and Genome Analysis

Phylogenetic Prediction:

Introduction: 238-247 p. (pdf: 239-248)

Methods: 247-248 p. (pdf: 248-249)

Maximum parsimony method: 248-254 p. (pdf: 249-255)

Distance methods: 254-256 p. (pdf: 255-257)

The neighbor-joining method: 260-261 p. (pdf: 261-262)

Choosing an outgroup: 264 p. (pdf: 265)

Correction of distances between nucleic acid sequences:
267-269 p. (pdf: 268-270)

The maximum likelihood approach: 274-275 p. (pdf: 275-276)

place: http://falco.elte.hu/bioinfo/english/books_papers/03_Mount-Bioinformatics-Sequence_and_genome_analysis.pdf

PAPER: Baldauf: Phylogeny for the faint of heart: a tutorial

place: http://falco.elte.hu/bioinfo/english/books_papers/05_Baldauf-Phylogeny_for_the_faint_of_heart.pdf

7. Systems biology

PAPER: Wang: A Roadmap of Cancer Systems Biology

place: http://falco.elte.hu/bioinfo/english/books_papers/06_Wang-A_Roadmap_of_Cancer_Systems_Biology_with_figure.pdf

PAPER: Rivas: Protein-Protein Interactions Essentials: Key Concepts to Building and Analyzing Interactome Networks

place: http://falco.elte.hu/bioinfo/english/books_papers/07_Rivas-Protein-Protein_Interactions_Essentials.pdf

PAPER: Untangling the protein web

place: http://falco.elte.hu/bioinfo/english/books_papers/08_Untangling_the_protein_web.pdf

PAPER: Gehlenborg: Visualization of omics data for systems biology

place: http://falco.elte.hu/bioinfo/english/books_papers/09_Gehlenborg-Visualization_of_omics_data_for_systems_biology.pdf