practical
computing
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biologists

HADDOCK • DUNN

Practical Computing Biologists Steven Haddock

Ziling Wang,Lishu Zhang

Practical Computing Biologists Steven Haddock:

   Practical Computing for Biologists Steven H.D. Haddock,Casey W. Dunn,2011-04-22 Practical Computing for Biologists shows you how to use many freely available computing tools to work more powerfully and effectively The book was born out of the authors own experience in developing tools for their research and helping other biologists with their computational problems Many of the techniques are relevant to molecular bioinformatics but the scope of the book is much broader covering topics and techniques that are applicable to a range of scientific endeavours Twenty two chapters organized into six parts address the following topics and more see Contents Searching with regular expressions The Unix command line Python programming and debugging Creating and editing graphics Databases Performing analyses on remote servers Working with electronics While the main narrative focuses on Mac OS X most of the concepts and examples apply to any operating system Where there are differences for Windows and Linux users parallel instructions are provided in the margin and in an appendix The book is designed to be used as a self guided resource for researchers a companion book in a course or as a primary textbook Practical Computing for Biologists will free you from the most frustrating and time consuming aspects of data processing so you can focus on the pleasures of scientific inquiry   **Bioinformatics Data Skills** Vince Buffalo,2015-07-01 Learn the data skills necessary for turning large sequencing datasets into reproducible and robust biological findings With this practical guide you ll learn how to use freely available open source tools to extract meaning from large complex biological data sets At no other point in human history has our ability to understand life s complexities been so dependent on our skills to work with and analyze data This intermediate level book teaches the general computational and data skills you need to analyze biological data If you have experience with a scripting language like Python you re ready to get started Go from handling small problems with messy scripts to tackling large problems with clever methods and tools Process bioinformatics data with powerful Unix pipelines and data tools Learn how to use exploratory data analysis techniques in the R language Use efficient methods to work with genomic range data and range operations Work with common genomics data file formats like FASTA FASTQ SAM and BAM Manage your bioinformatics project with the Git version control system Tackle tedious data processing tasks with with Bash scripts and Makefiles   *Make: Technology on Your Time Volume 27* Mark Frauenfelder,2011-07-15 The robots are coming MAKE Volume 27 shows you how to build robots that walk fly swim play music dance and even extinguish fires Some of the buildable bots you ll meet include Yellow Drum Machine which roves around looking for things to drum on then drums records and accompanies itself playing catchy rhythms Roomba Recon Roomba robotic vacuum with a wireless router and webcam on its back programmed so you can drive it around your house and see what it sees from a browser window anywhere Hamster Powered Strandbeest which walks around on eight legs powered by a hamster inside its hamster globe head The winning project from MAKE s Most Entertaining Robot contest Tiny Robots made from common electronics components The special Robots section will also

include a roundup of hobby robotics highlights and a Primer on using the EZ Robot controller board to turn any animatronic toy into a fully controllable robot that recognizes faces and responds to voice commands **A Voice in the Wilderness** Professor Joseph L Graves Jr.,2022-09-13 Why understanding evolution the most reviled branch of science can help us all from fighting pandemics to undoing racism Evolutionary science has long been regarded as conservative a tool for enforcing regressive ideas particularly about race and gender But in A Voice in the Wilderness evolutionary biologist Joseph L Graves Jr once styled as the Black Darwin argues that his field is essential to social justice He shows for example why biological races do not exist He dismantles recent work in human biodiversity seeking genes to explain the achievements of different ethnic groups He decimates homophobia sexism and classism as well As a pioneering Black biologist a leftist and a Christian Graves uses his personal story his journey from a child of Jim Crow to a major researcher and leader of his peers to rewrite his field A Voice in the Wilderness is a powerful work of scientific anti racism and a moving account of a trailblazing life **Using the Biological Literature** Diane Schmidt,2014-04-14 The biological sciences cover a broad array of literature types from younger fields like molecular biology with its reliance on recent journal articles genomic databases and protocol manuals to classic fields such as taxonomy with its scattered literature found in monographs and journals from the past three centuries Using the Biological Literature A Practical Guide Fourth Edition is an annotated guide to selected resources in the biological sciences presenting a wide ranging list of important sources This completely revised edition contains numerous new resources and descriptions of all entries including textbooks The guide emphasizes current materials in the English language and includes retrospective references for historical perspective and to provide access to the taxonomic literature It covers both print and electronic resources including monographs journals databases indexes and abstracting tools websites and associations providing users with listings of authoritative informational resources of both classical and recently published works With chapters devoted to each of the main fields in the basic biological sciences this book offers a guide to the best and most up to date resources in biology It is appropriate for anyone interested in searching the biological literature from undergraduate students to faculty researchers and librarians The guide includes a supplementary website dedicated to keeping URLs of electronic and web based resources up to date a popular feature continued from the third edition

Research Software Engineering with Python Damien Irving,Kate Hertweck,Luke Johnston,Joel Ostblom,Charlotte Wickham,Greg Wilson,2021-08-05 Writing and running software is now as much a part of science as telescopes and test tubes but most researchers are never taught how to do either well As a result it takes them longer to accomplish simple tasks than it should and it is harder for them to share their work with others than it needs to be This book introduces the concepts tools and skills that researchers need to get more done in less time and with less pain Based on the practical experiences of its authors who collectively have spent several decades teaching software skills to scientists it covers everything graduate level researchers need to automate their workflows collaborate with colleagues ensure that their results are trustworthy and

publish what they have built so that others can build on it The book assumes only a basic knowledge of Python as a starting point and shows readers how it the Unix shell Git Make and related tools can give them more time to focus on the research they actually want to do Research Software Engineering with Python can be used as the main text in a one semester course or for self guided study A running example shows how to organize a small research project step by step over a hundred exercises give readers a chance to practice these skills themselves while a glossary defining over two hundred terms will help readers find their way through the terminology All of the material can be re used under a Creative Commons license and all royalties from sales of the book will be donated to The Carpentries an organization that teaches foundational coding and data science skills to researchers worldwide   **Practical Computing Systematic Biology** Pankhurst,1990-10-18

Computing for Biologists Ran Libeskind-Hadas,Eliot Bush,2014-09-22 This book teaches life science students how to use Python programming and computational problem solving in the context of compelling biological applications

Computing Skills for Biologists Stefano Allesina,Madlen Wilmes,2019-01-15 A concise introduction to key computing skills for biologists While biological data continues to grow exponentially in size and quality many of today s biologists are not trained adequately in the computing skills necessary for leveraging this information deluge In Computing Skills for Biologists Stefano Allesina and Madlen Wilmes present a valuable toolbox for the effective analysis of biological data Based on the authors experiences teaching scientific computing at the University of Chicago this textbook emphasizes the automation of repetitive tasks and the construction of pipelines for data organization analysis visualization and publication Stressing practice rather than theory the book s examples and exercises are drawn from actual biological data and solve cogent problems spanning the entire breadth of biological disciplines including ecology genetics microbiology and molecular biology Beginners will benefit from the many examples explained step by step while more seasoned researchers will learn how to combine tools to make biological data analysis robust and reproducible The book uses free software and code that can be run on any platform Computing Skills for Biologists is ideal for scientists wanting to improve their technical skills and instructors looking to teach the main computing tools essential for biology research in the twenty first century Excellent resource for acquiring comprehensive computing skills Both novice and experienced scientists will increase efficiency by building automated and reproducible pipelines for biological data analysis Code examples based on published data spanning the breadth of biological disciplines Detailed solutions provided for exercises in each chapter Extensive companion website

Computing for Biologists Ran Libeskind-Hadas,Eliot Christen Bush,2014 Computing is revolutionizing the practice of biology This book which assumes no prior computing experience provides students with the tools to write their own Python programs and to understand fundamental concepts in computational biology and bioinformatics Each major part of the book begins with a compelling biological question followed by the algorithmic ideas and programming tools necessary to explore it the origins of pathogenicity are examined using gene finding the evolutionary history of sex determination systems is studied

using sequence alignment and the origin of modern humans is addressed using phylogenetic methods In addition to providing general programming skills this book explores the design of efficient algorithms simulation NP hardness and the maximum likelihood method among other key concepts and methods Easy to read and designed to equip students with the skills to write programs for solving a range of biological problems the book is accompanied by numerous programming exercises available at www cs hmc edu CFB *Essential Computing Skills For Biologists* Ziling Wang,Lishu Zhang,2018-07-02 This is a handbook of methods and protocols for biologists It aimed at undergraduate graduate students and researchers originally trained in biological or medical sciences who need to know how to access the data archives of genomes proteins metabolites gene expression profiles and the questions these data and tools can answer For each chapter the conceptual and experimental background is provided together with specific guidelines for handling raw data including preprocessing and analysis The content is structured into three parts Part one introduces basic knowledge about popular bioinformatics tools databases and web resources Part two presents examples of omics bioinformatics applications Part three provides basic statistical analysis skills and programming skills needed to handle and analyze omics datasets **Computing for Biologists** Alan Fielding,1985

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