Coding worksheets

Background

Bioinformatics requires you to consider a problem from multiple perspectives and decide how to solve the task most efficiently with the tasks provided. Generally, there are multiple ways of achieving a task with different functions. For this reason, answer keys are not provided, and each assignment will receive personal feedback on the code.

Each of the worksheets will concentrate on utilizing skills learned in the most recent module but most will also require you to incorporate skills learned earlier as well. In some cases, you may be guided through a challenge to explore a new skill as well!

In practical applications of bioinformatics, you will be challenged with tasks that require you to consider your toolset and pick the most appropriate tools for the task. These worksheets will be more guided, but similarly challenge you to use the recent tools to analyze real, published datasets.

Objectives

- Understand the structure of the data
- Understand the principles of tidy data and wrangle the data to clean and re-shape the dataset in preparation for analysis
- Choose the most accurate and effective functions to carry out the analysis
- Annotate your workflow to explain your methodology and the results of your analysis
- Present the results of your analysis clearly and accurately through well formatted text, tables, or figures

How to complete the assignment

The worksheets will be available for you to access on BlackBoard at least one week in advanced of the assignment due date.

Once completed, run the code sequentially from start to end (code cells must be numbered starting from 1 in the first cell with no skips in subsequent code cell numbers). Export the completed worksheet as PDF to submit in the correct assignment on the course website before the due date.

Course grade

There are 5 coding worksheets throughout the semester which will contribute to 40% of your final course grade.

At the end of the semester, the 4 worksheets with the highest grade will each be weighted 9% and the worksheet with the lowest grade will be weighted 4%.

Support

You are recommended to start the assignment as soon as possible.

Questions should be posted on the course discussion board so that everyone has the same information and to reduce repeated questions. Clearly indicate which assignment and question you are inquiring about in the subject.

You are permitted to post incomplete problematic code in your question – also include any errors that you encounter or an explanation of why the code is not behaving as you are expecting.

You are not permitted to post completed code on the discussion board or otherwise share completed code with others in the course or other platforms. When responding to your peer's posts on the discussion board, do not respond with completed code but instead respond with suggestions such as "please check the name of your object for typos".

There will be time available at the end of most coding lessons for brief questions.

Rubric

Note that the coding worksheets are marked for completeness and correctness, but marks may be deducted if assignment instructions are not followed.

Evaluation	Does not meet expectations	Meets expectations	Exceeds expectations
Completeness (50pt)	Submitted code is mostly incomplete and does not sufficiently address the assignment tasks. 0 -24pts	Submitted code mostly completes the assignment tasks, some tasks are incomplete. 25-39 pts	All code required to complete the assignment are included in the worksheet and when run, and when run, completes the given tasks. 40-50 pts
Accuracy and Robustness (30pts)	Code has trouble running Code is missing annotations, or they are inaccurate Code is missing checkpoints, or they are inaccurate, many instances of incorrect behaviors	Code mostly executes smoothly and free of bugs. Code mostly matches the accompanying annotations Code ensures some checkpoints, code rarely leads to minor incorrect behaviors	Code executes smoothly and free of bugs. Code matches the accompanying annotations. Code is well written to ensure checkpoints demonstrating the accuracy of the code and

	0-14 pts	15-22 pts	robustly completes the task at hand 23-30 pts
Efficiency of design (10pts)	Code is written with functions that attempt to address the task. Writing is not succinct. 0-4pts	Code is written with reasonably suited functions for the tasks and with mostly efficient writing 5-7 pts	Code accomplishes the task using the most efficient functions and using the most efficient writing 8-10 pts
Formatting (5pts)	Code is missing a large portion of formatting Some tables and figures are missing major aspects of formatting 0-1 pts	Code is mostly annotated to assist the reader with following the methodology and rationale of the analysis. Some tables and figures are missing aspects of formatting 2-3 pts	Code is well annotated making it easy for the reader to follow the methodology and rationale of the analysis. Tables and figures are clearly displayed and properly formatted including accurate and legible labels 4-5 pts
Export and submission (5pts)	Assignment instructions not followed, format incorrect. 0-1 pts	Assignment instructions loosely followed, inconsistencies with running code sequentially before export 2-3 pts	Assignment instructions closely followed to run all code sequentially before exporting as a PDF for submission on course site. 4-5 pts