The course builds on DS110 and during the first part of the semester introduces a number of classification and regression algorithms on top of the popular python packages numpy, pandas, matplotlib and scipy/sklearn. It then moves to introducing a high performance language (Rust) and how to use it to implement a number of fundamental CS data structures and algorithms (lists, queues, trees, graphs etc), Students are expected to propose and complete an independent project on a large graph dataset using Rust.

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Date	Topics Covered
Week 1	Course overview, supervised and unsupervised learning, decision trees.
Week 2	Classification, Regression, Pandas, Interpolation Homework: Markdown and decision trees
Week 3	Clustering, k-means, linear programming, linear regression Homework: Numpy and K-clustering
Week 4	Loss functions, overfitting, underfitting, hyperparameter tuning Homework: Pandas and Linear Programming
Week 5	Programming languages, documentation, source control, basics of Rust. Homework: Rust, overfitting and underfitting
Week 6	Rust: project manager, functions, flow control, arrays, tuples, enums, memory management Homework: Data set research
Week 7	Rust: ownership, borrowing, methods, copying, references, generics and traits. Homework: Basic Math in Rust
Week 8	Rust: Collections, Vectors, Hash Maps, Hash Sets, Graphs Homework: Enums, Structs and Traits in Rust
Week 9	Rust: Graph algorithms, modules and external files.

	Homework: Generics and methods in Rust
Week 10	Rust: Parsing, stacks and queues, DFS, BFS, Priority queue, Binary heaps. Homework: Simple decision tree in Rust
Week 11	Rust: Sorting, shortest paths, strings, &str, closures and iterators Homework: Graph pagerank in Rust
Week 12	Rust: Binary search trees, dynamic programming, greedy algorithms.
Week 13	Rust: Multithreading, parallel programming, inter-language calls

Homework dates are when the homeworks are due (they will be handed out the week before).

Course Policies

You are welcome to search the internet for help in all possible ways. You must understand your solution and be able to explain it in your writeups for the assignments. If you collaborate with anyone else you must say so and you must still do your own writeup. Identical or largely same copies submitted will be considered plagiarism and be zeroed out.

Homeworks will be due on the date specified in gradescope. A standard date and a late date will be specified with a 10% penalty for those turned in on the late date. No extensions after the late date are allowed.

10 Homeworks, 1 final project, 1 midterm, 1 final exam.

Grade will be determined 25% homeworks, 20% midterm, 25% final project, 25% final exam, 5% attendance. Cutoffs for final grades will be determined by me and will be curved, based on the student body's performance.

Code of conduct: https://www.bu.edu/academics/policies/academic-conduct-code/

Using AI bots: https://www.bu.edu/cds-faculty/culture-community/gaia-policy/