Open Source + Libraries

Algorithms - OSS Project

Project in Python and Java that has solutions to a lot of common and complex Algorithmic problems (75+ and counting), found on popular Competitive websites like hackerrank.com. Under BSD License

Special - Won a Hacktoberfest T-Shirt for this OSS contribution

Github Link:- https://github.com/tejasnikumbh/Algorithms

HNFComputation - OSS Project

Open Sourced Project in C that implements HNF Matrix Computation using different algorithms. The complete project can be found at the GitHub link. Under BSD License

Github Link:- https:// github.com/tejasnikumbh/ **HNFComputation**

Computation of Hermite Normal Forms of Integer Matrices

Importance of HNF

Many Integer programming algorithms, or algorithms that compute with modules over Z, have computation of HNF as a core building block. Computation of HNF over integer matrices of large size and value [value meaning the size of the integer entries in the matrix] is therefore a very important problem to solve.

Definition adopted for HNF

There are various definitions for HNF which present the same idea for an HNF in different ways. Different algorithmic implementations choose to represent HNF in different ways will be stated when the corresponding algorithm is laid out. However, if not mentioned specifically, HNF is mostly the column reduced echelon form. For the naïve Gaussian procedure, I have assumed the lower triangular definition as described

For a mXn matrix A, with entries a[i][j]

- 1. a[i][j] = 0 if $1 \le i \le j \le n$ Lower triangular 2. $a[i][i] \ge 0$ for $1 \le i \le n$ A). Diagonal Positive
- 3. 0<=a[i][j]<a[i][i] for 1<=j<i<=rank(A) Row entries non negative and less than corresponding diagonal.

RandomWriter - OSS Project

Open Sourced Project in C++ that generates stories. Generative Algorithm using Markov Models that trains on user data of different novella. Using Probabilistic Models, this generates stories that resemble the style of writing of the author. Grammatically correct stories for higher orders of the Markov Model used. Under BSD License

Github Link:- https://github.com/tejasnikumbh/RandomWriter

ROBDD - OSS Project

Reduced Ordered Binary Decision Diagram. A very important data structure in Computer Science Research for Streaming BDDs & memory management. Implemented in C++ and under BSD License.

Github Link:- https://github.com/tejasnikumbh/ROBDD/tree/master

Open Source + Libraries

LogicSimulator - OSS Project

Open Sourced Project in C++ that implements logic simulation useful for Circuit Simulation. Useful for simulation of circuits using computers. Open sourced under **BSD License**

Logic-Simulator

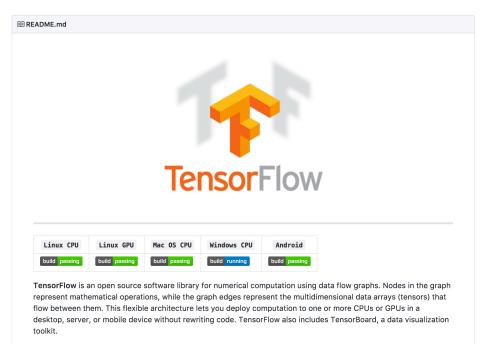
Event Driven Logic Simulator for Foundation of Project Course. This simulator is written in c++ and makes use of the naive Twin Queue (Event Processor and Gate Processor) Algorithm to simulate the evaluation of a circuit with logic gates.

Currently the circuit is hardcoded into the code. The contents of this repository are described below.

- Sample Circuit Image of circuit which is simulated in the simulator.
- main.cpp Main program that simulates the circuit.
- graph.h Graph Abstraction that is leveraged for modelling of circuit as a graph. Note that this has minor
 modifications to the definition of a node and an arc to accommodate the concepts of gate and wires respectively.
- circuitInitializer.h and circuitInitializer.cpp Interface and implementation of circuit initializer code. The code is sufficiently modularised such that the definition of the ckt can be changed easily. Further revisions would include taking in ckt input from a text file.
- circuitSimulator.h and circuitSimulator.cpp Interface and implementation for the circuit simulator. Here is where
 the core recursive algorithm lies. The algorithm consists of two functions, processEvents and processGates,
 which recurseively call each other until the queue size becomes 0, indicating that there is no need to simulate
 the ckt further as there is no change in inputs to the next layer.

Github Link:- https://github.com/tejasnikumbh/LogicSimulator

Bleeding edge libraries I'm exploring -



TensorFlow - https://github.com/tejasnikumbh/ tensorflow

State of the art
Machine Learning
library by Google useful
for Neural Networks
and other state of the
art algorithms involving
regression,
classification