WORKING ON THE FTK: MAKE ATLAS GREAT AGAIN

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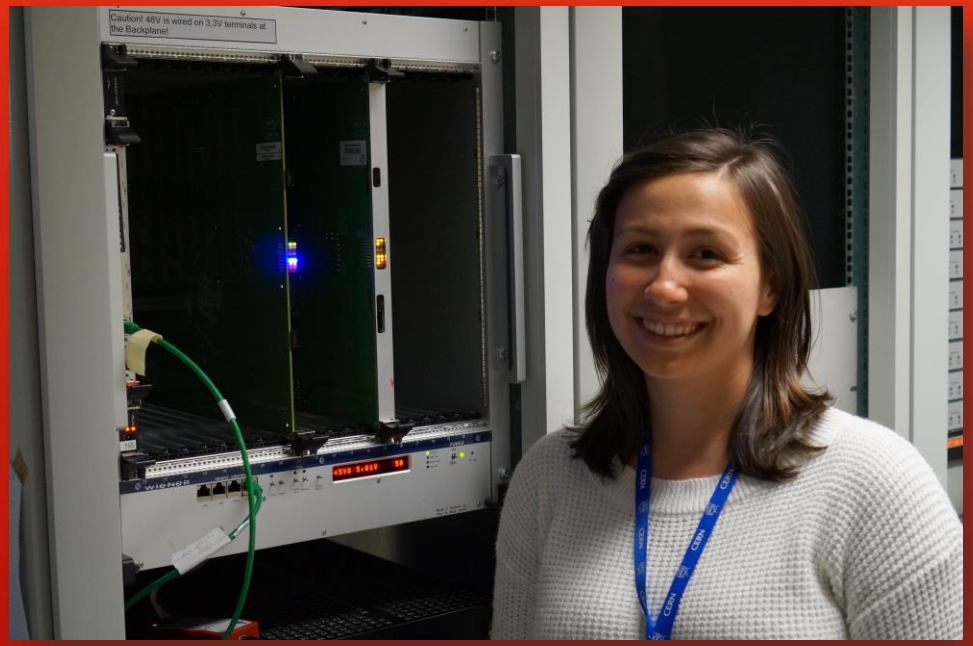
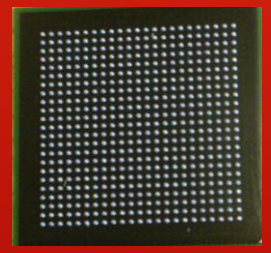
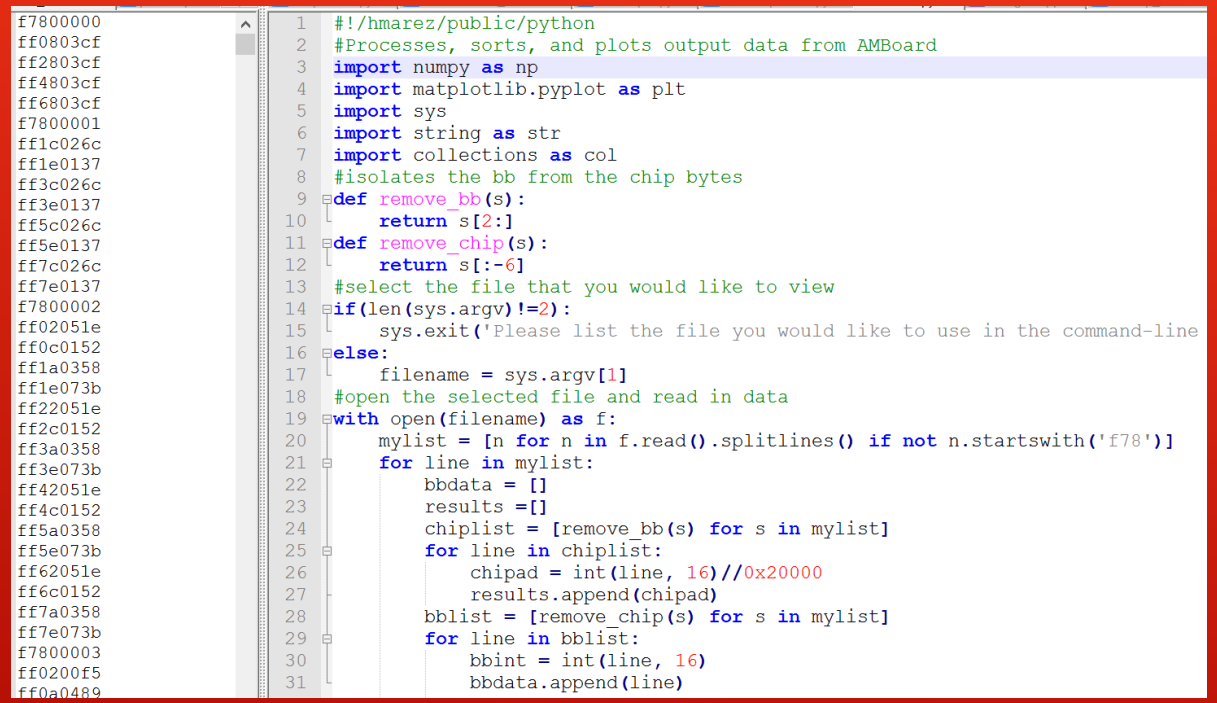


THE BOARD

The board(s) that I'm going to be working with this summer are currently located in Lab 4.

These boards are AMBs or Associative Memory Boards which are responsible for processing hits and track fitting the data that comes from the ATLAS detectors.



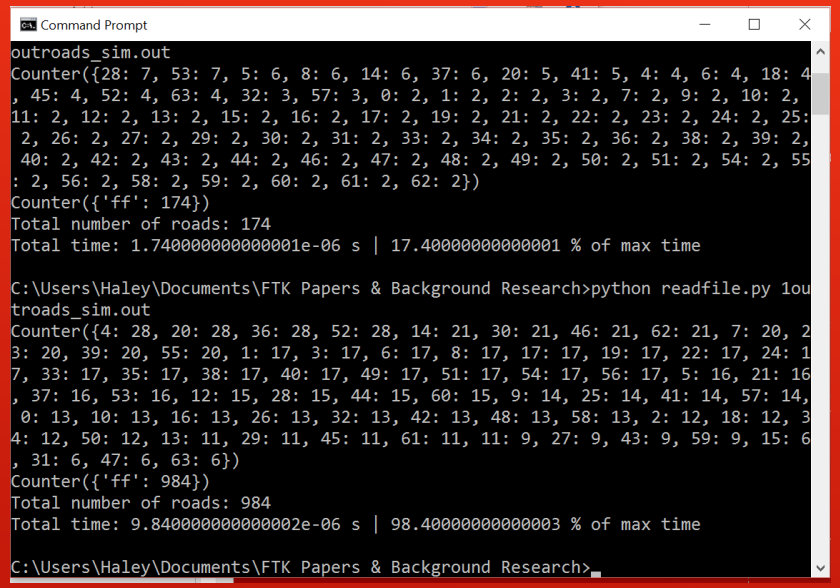


PROGRAMMING: PYTHON

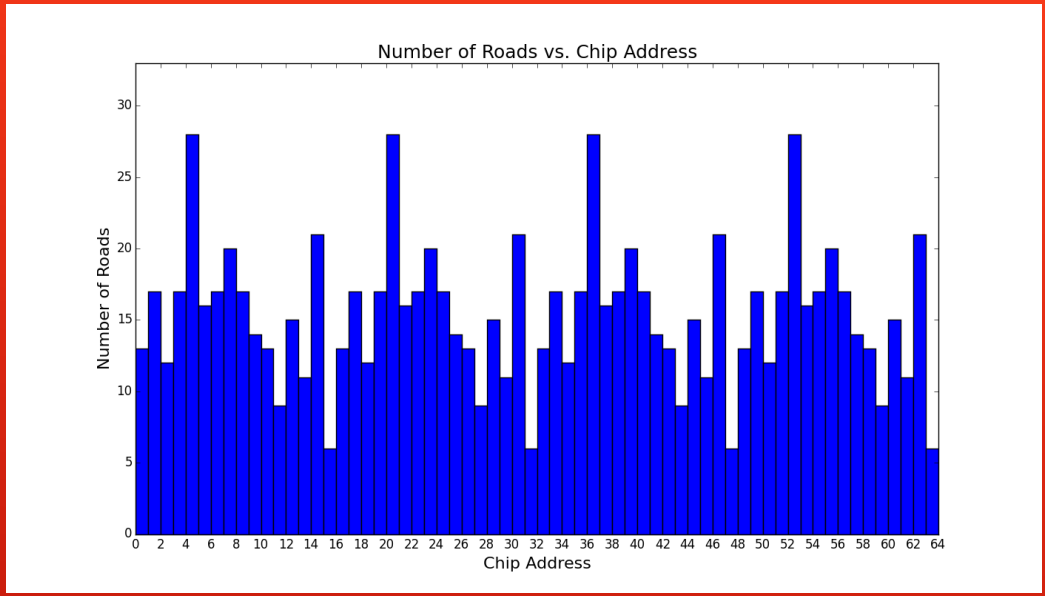
The way that data about each chip in the board outputs is in a byte based format using hexadecimal based variables.

I wrote a program that could break this output apart and analyze where the data is coming from to test the state of the board.

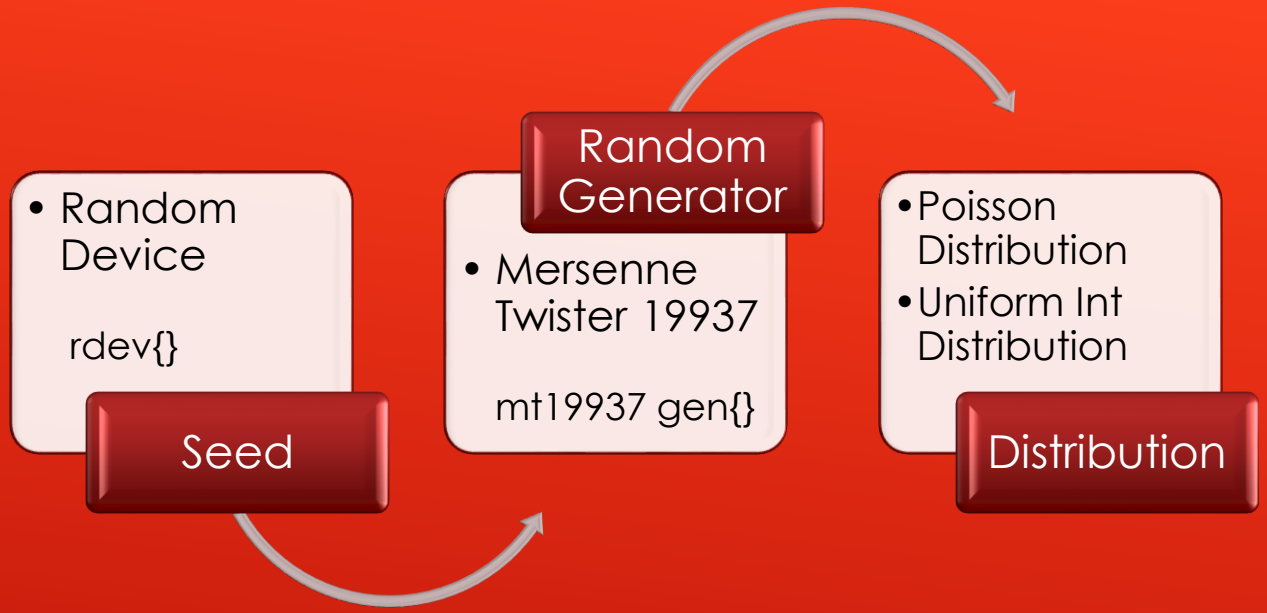
Command Prompt



Graphing: Matplotlib



- Each road is counted and listed based on its source path in the board as well as how many panels had hits.
- The program will output a graph that displays how many roads are being produced by each chip on the board.




```cpp
#include <random>
int main()
{
  using namespace std;
  random_device rdev{};
  mt19937 gen{};

  int seed = rdev();

  int pattmin, pattmax;
  pattmin = 100;
  pattmax = 20000;

  poisson_distribution<int> distribution(7);
  int nroads_int = distribution(gen);

  uniform_int_distribution<int> dist(pattmin,pattmax);
  for (int i=0;i<nroads_int;i++){
    int index = dist(gen);
  }
  return 0;
}
```

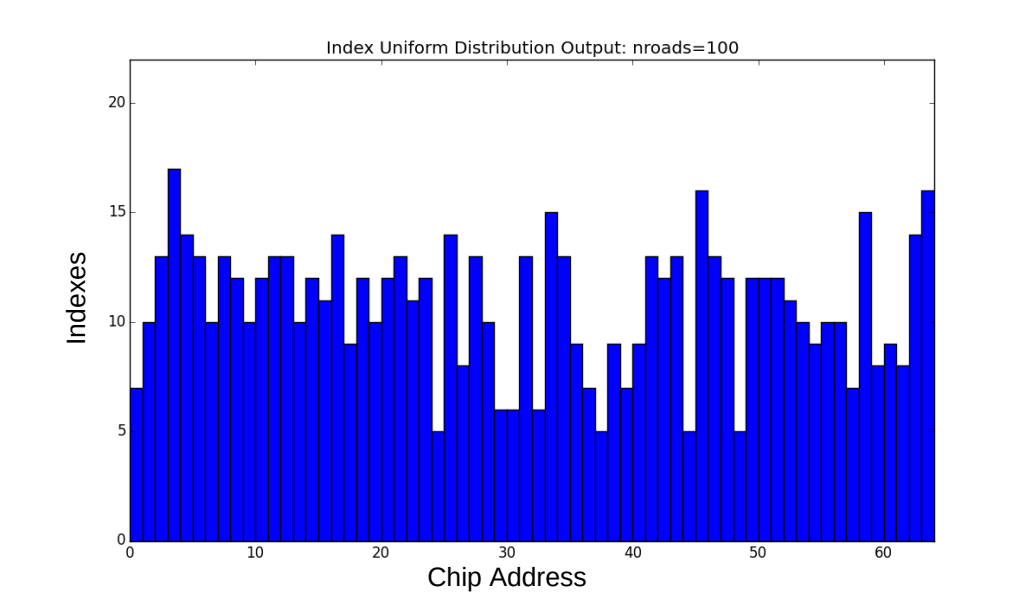
PROGRAMMING: C++11

I have been updating the random generating systems used within the mainboard C++ code that is used to produce input files to test the board.

Now that ATLAS uses C++11 I rewrote some of the code to utilize the <random> library to update the seed, random generator (Mersenne Twister) and introduce new Poisson and uniform distributions.

LOOKING AT THE UNIFORM DISTRIBUTION

Low Number of Roads



High Number of Roads