**Pelechian Hamiltonian Paths Spring 2020**

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**Computational Goals**

* Develop a method for inputting grids and saving as some form of graph/path
* Find and enumerate all possible 3x3 hamiltonian paths
* Find and enumerate all possible 4x4 hamiltonian paths
* Explore the extent of enumeration for nxn graphs
* Develop a method for inputting two paths and outputting cycle length (and diagrams?)
* For all possible pairs of 3x3 hamiltonian paths, tabulate the cycle length
* For all possible pairs of 4x4 hamiltonian paths, tabulate the cycle length
* Explore the extent of tabulation for nxn graphs (dependent upon enumeration of paths)
* Implement a method of outputting a maze diagram given a cycle diagram
* Implement a method for evaluating the solvability of a given maze diagram
* For larger grids, attempt to search for solutions by inputting cycle diagrams and evaluating maze solvability

**Coding:**

* Create point/grid class
* Enumerate all for 3x3, 4x4, nxn (iteratively/recursively and run time test)

**Mathematical Proof Goals**

* Prove that every input pair of paths outputs a cycle diagram
* Prove that cycle length is bounded above by Landau’s function
* Prove that for a 2x2 grid, it is impossible to construct a solution consisting of 2 hamiltonian path inputs which outputs a maximized cycle length { L(4) = 3 }
* Enumerate total number of possible cycles in nxn grid given Landau’s function for cycle length constraints

**Write Up:**

* Proof of the 4 cycle in 3x3