

DAA-20CS2220AH

DESIGN & ANALYSIS OF ALGORITHMS(DAA)

PROJECT DOCUMENTATION

TEAM MEMBERS:-

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Project Abstract:-

In the vertex splitting problem, the objective is to determine a minimum number of vertices from the graph to split such that the resulting graph has no path of length greater than a given δ.

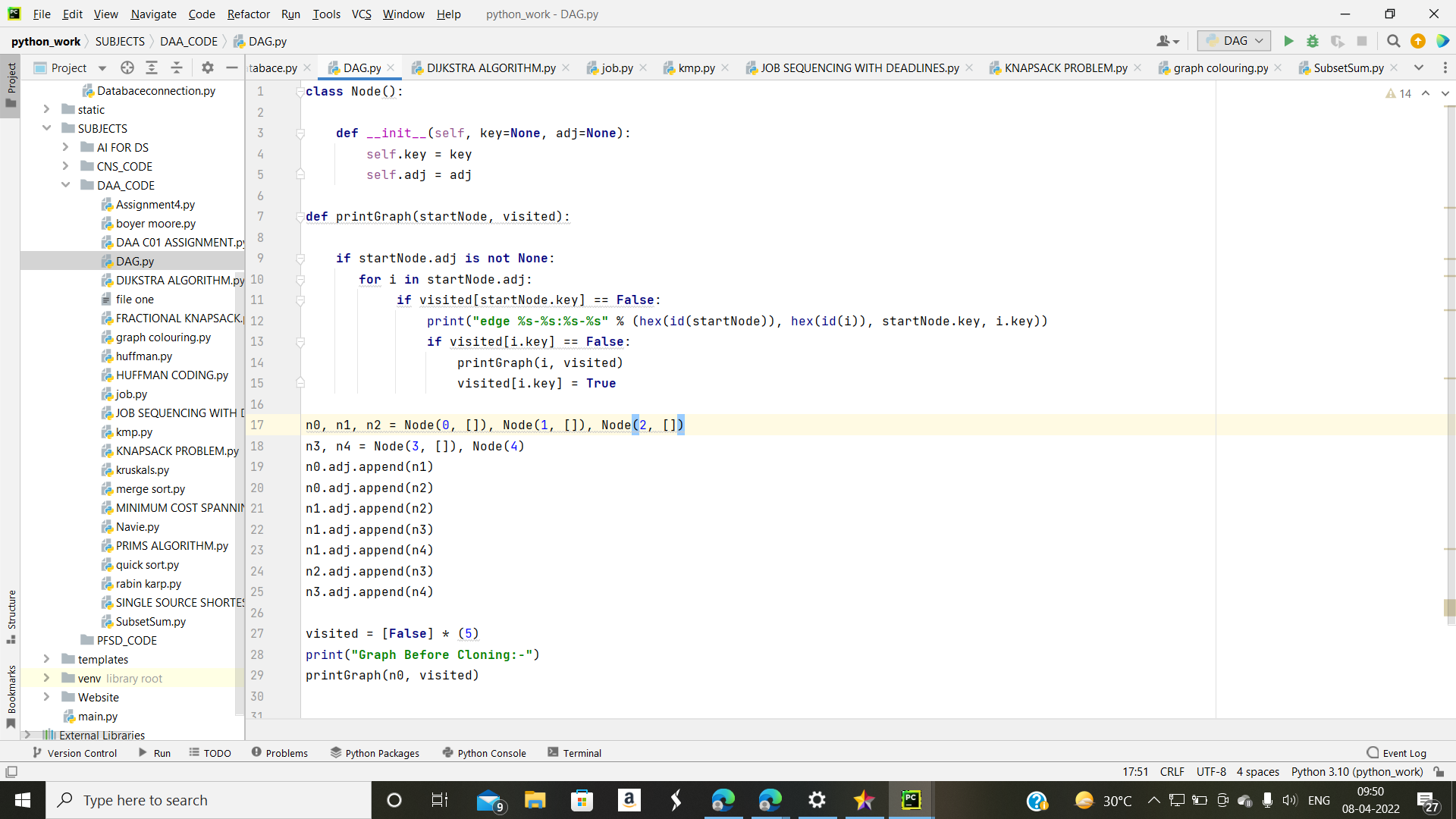
The problem has been proven to be NP-hard. A Genetic Algorithm is used to solve the DAG Vertex Splitting Problem.

This approach uses a variable string length to represent the vertices that split the graph and a dynamic population size

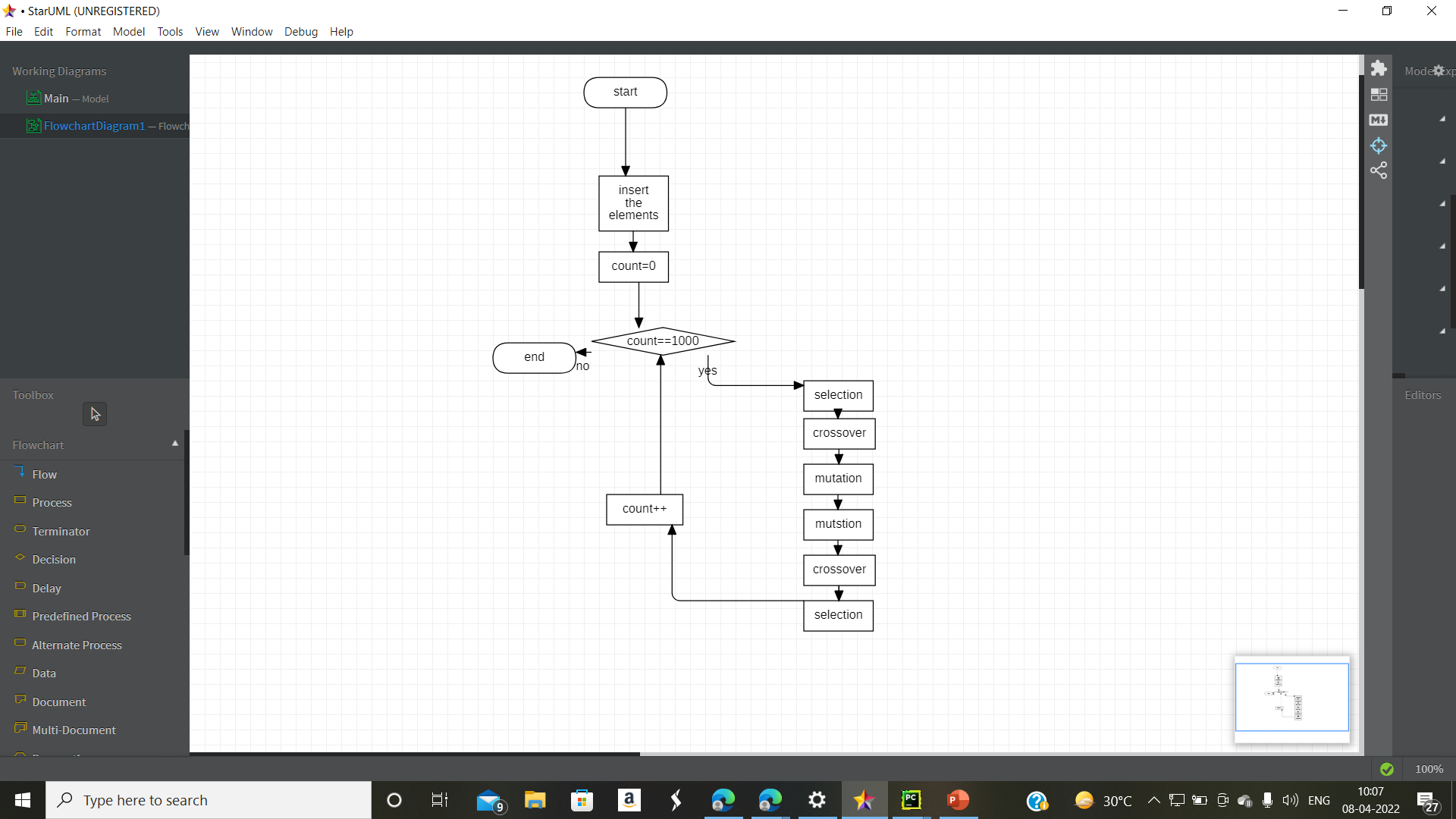
Introduction:-

Directed Acyclic Graphs are often used to model circuits and networks. The path length in such Directed Acyclic Graphs represents circuit or network delays. I has many applications in the fields of computer science and electrical engineering

Algorithms for this project:-



Flow Process:-



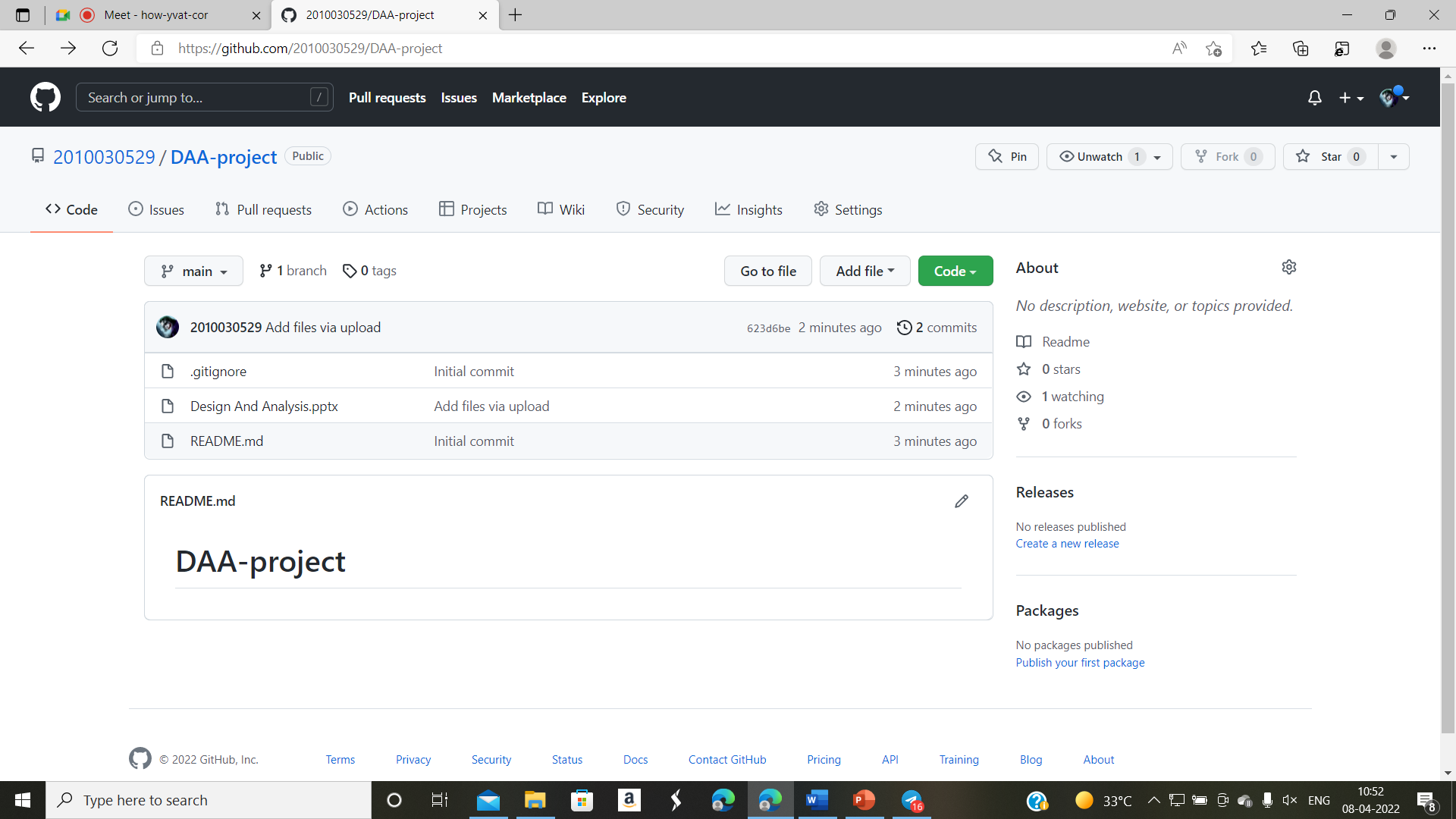
Implementation :-

* We can use Genetic Algorithms for vertex splitting

Basically, the algorithm works as follows

* 1) try to find a suboptimal solution by splitting x vertices
* 2) if a suboptimal solution is found, reduce the number o f vertices and try again
* 3) if no solution has been found within a certain number of generations, expand the
* number o f vertices and try again
* equation
* Let G = (V, E, w) be a weighted directed acyclic graph (WDAG) with vertex set V, edge
* 2
* set E, and edge function w. w(i, j) is the weight of the edge <i, j> e E. w(i, j) is a positive
* real number for <i, j> e E and is undefined if <i, j> £ E. The delay, d(P), on the path P, is
* the sum of the weights of all the edges on that path. The delay, d(G), of the graph G is the
* maximum path delay in the graph.

Project GitHub:-



Conclusion: -using this we can find the shortest distance