

1125-90-1555

Clarissa Tahnise McMillar* (mcmillar_c06478@utpb.edu). *Studying the Traveling Salesman Problem.*

In 1971, Stephen Cook and Leonid Levin described two classes of problem known as “polynomial” (P) and “non-deterministic polynomial” (NP). The vast majority of problems are P. The Clay Mathematics Institute describes the solutions to these problems as “easy to find”, meaning that an answer exists and can be found within a “reasonable” amount of time. The other set of problems known as NP are described as “easy to check”, but due to the amount of possible solutions, the answer is hard to find. The question that plagues mathematicians and computer scientists is whether $P=NP$. If so, an algorithm exists that can solve any NP problem, but it has yet to be found.

The “Traveling Salesman Problem” is a prime example of this debate. The TSP asks for the best possible Hamiltonian circuit i.e. tour to be found among a large number of possible routes. Since it is a Hamiltonian circuit each city can only be visited once with exception to the origin. This research project studies the different approaches used to find the optimal solution to a TSP using methods such as brute force and other algorithms. (Received September 18, 2016)