Leonhard Euler

My favorite mathematician is Leonhard Euler. Almost all textbooks related to “Graph Theory” have mentioned his name and the reason is that Graph Theory is originated from a problem given by Leonhard Euler and this problem is called the **Konigsberg Bridge Problem (Seven Bridges of Konigsberg)** and Euler proved that there is no solution for this problem.

Euler was born in 1707 in Switzerland and died in 1783 in Russia. In his lifetime, he contributed a lot in Calculus, Geometry, Trigonometry, Number Theory etc. In Real Analysis, he had given the concept of “function”.

He is also remembered for the famous **Euler Identity eiθ = cos θ + i sin θ**. Here, “e” is nothing but an “**Euler Constant**” which is used in almost all the fields of Physics, Mathematics, Computer Science etc. Both constants “e” and “i” are given by Euler.

The most famous and beautiful equation in Mathematics is considered as **eiπ+1=0 (it comes when we put θ=π in the Euler Identity)** and the reason why it is beautiful because it is having five constants that is e, i, π,0,1 where “e” is the base of the natural logarithm, “I” is an imaginary number, π is the ratio of circumference of a circle and its diameter, 0 is additive identity and 1 is multiplicative identity in the theory of groups in the field of Abstract Algebra.

**Konigsberg Bridge Problem:**

In 1736, Euler had solved this problem and discovered a new branch of Mathematics as “Graph Theory”. The Problem was that a city of Konigsberg was situated on both sides of the river Pregel. The landmass of this city was made of two islands which were connected to each other and to the two mainland portions of this city by exactly seven bridges. Euler had represented each landmass as node/vertex and each bridge as an edge or a connection between two nodes or vertices. Now the problem was that whether one could walk through the city by **crossing bridges only once**.

Euler realized that successful walk of the city is possible if each landmass has even number of bridges but in the above model, every landmass is connected by an odd number of bridges which makes the walk impossible but if each vertex has an even degree or even number of edges in this model then it is possible to walk the city.

This problem made a breakthrough in mathematics because we can represent a complex problem using vertices and edges and can solve the problems of Mathematics, Computer Science, Network Theory etc.