NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Set Theory

History

With
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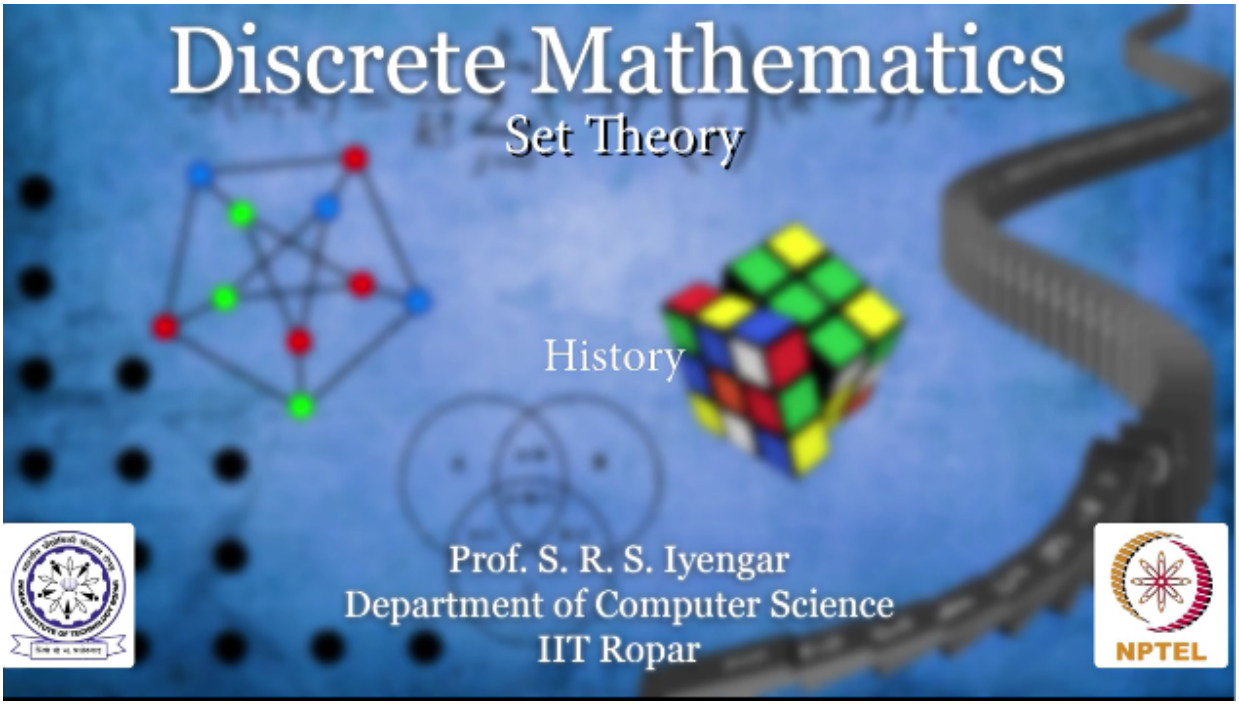
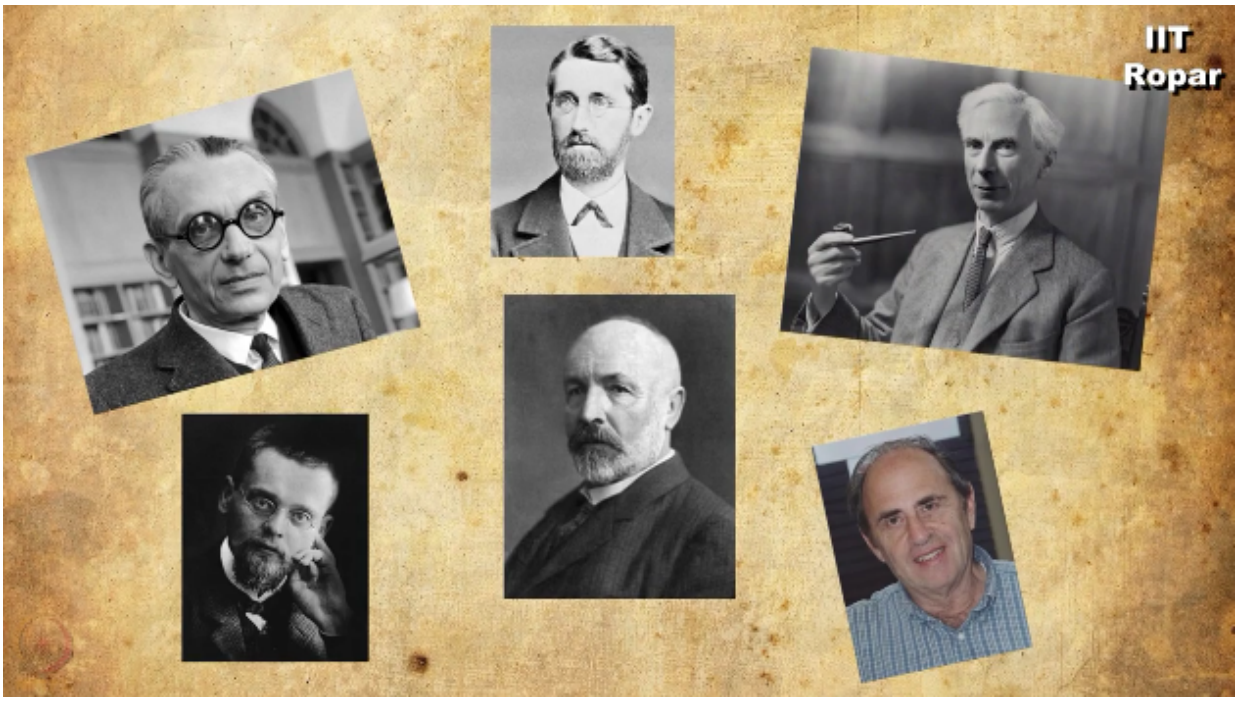
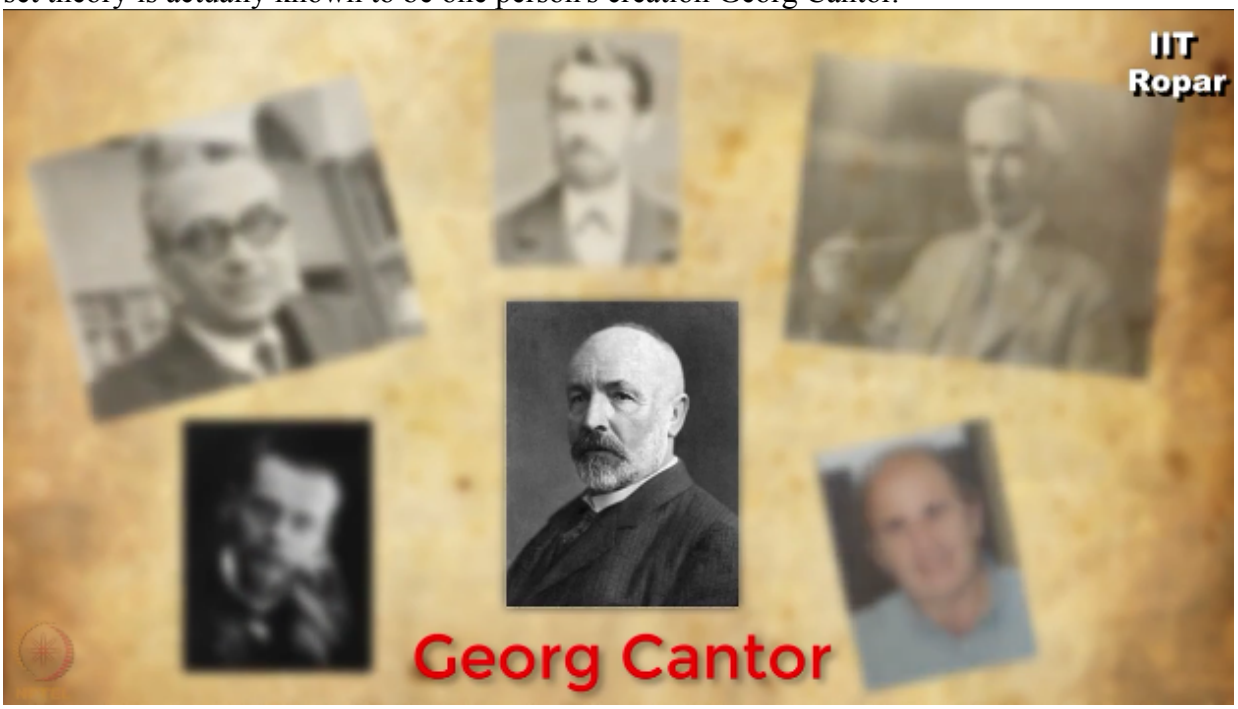


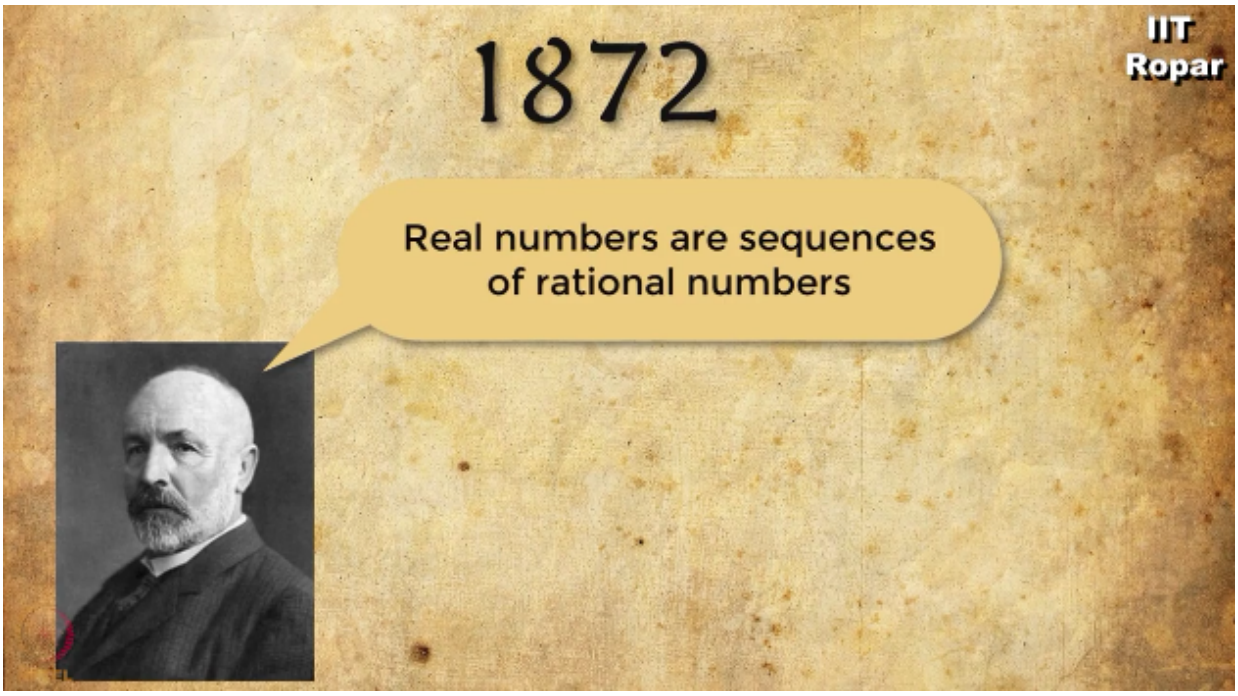
Georg Cantor, Richard Dedekind, Bertrand Russell, Kurt Gödel, Zermelo, Paul Cohan, and many more, these are a few of the several great mathematicians who have laid the foundations



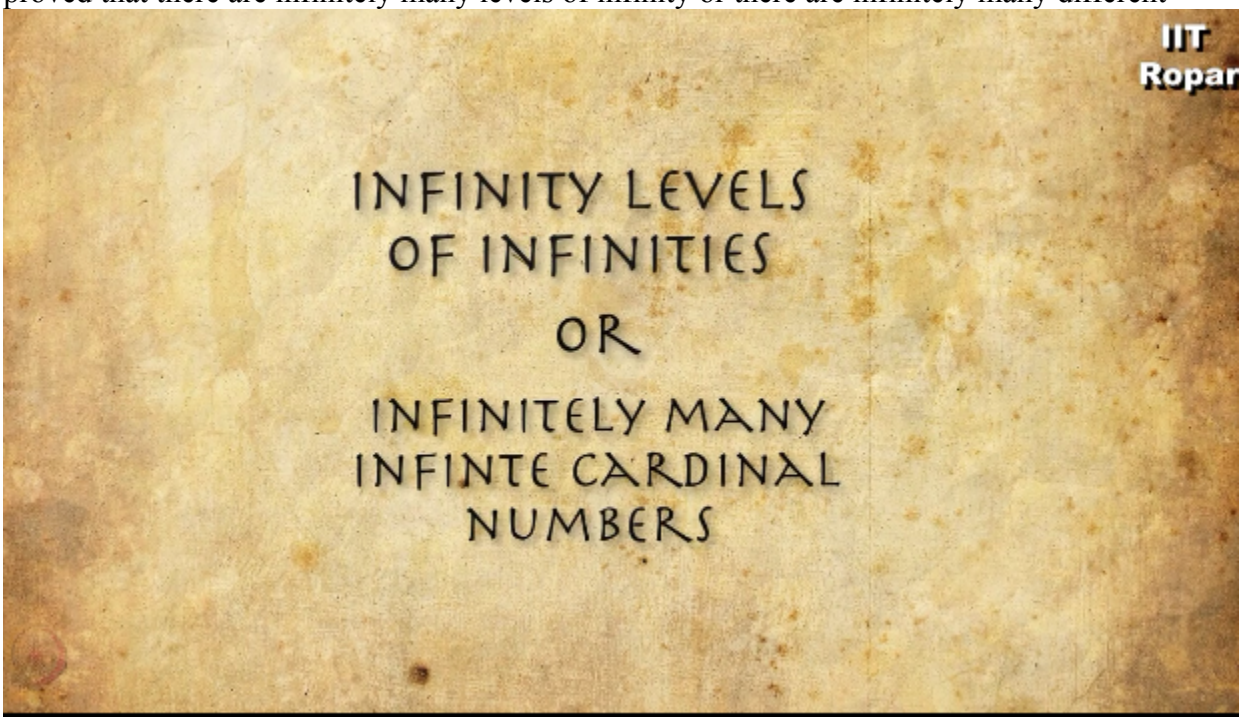
of whatever we have learned this week, set theory, their contribution is acknowledged worldwide even today, it is not very easy to sort out the dates exactly of what happened when we speak about the history of the subject, several interactions have led to its development, but set theory is actually known to be one person's creation Georg Cantor.



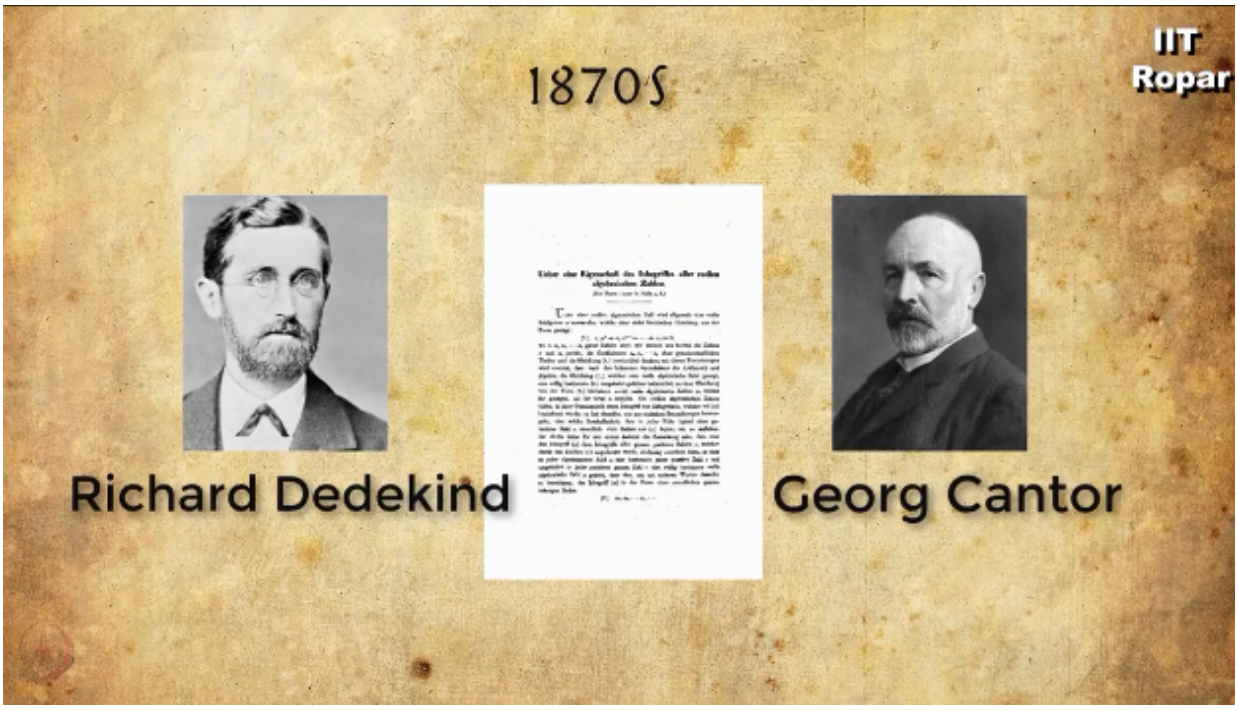
Early 19th century saw the inception of set theory where mathematicians were struggling to understand the concept of infinity, in 1872 Cantor formulated real numbers as sequences of



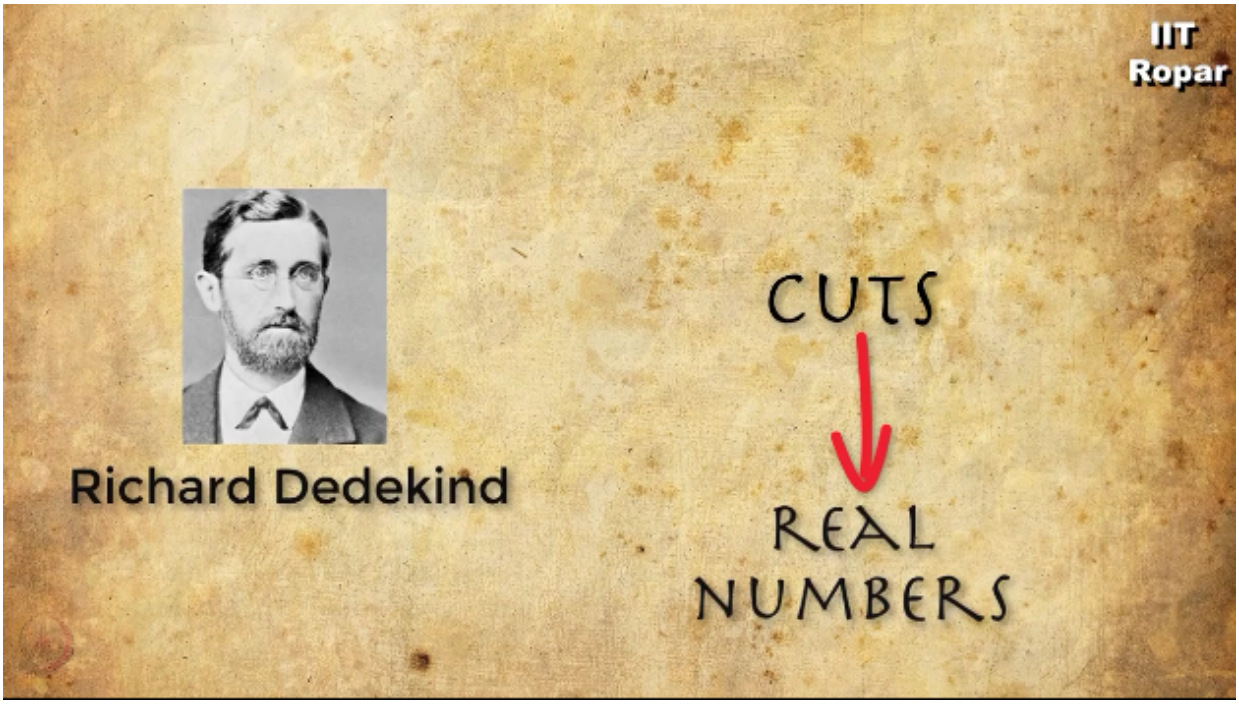
rational numbers this was a motivational drive for the mathematicians to understand the notion of infinity, Cantor brought in the concept of proving two sects to be equivalent if there is a one-to-one correspondence which is a very powerful concept even today, using this Cantor also proved that there are infinitely many levels of infinity or there are infinitely many different



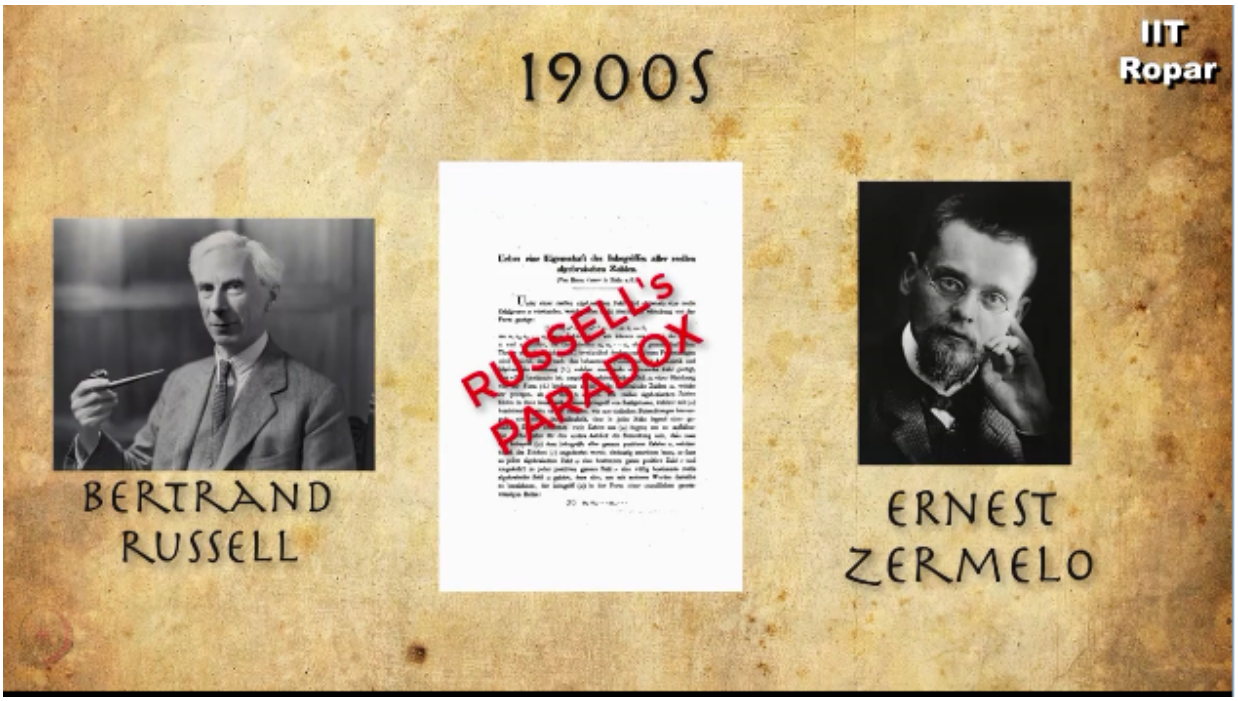
infinite cardinal numbers, I repeat there are infinitely many levels of infinity or there are infinitely many different infinite cardinal numbers, and that sounds confusing, don't worry if you don't understand this if you really want to understand more you can always search the internet there are a whole lot of references.



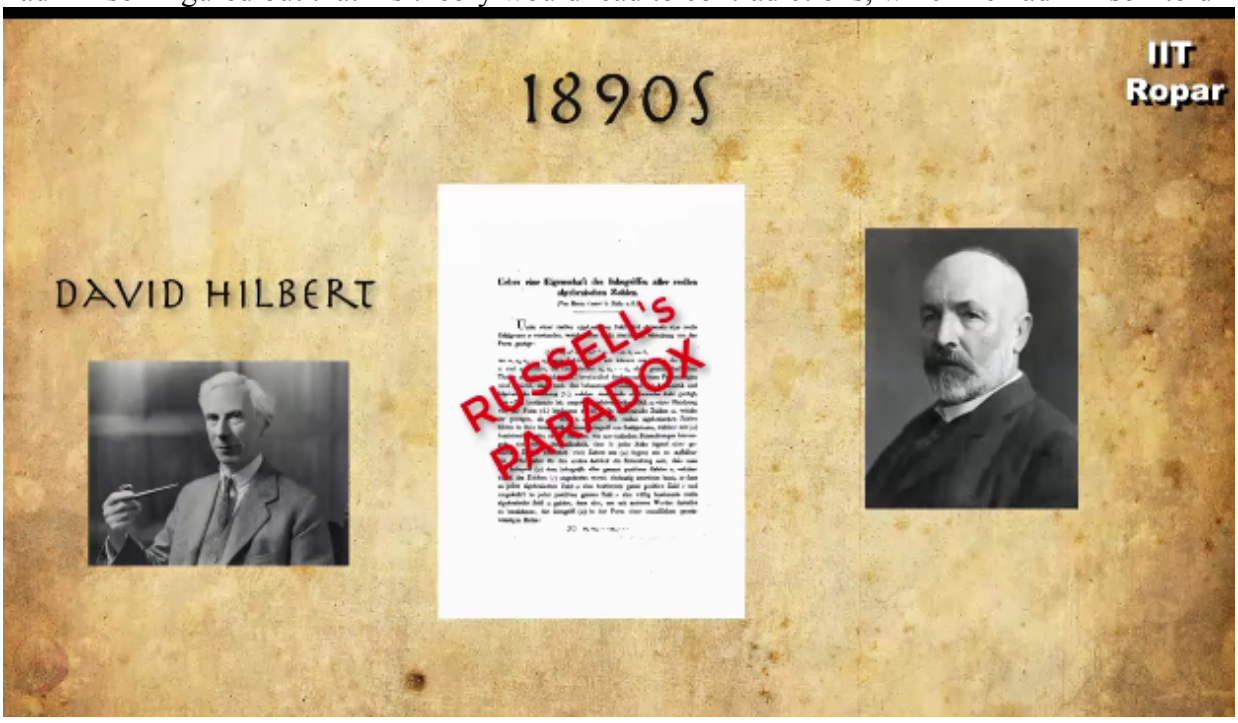
Further interactions of Cantor with Dedekind, during 1870s developed a mutual respect between the two and Dedekind was the first one to acknowledge Cantor's work on infinite sets, it was actually disagreed upon by other contemporaries, Dedekind has developed the concept of cuts which forms the basis for defining real numbers, he has shed light on how two infinite sets can be turned similar.



It was then during 1900's that Bertrand Russell and Ernst Zermelo independently found that Cantor discoveries lead to paradoxes, and these paradoxes were in itself very interesting,

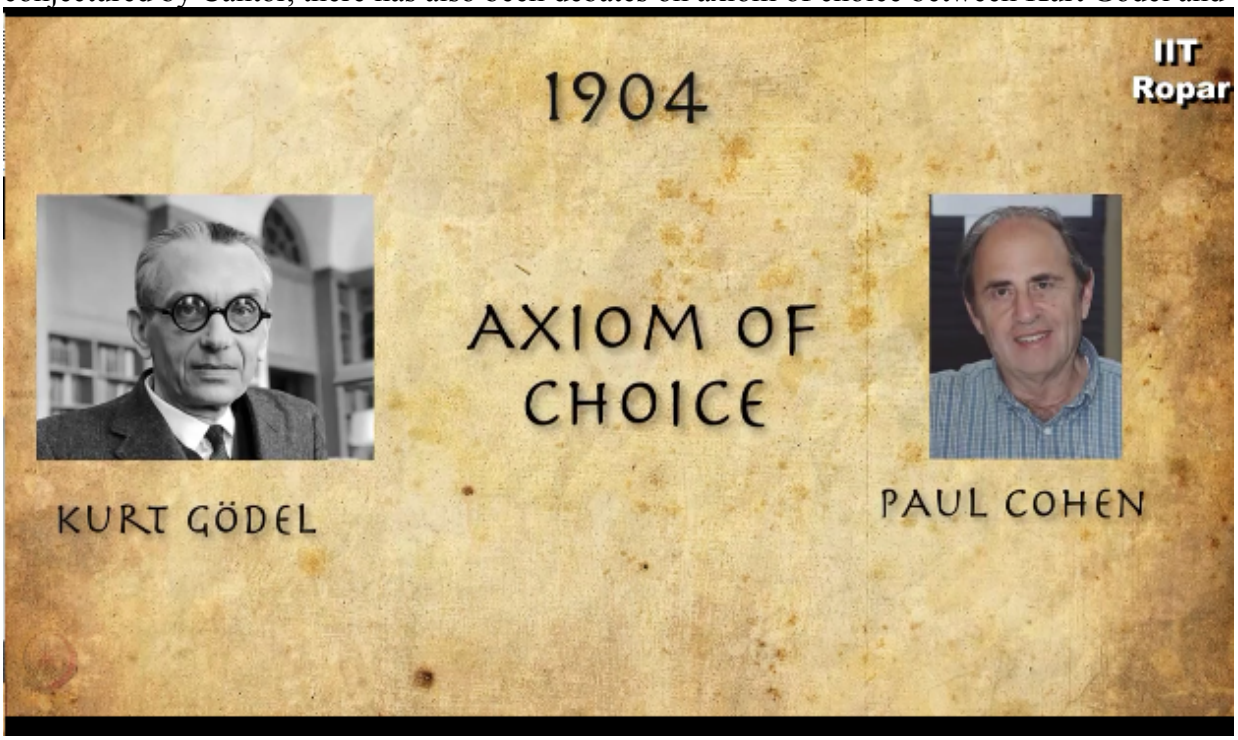


Russell's paradox is one such contradiction to what Cantor stated, at the end of 1890s Cantor had himself figured out that his theory would lead to contradictions, which he had himself told



Hilbert and Russell in a letter, those set theory had paradoxes and huge debates it did not lose

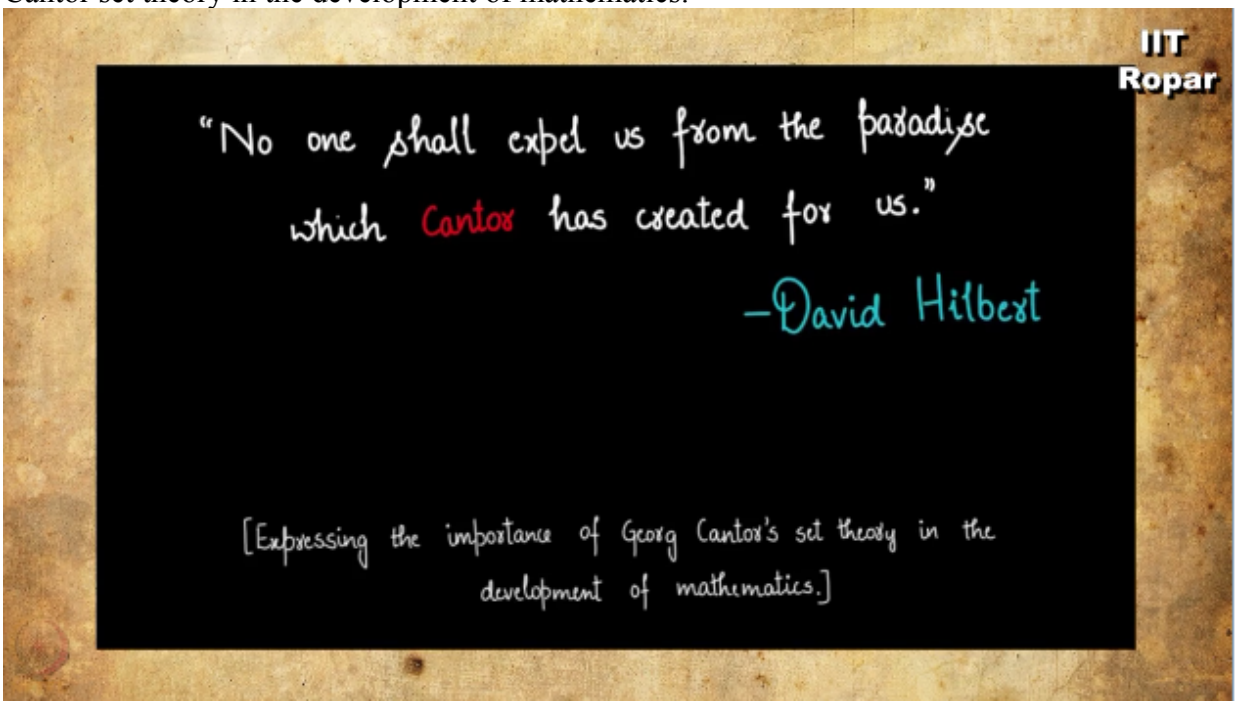
its momentum, Zermelo in 1904 proved that every set can be well ordered which was conjectured by Cantor, there has also been debates on axiom of choice between Kurt Gödel and



Paul Cohan, this is how set theory has taken shape to what it is today, it is impossible to mention all the details in this short video clip, this must be an initial trigger for you all to read more about the development on the internet.

Now go back to the first lecture of this week, read the quote again and you would understand it with a brand new perspective, no one shall expel us from the paradise which Cantor has created

for us said David Hilbert, he just meant he was trying to express the importance of Georg Cantor set theory in the development of mathematics.



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