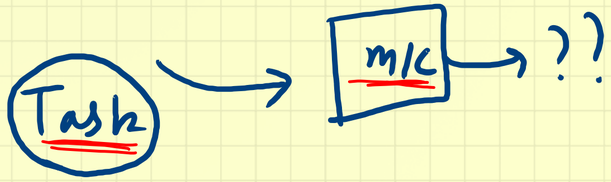
T.O.C

Theory of computation

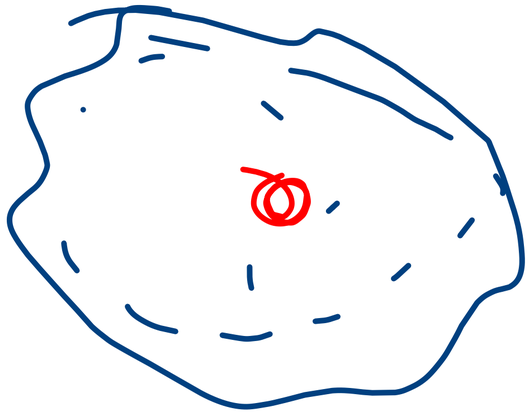
2 things

1. How m/c perform computation → What ever Computer do
2. Computational Capability of m/c



Thomas J Watson

Watson Labs —



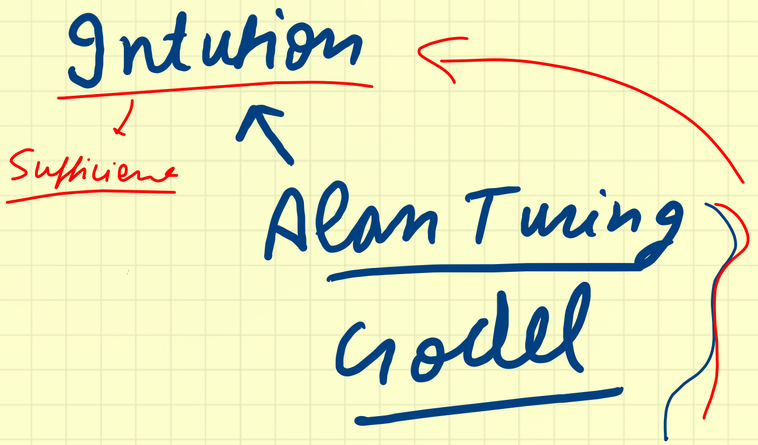
5 Computer

→ All problems will be solved

History

Early 19th century

Logic is complex


Intuition
Sufficient
Alan Turing
Godel

2 Questions

Logic complete →

1. Given any statement & we know that it is true ⇒ Logic proves

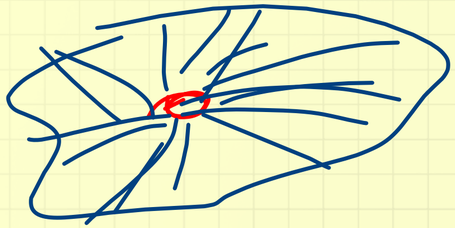
2. Problem → soln
   → Solved

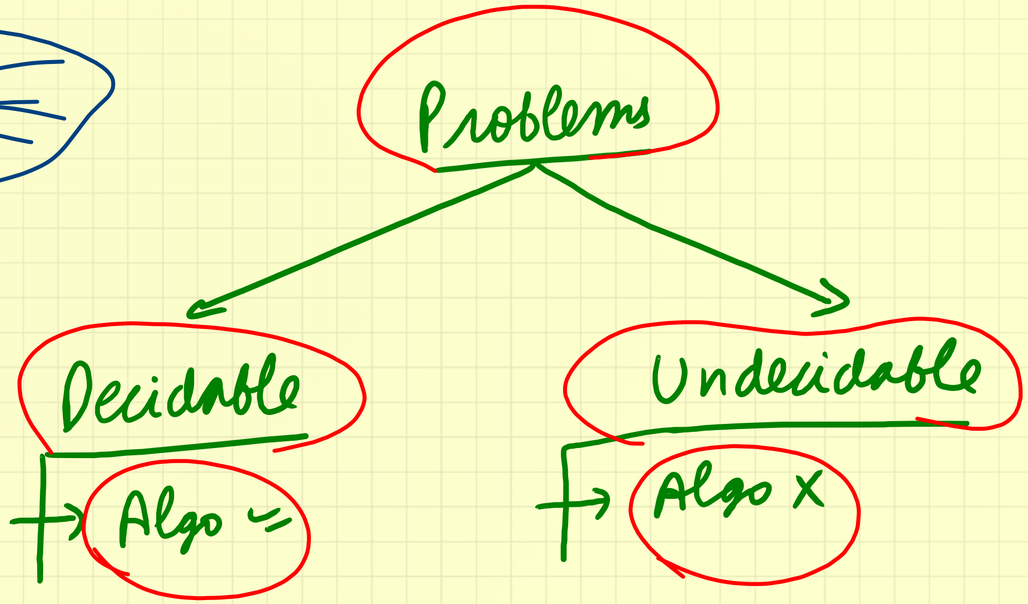
Proove with help of logic that logic is incomplete

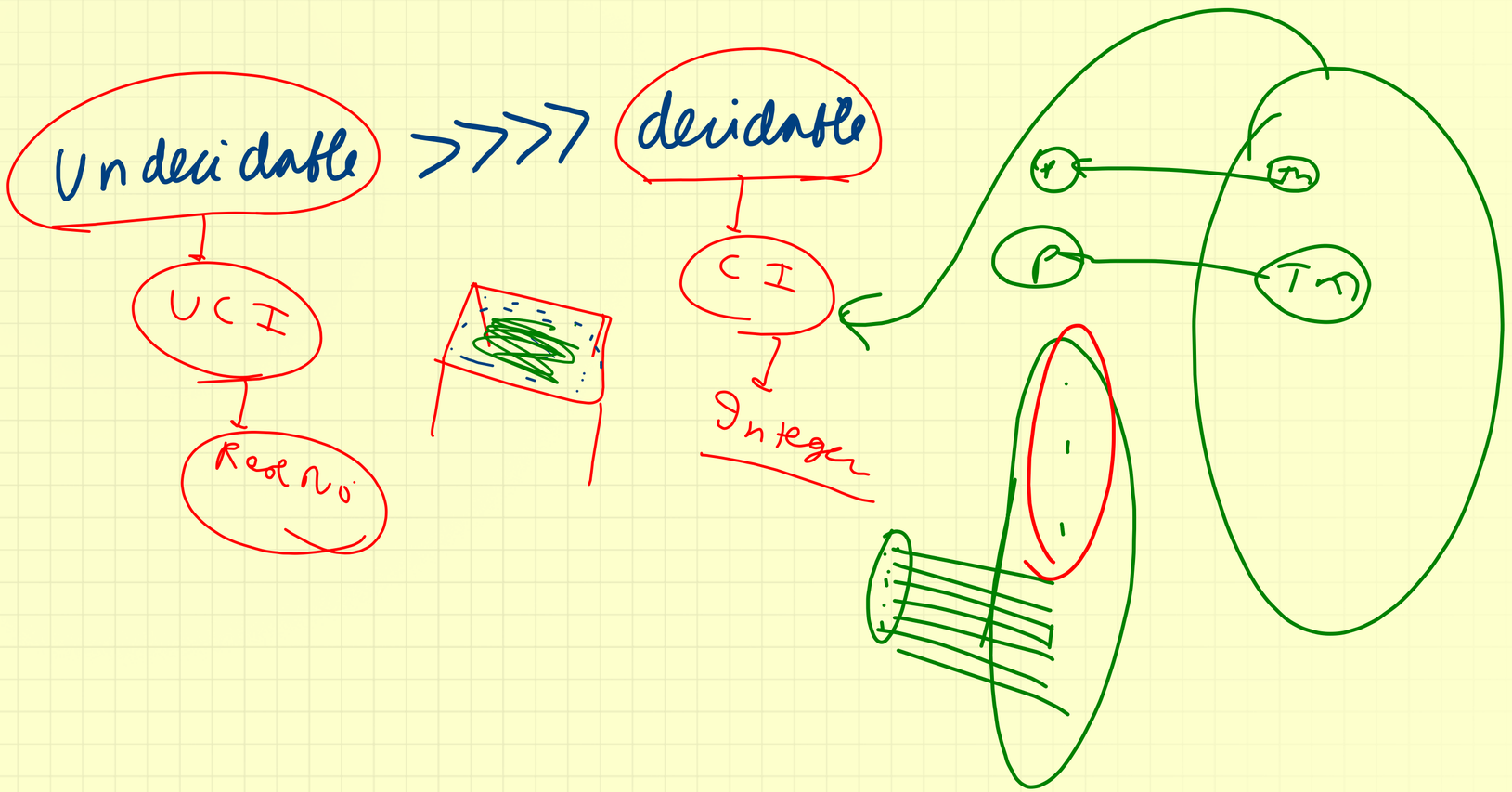
Done in 1936 by Alan Turing by making a m/c called Computer [Turing m/c]

Turing m/c is mathematical model of logic

In 1946 Von neuman made 1st Computer based on Turing machine.




Problems
Decidable
Algo =
Undecidable
Algo X


Undecidable >>>> decidable
UCI
Real No
CI
Integer

Logic is like fork

Syllabus of TOC :-

4 chapters :-

1. Basic terms used in T.O.C
2. F.A. & regular languages
3. P.D.A & CFLs
4. T.M. & decidability

⇒ Syllabus of 2nd chapter [FA & Regular Languages]

7.0.1. to 8.1.

1. Introduction to FA
2. Construction of FA
3. NFA to DFA conversion
4. Minimization of states of DFA
5. NFA with ∈ moves
6. Miley moore machines →

7. Grammars
8. Chomsky Hierarchy
9. Construction of grammars
10. Closure properties of Languages
11. Regular expressions
12. Equivalence of F.A, R.G, R.E.
13. Pumping lemma for regular languages

Syllabus of chapter 3
(CFLs & PDA)

1. Ambiguity in CFG
2. Reduction of CFG
3. Normal forms
4. PDA
5. DCFLs

Syllabus of chapter 4
(Turing machines & Decidability)

1. Introduction to T.M.
2. Construction of T.M.
3. Church Turing Thesis
4. Variations of TM

5. RE & REC Languages
6. Countability
7. What is problem & language corresponding to problem
8. Types of problems
9. 6 Undecidable problems of T.M.
10. Rice's theorem