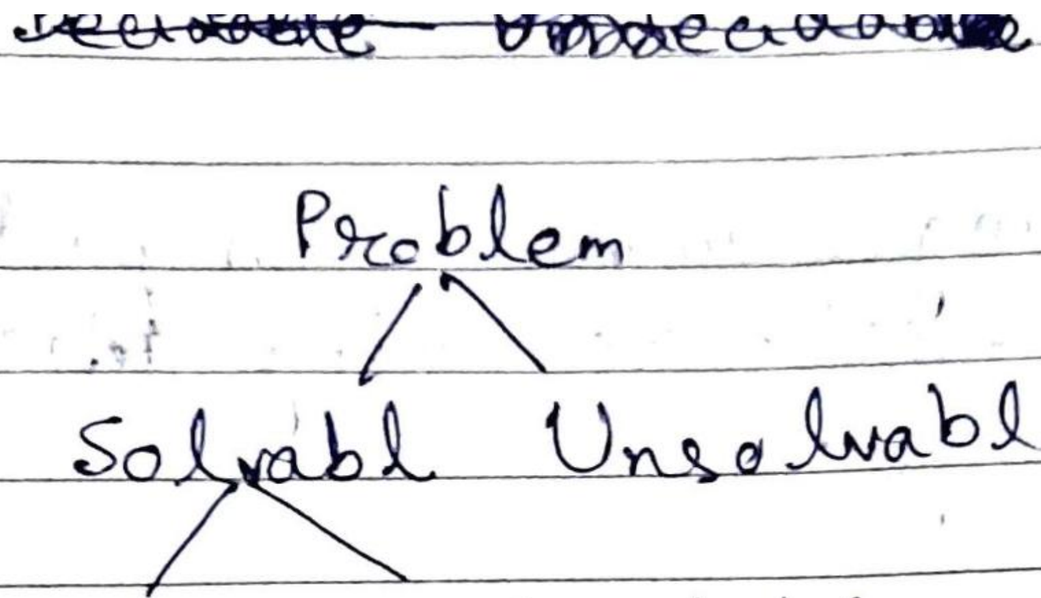

Decidability & Undecidability :-

Decidable Languages :-

A language 'L' is decidable if it is a recursive language. All decidable languages are recursive language are recursive languages and vice-versa.

Partially Decidable language :-

A language 'L' is partially decidable if 'L' is a recursively enumerable language.

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DECIDABILITY Overview

→ Every question about regular languages is decidable.

→ Some questions about CFLs are decidable, but some are not.

→ The "Halting Problem" is not decidable.

→ Some languages are not turing recognizable.

→ Many questions about turing machines are not ~~decidable~~ decidable and some are not even turing recognizable.

Q. Given a DFA and a string, will the DFA accept?
Is this problem decidable?

Sol^n. Languages are decidable. We must express the problem in terms of languages.

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Undecidable language:

→ A language is undecidable if it is not decidable.

→ An undecidable language may sometime be partially decidable but not decidable.

→ If a language is not even partially decidable, then there exists no Turing Machine for that language.

Recursive Language	TM will always Halt
Recursively Enumerable Language	TM will halt sometime & may not halt sometimes
Decidable Language	Recursive Language
Partially Decidable Language	Recursively Enumerable Language
UNDECIDABLE	No. TM for that lang.