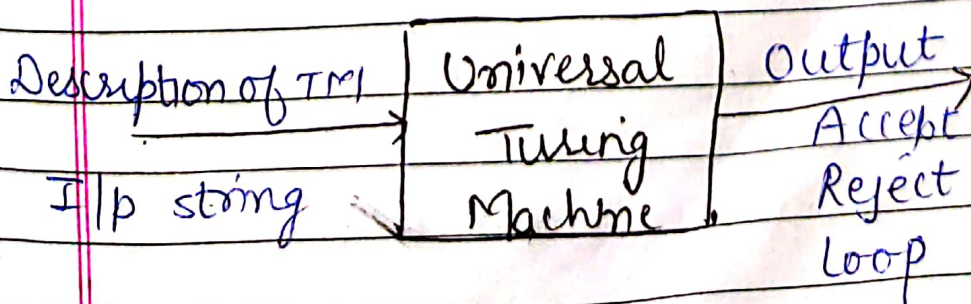
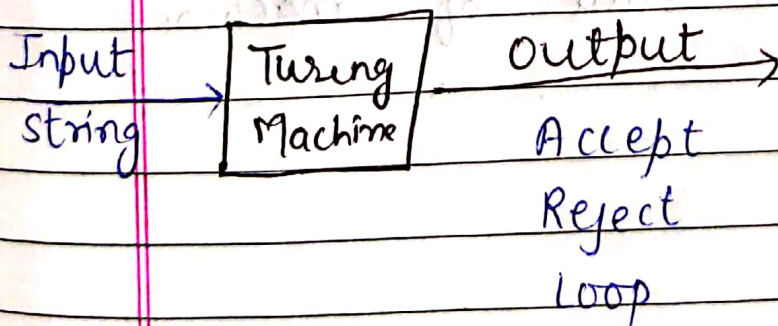


Universal Turing Machine.

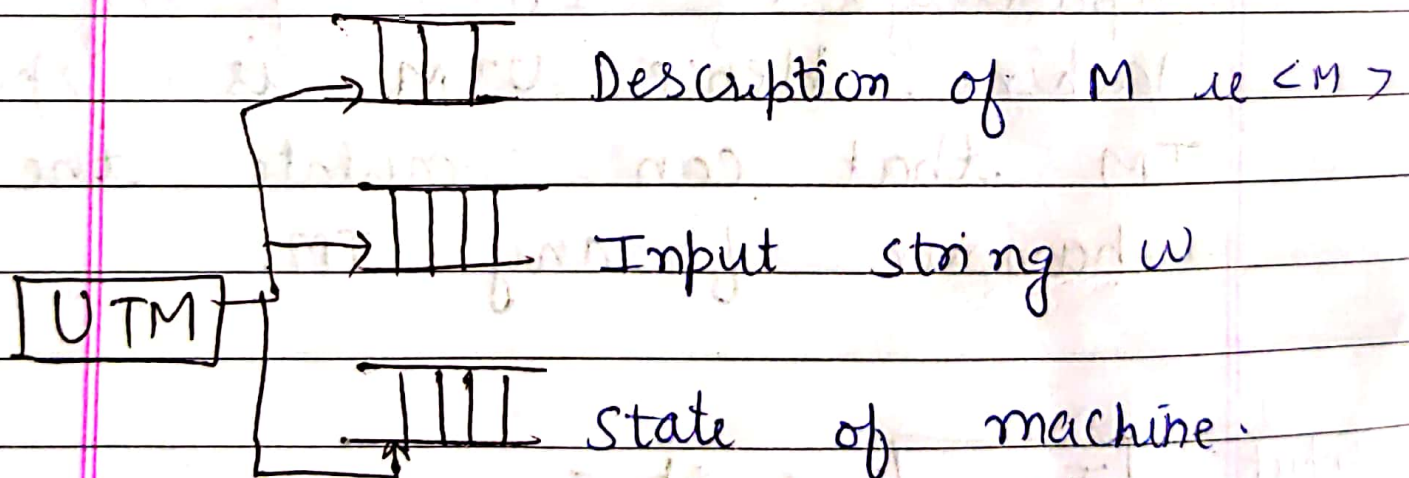
Till now for 0^*1 , $a^n b^n$, $a^n b^n c^n$,
w.c.w. we have created different
T.M. for all different Language.
So, we need a single
machine, which can solve any type
of problem, such machine is
known as UTM (Universal Turing
Machine)

UTM is a kind of TM,
which is capable of doing anything
that any other TM can do. That
means Universal TM should have
capability of Imitating any Turing
Machine. Hence, UTM is a specified
TM that can simulate the
behaviour of any TM.



To Design UTM, we use because along with input string, we also give description of TMC.

- 1) The description of T in terms of its operation or program area of tape.
- 2) The initial configuration of T , which includes starting state and the special symbol scanned. (State area of tape)
- 3) The input data to be given to TMT (ie data area of the tape)



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The marker indicates the point on its tape at which the description of T begins and keeps a complete account of how the tape T looks like at every instant.

* It also remembers the state of T along with the symbol T is reading.

* Then the marker notes the description of T to carry out what T is supposed to do.

The UTM should have table look up facility and it should perform following steps:

1.) Scan the cell on the state area of the tape and read the symbol that T reads and initial state of T .

2.) Move the tape to the program area containing the description of T and find the row from transition table headed by symbol in step 1.

3.) Find the column from transition table headed by state symbol, in which T resides and read

three things i.e

- 1.) The new state
- 2.) The symbol to be replaced and
- 3.) Direction of the movement of the tape.

in the intersection of this column with the row obtained in step 2.

- 4.) Move the tape to the appropriate cell in the data area, Replace the symbol. Then Move the head in required direction, Read the next symbol and finally reach the state area. Here replace the state and scanned symbol. Go to step 1.