***CS 402 GDB 1 SOLUTION FALL 2020***

***FINITE AUTOMATA (FA):***

Finite Automata

= PDA with finite stack.

= TM with finite tape.

= TM with unidirectional tape.

= TM with read only tape.

***PUSH DOWN AUTOMATA (PDA):***

PDA = Finite Automata with Stack

***TURING MACHINE (TM):***

Turing Machine

= PDA with additional stack.

= FA with 2 stacks.

The **Applications** of these Automata are given as follows:

***1.***[***Finite Automata (FA)***](https://www.geeksforgeeks.org/toc-finite-automata-introduction/)***–***

* For the designing of lexical analysis of a compiler.
* For recognizing the pattern using regular expressions.
* For the designing of the combination and sequential circuits using Mealy and Moore Machines.
* Used in text editors.
* For the implementation of spell checkers.

***2.***[***Push Down Automata (PDA)***](https://www.geeksforgeeks.org/theory-of-computation-pushdown-automata/)***–***

* For designing the parsing phase of a compiler (Syntax Analysis).
* For implementation of stack applications.
* For evaluating the arithmetic expressions.
* For solving the Tower of Hanoi Problem.

***3. Linear Bounded Automata (LBA) –***

* For implementation of genetic programming.
* For constructing syntactic parse trees for semantic analysis of the compiler.

***4.***[***Turing Machine (TM)***](https://www.geeksforgeeks.org/turing-machine/)***–***

* For solving any recursively enumerable problem.
* For understanding complexity theory.
* For implementation of neural networks.
* For implementation of Robotics Applications.
* For implementation of artificial intelligence.