Scribed Notes

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Models of computation

There are 4 models of computation model and their algorithm. We expressed f(n) from a domain of legal input to codomain of corresponding output.

1. **Finite state machine/ Deterministic finite automaton**-is a mathematical model of computation. It is an abstract machine that can be in exactly one of a finite number of *states* at any given time.
   Problems solved using this machine model are known as **Regular languages.**

2. Push down automaton-It is a finite automata which is used to recognise **context free languages.**

3. Linear bound automaton- used to recognise **context sensitive language**

4. Turing machines- **Recursively enumerable language.**

Types of computational problems

1. **Optimisation problem**- When there is objective function we have two options maximization and minimization. There are two conditions feasible and infeasible. In feasible basic conditions are satisfied and in infeasible basic/primary conditions are not satisfied.
   Both feasible and infeasible solution have a cost associated with it.
   E.g. single source shortest path.

2. **Decision problems** - Special class of computational problems where ans has yes/no as an output.
E.g. whether the given graph is connected or not, is the sequence sorted or not.

Formal languages- is a set of strings of symbols drawn from a finite alphabet.

Σ={a,b,c}
Σ^0= ε (epsilon is the identity for concatenation and it is the string of zero length)
Σ^1={a,b,c}
Σ^2={aa,ab,ac,ba,bb,bc,ca,cb,cc}
Σ^3= 3*9=27 elements.

E.g. to demonstrate that every computational problem can be mapped to strings.
Each monotonic block should be longer than the previous one.

Σ={a,b,c}
a
aa
aabbb
aabbbccccbbbbbb

All the above strings $\in$ l
bbc $\notin$ l