Symbolic Programming Paradigm

1. Calculate $\sqrt{2}$ with 100 decimals.
2. Calculate 1/2 + 1/3 in rational arithmetic.
3. Calculate the expanded form of $(x+y)^6$.
4. Simplify the trigonometric expression $\frac{\sin(x)}{\cos(x)}$
5. Calculate $\lim_{x \to 0} \left(\frac{\sin(x)-x}{x^3} \right)$
6. Calculate the derivative of log(x), 1/x, sin(x), cos(x) for x.
7. Solve the system of equations x + y = 2, 2x + y = 0
8. Integrate x^2,sin(x), cos(x) interms of x and y
9. Solve f''(x) + 9 f(x) = 1
10. Using matrices solve the linear equations
    3x+7y=12z
    4x-2y=5z

Automata

1. Write a deterministic automata code for the language L(M) = {w | w ε {0, 1}*} and W is a string that does not contain consecutive 0's.
2. Write a deterministic automata code for the language with ∑ = {0, 1} accepts the set of all strings with three consecutive 1's.
3. Write a deterministic automata code for the language with ∑ = {0, 1} accepts even number of 0's and even number of 1's
4. Write a deterministic automata code for the language with ∑ = {0, 1} accepts the only input 101.
5. Write a deterministic automata code for the language with ∑ = {0, 1} accepts those string which starts with 1 and ends with 0.
6. Give a non-deterministic automata code for (a|b)*aab
7. Give a non-deterministic automata code for the set of all binary strings that have either the number of 0's odd, or the num-ber of 1's not a multiple of 3, or both
8. Give a non-deterministic automata code for the language L=(ab)*(ba)*U aa*
9. Give a non-deterministic automata code for the the language L that have atleast two consecutive 0's or 1's
10. Give a non-deterministic automata code for the the language L= (01 U 010)*