2CS503 Design and Analysis of Algorithms

Tutorial 3: Recurrences

Q-1 Obtain the total solutions of the following recurrence relations:-

1) $T(n) – 4T(n-1) + 4T(n-2) = 0$
2) $T(n) – 5T(n-1) + 6T(n-2) = 0$
3) $T(n) + 5T(n-1) + 6T(n-2) = 3n^2 – 2n + 1$

Q-2 Solve the following by using Recursion tree method:-

1) $T(n) = 3T(n/4) + n^2$
2) $T(n) = 4T(n/3) + n$
3) $T(n) = 4T(n/2) + n$
4) $T(n) = T(9n/10) + T(n/10) + cn$

Q-3 Solve the following by using Master method:-

1) $T(n) = 8T(n/2) + 1000n^2$
2) $T(n) = 2T(n/2) + 10n$
3) $T(n) = 2T(n/2) + n^2$
4) $T(n) = 3T(n/3) + n\log n$
5) $T(n) = 9T(n/3) + n$
6) $T(n) = 27T(n/3) + n^3$
7) $T(n) = 8T(n/2) + n^3/\log n$
8) $T(n) = 2T(n/2) + n/\log n$
9) $T(n) = 0.5T(n/2) + 1/n$
10) $T(n) = T(n/2) + n(2 – \cos n)$

Q-4 Solve the following using “Change of variable” method:-

$T(n) = \sqrt{n}T(\sqrt{n}) + n$

Q-5 Apply “Intelligent Guesswork” method to solve the following: -

$T(n) = 3T(n/2) + n$ (n is an exact power of 2)

Q-6 Apply “Range transformation” method to the solve the following: -

$T(n) = nT^2(n/2)$ (n is an exact power of 2 and $T(1) = 1/3$)