

SNS COLLEGE OF ENGINEERING Coimbatore-107



COURSE NAME: ANALYSIS OF ALGORITHM

II YEAR/ IV SEMESTER

UNIT – V

BACKTRACKING ALGORITHM

Topic

NP Problem





| | Durie Prince |
|--|---|
| | computational complexity classes: |
| A CONTRACTOR OF THE PARTY OF TH | |
| | P NP NP Hand NP Complete Picklan |
| | P NP NP Hand NP Complete Peobless Reduction |
| | |
| (1) | P class: Time Complexity (o(n), o(n2), o(n3)) |
| 0.16 | * Stands for polynomial Time |
| | * Collection of decision problems |
| | * Stands for polynomial Time * Collection of decision problems (.yes/No) |
| | A. It can be solved by deterministic |
| | Cregular Machine in polynomial time. |
| | # solved in theory of peactable. Examples: |
| 1 | # Solved in theory of peardical: |
| | Examples: |
| | find GCD, Searching, find maximum Match |
| | |
| (1) | . Mp class: |
| | * It is not known, how to solve |
| | quickly (Collection of decision Publims) |
| | * Bug if Solution is reached, |
| | Verification of Solution is easy. |
| | of Hard to Solve, But easy |
| | to check boards |
| | * Pt can be verified by Turing |
| | mali plus amial time. |
| | Machine in polynemial time. But Cannot be solved in polynamial |
| | 1841 Capport of |
| | Ame. |





| | Examples Sudoky |
|------|--|
| | Example & Sudoky Gleaph coloring Hamil tonian path peoblem Travelling salesman peoblem Note: |
| | Hamiltonian path problem |
| | Salesman peoblem |
| | 1/ Toak etting |
| 1 | Note: Rased on given Ilp & Craaph. it may fall either in Np. class or in P class. |
| | Rased on given It |
| | it may fall either in |
| | Class P class |
| | Cass - |
| 0/1. | Complete (Non Determin SDC polynomial - |
| (11) | NP Agordo |
| |) A problem is no comper |
| • | is it is both NP & NP nord |
| | There are hard peoblems in |
| | Np hand peoblem is np complete it is both np & np hand These are hand peobleme in Np. |
| | => These are subset of larger |
| | These coile |
| | class of NP any peoblem in Np class |
| - 4 | any peoblem in Np cass |
| | can be transformed reduced into |
| | can be transformed / reduced into Np complete peoplems in polynomia |
| | time. (D-NP) |
| | |
| | Dample: |
| _ | 1) Of Knap Sack |
| | 2) Hamiltonian cycle |
| | 2) |
| | 2/ |





| -1.1 | NO flard beoblemic (m |
|--------|--|
| | Mp fland problems (non Deterministic) |
| | problems atteast hand as problems in Np class. |
| | problems alleast hand as problems |
| | in up class. |
| | of Longer time to solve |
| | But solution can be verified in |
| . , | polynomial time. |
| | # It is harder than Mp |
| | Complete peoplem & Gland |
| | Complete peoblem & Solved by |
| 11:4 | Problem reduction techniques. |
| Jac' . | (Divide & conquer, Backtracking). |
| 117. | * AU NP peoblems are not |
| | in Np Hand |
| | Examples |
| | Halting peoblem, no Hamiltonian eyele |
| | Egae |
| (V), | Peoplem Reduction! |
| A Comp | -> Strategy is dividing Complex |
| | Peoplem into smaller a b problem |
| | Problem Reduction! 3 Strategy is dividing complex Problem in to Smaller Sub problem problem |
| | peoblem |
| | Sub peoplem |
| | Sub Publem Sub Publem |
| | Sol 12 |
| | 80 m. |
| | Compine |
| | |





| Applications? | megaze | | |
|--|---------------|--|--|
| Applications. Divider & conquer (Q) Peeursion. (Peoblem 7) Recursion. (Peoblem 7) | wicksorth | | |
| a Recursion (Peoblem 7) | sest cases) | | |
| AT (Reduce Complexe g | oal surp | | |
| Peeuroop, Creoner g De AI Creduce Complex g Sub grals | | | |
| Algorithm & Analysis of n | Queen pu | | |
| Algorithm solve N Queens (n) | Time Comple | | |
| 5 | @(N1)26 | | |
| bona od [n][n]=0 | Cach row; n | | |
| | acce possible | | |
| ig Eplace Queen (boorrod (row-0) ig Eplace Queen vetums true print ("Solution found"). | Space Cample | | |
| Print (" Solution found"). | Soll Soll | | |
| else | (M*K) -) fr | | |
| Print (No Solution); | Storing au | | |
| Z delta control control | southors | | |
| Agonithm place Queen Choons | (0000) | | |
| 5 | | | |
| ij (2000 > n) | | | |
| return true / Queens placed Succes | | | |
| for (Col from o to n-1 | | | |
| 12 (128 Safe Choard, now, co1) == +xxx | | | |
| place queen at board frow [col)=1 | | | |
| Place queen at board love 12 place queen (board, vous | -1) Setwo | | |
| | | | |