CE205 CE205 WD ata Structures

Week-6

Graph MST, Backtracking, Topological Sorting, Shortest Paths, Connectivity, Max Flow and Cycle Detection Algorithms.

Graph Isomorphism and canonization

Graph Cuts

Download DOC, SLIDE, PPTX



Outline-1

- Graph Topological Sorting
- Graph MST
- Graph Backtracking
 - Tug of War
 - o n-Queen's Problem
 - o m Coloring Problem
 - Euler & Hamiltonian Path



Outline-2

- Graph Sortest Paths
- Graph Connectivity SCC
- Graph Max Flow
- Graph Isomorphism
- Graph canonization
- Graph Cuts
 - Min Cut
 - Max Cut



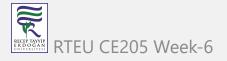
Outline-3

- Alpha-Beta Pruning
- Hasse Diagrams
- Petri Nets
- Bipartite Graphs
- Cycle Detection
 - Brent's Algorithm
 - Hare and Tortoise Algorithm
- Bayesian Network



Graph Topological Sorting

- CE100
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/?h=topolo#directed-acyclic-graphs-dag
- Geeks for Geeks
 - https://www.geeksforgeeks.org/topological-sorting/



Graph MST

- CE100
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/?h=mst#minimum-spanning-tree-mst
- Geeks for Geeks
 - https://www.geeksforgeeks.org/prims-minimum-spanning-tree-mst-greedyalgo-5/



- Tug of War
 - Geeks for Geeks
 - https://www.geeksforgeeks.org/tug-of-war/



- n-Queen's Problem
 - Geeks for Geeks
 - https://www.geeksforgeeks.org/n-queen-problem-backtracking-3/? ref=lbp



- m Coloring Problem
 - Geeks for Geeks
 - https://www.geeksforgeeks.org/m-coloring-problem-backtracking-5/
 - Tutorials Point
 - https://www.tutorialspoint.com/M-Coloring-Problem#:~:text=The problem is to find,is assigned on which vertex.



- Euler & Hamiltonian Path
 - https://www.geeksforgeeks.org/mathematics-euler-hamiltonian-paths/



Graph Sortest Paths

- Single-Source Shortest Paths (SSSP)
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-11/ce100-week-11-shortestpath/
 - https://visualgo.net/en/sssp?slide=1



Graph Connectivity

- Strongly Connected Components
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/tr/week-10/ce100-week-10-graphs/?h=scc#strongly-connected-components-scc



Graph Max Flow

- Geeks for Geeks
 - https://www.geeksforgeeks.org/max-flow-problem-introduction/



Graph Isomorphism

- https://www.sciencedirect.com/science/article/pii/S0747717113001193
- https://www3.cs.stonybrook.edu/~algorith/implement/nauty/implement.shtml
- https://github.com/Mith13/Graphs-isomorphism



Graph Cuts

- 1. Min Cuts
- 2. Max Cuts
- Wikipedia
 - https://en.wikipedia.org/wiki/Cut_(graph_theory)#:~:text=In graph theory%2C
 a cut,said to cross the cut.



Graph canonization

- Wikipedia
 - https://en.wikipedia.org/wiki/ Graph_canonization



Cycle Detection

• https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/#cycle-detection



Graph Coloring

• https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/#graph-coloring



Alpha-Beta Pruning

- Geeks for Geeks
 - https://www.geeksforgeeks.org/minimax-algorithm-in-game-theory-set-4alpha-beta-pruning/



Hasse Diagrams

- Geeks for Geeks
 - https://www.geeksforgeeks.org/discrete-mathematics-hasse-diagrams/



Petri Nets

- Wikipedia
 - https://en.wikipedia.org/wiki/Petri_net



Bipartite Graphs

- CE100
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/?h=bipartite#biparitite-checker
- Geeks for Geeks
 - https://www.geeksforgeeks.org/bipartite-graph/



Cycle Detection

- Brent's Algorithm
 - Geeks for Geeks
 - https://www.geeksforgeeks.org/brents-cycle-detection-algorithm/
- Hare and Tortoise Algorithm
 - Geeks for Geeks
 - https://www.geeksforgeeks.org/tag/tortoise-hare-approach/



Cycle Detection

- CE100
 - https://ucoruh.github.io/ce100-algorithms-and-programming-II/week-10/ce100-week-10-graphs/?h=bipartite#cycle-detection



Bayesian Network

• https://towardsdatascience.com/introduction-to-bayesian-networks-81031eeed94e



$$End-Of-Week-6$$

