

Overview

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# Week 3

Algorithms on Graphs

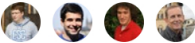
## Week 3

Discuss this week's modules here.

Go to forum

70 threads · Last post 5 days ago

## Paths in Graphs 1



In this module you will study algorithms for finding Shortest Paths in Graphs. These algorithms have lots of applications. When you launch a navigation app on your smartphone like Google Maps or Yandex.Navi, it uses these algorithms to find you the fastest route from work to home, from home to school, etc. When you search for airplane tickets, these algorithms are used to find a route with the minimum number of plane changes. Unexpectedly, these algorithms can also be used to determine the optimal way to do currency exchange, sometimes allowing to earn huge profit! We will cover all these applications, and you will learn Breadth-First Search, Dijkstra's Algorithm and Bellman-Ford Algorithm. These algorithms are efficient and lay the foundation for even more efficient algorithms which you will learn and implement in the Shortest Paths Capstone Project to find best routes on real maps of cities and countries, find distances between people in Social Networks. In the end you will be able to find Shortest Paths efficiently in any Graph. This week we will study Breadth-First Search algorithm.

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## Learning Objectives

- Explain what a shortest path is
- Describe algorithms for computing shortest paths in undirected graphs
- Create a program for finding an optimal flight

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## Most Direct Route

▶ Video: Most Direct Route 9 min

Resume

▶ Video: Breadth-First Search 7 min

▶ Video: Breadth-First Search (continued) 6 min

▶ Video: Implementation and Analysis 9 min

▶ Video: Proof of Correctness 7 min

▶ Video: Proof of Correctness (continued) 5 min

▶ Video: Shortest-Path Tree 6 min

▶ Video: Reconstructing the Shortest Path 3 min

📖 Reading: Slides and External References 10 min

## Programming Assignment

⌚ Programming Assignment: Programming Assignment 3: Paths in Graphs 3h

Due Aug 23, 1:59 AM CDT

## User experience survey

⌚ Survey 10 min

