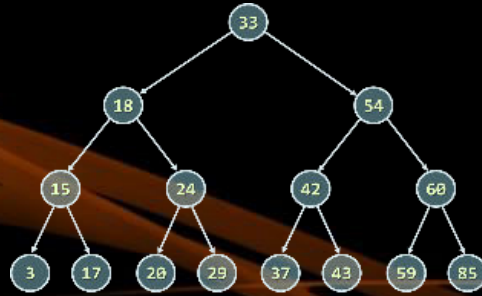


```

DFS(node)
{
  stack ← node
  visited[node] = true
  while stack not empty
    v ← stack
    print v
    for each child c of v
      if not visited[c]
        stack ← c
        visited[c] = true
}

```



# Algorithms

## Course Overview



```

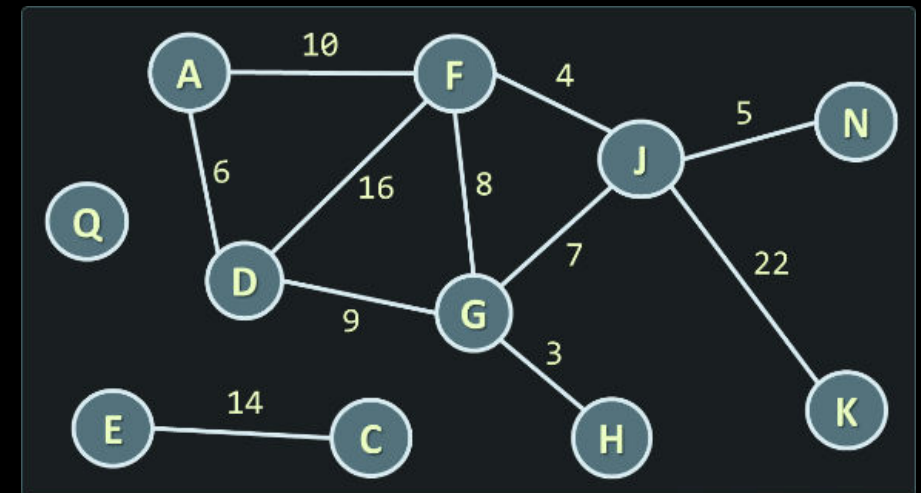
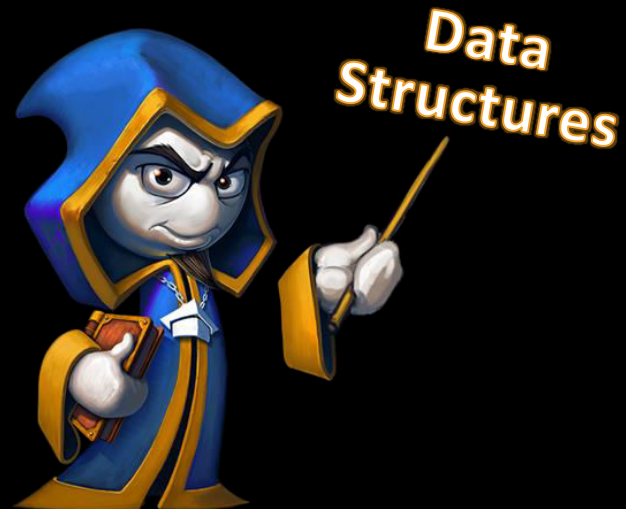
DFS(node)
{
  for each child c of node
    DFS(c);
  print the current node;
}

```



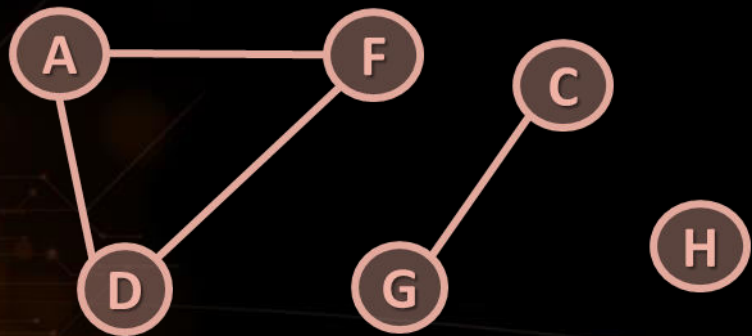
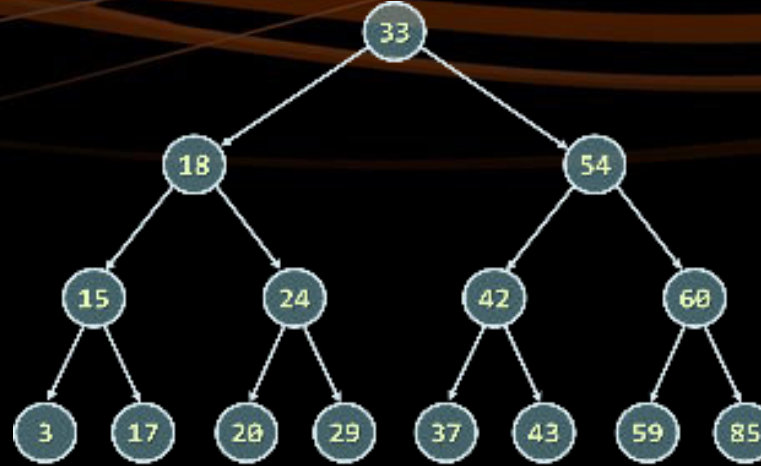
**SoftUni Team**  
**Technical Trainers**

**Software University**  
<http://softuni.bg>



# Table of Contents

1. Course Curriculum
2. Trainers Team
3. Examination
4. Learning Resources



```
DFS(node)
{
    for each child c of node
        DFS(c);
    print the current node;
}
```

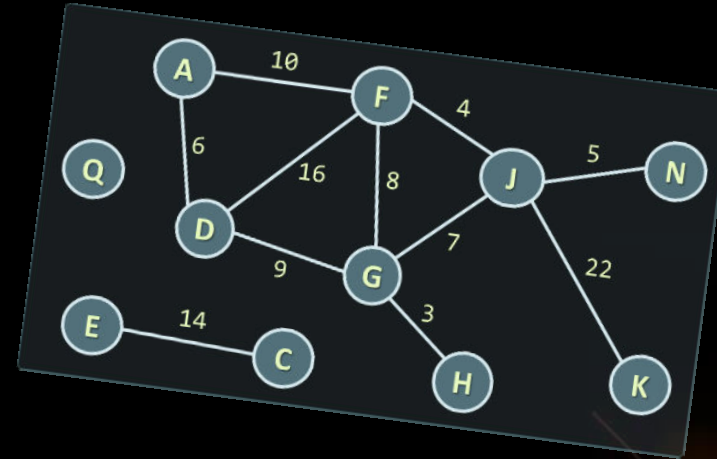
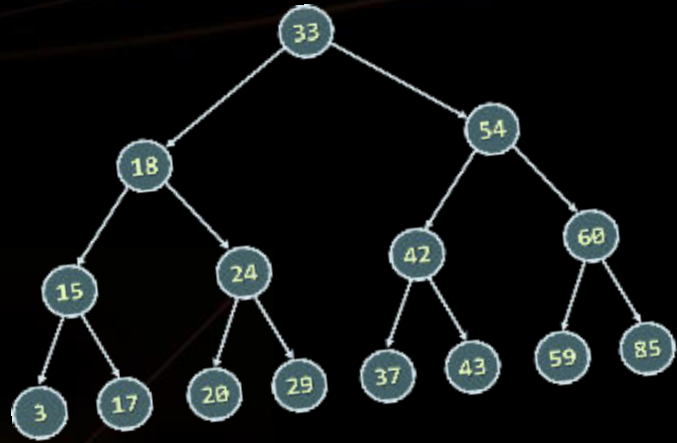


Have a Question?

sli.do

#DsAlgo





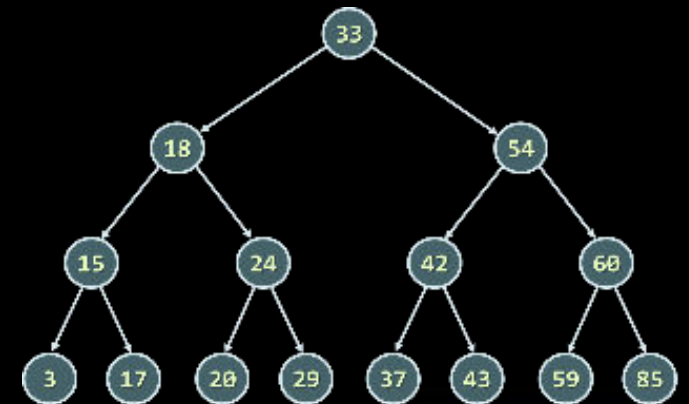
# Algorithms

## Course Curriculum

# Algorithms – Course Curriculum

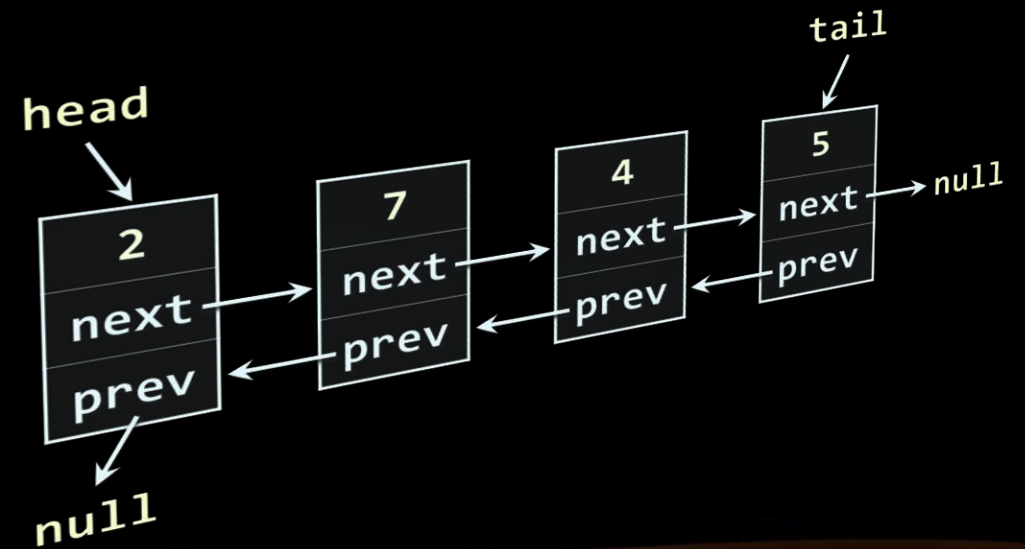
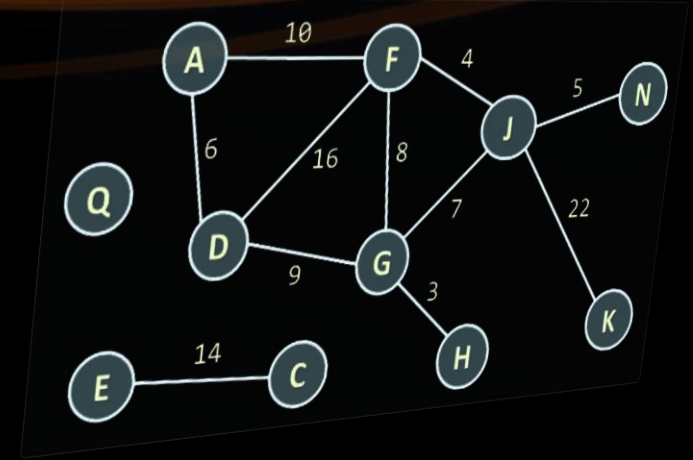
1. Course Overview
2. Recursion, Sorting and Searching Algorithms
3. Combinatorial Algorithms
4. Greedy Algorithms
5. Dynamic Programming I
6. Dynamic Programming II

```
DFS(node)
{
    for each child c of node
        DFS(c);
    print the current node;
}
```



# Algorithms – Course Program (2)

8. Graphs and Graph Algorithms
9. Advanced Graph Algorithms - Part I
10. Advanced Graph Algorithms - Part II
11. Problem Solving Methodology
12. Solving Practical Problems x 2
13. Exam Preparations x 2
14. Practical Exam







# The Trainers Team

# Trainers Team

## ■ Ivaylo Kenov

- Various job titles at the same time:
  - Mathematical competitions champion
  - Full Stack Technical Trainer
  - Senior Software Developer
  - Solution Architect & Technical Lead
  - One-man army @ My Tested ASP.NET
- Contacts:
  - <https://github.com/ivaylokenov>
  - <https://facebook.com/ivaylo.kenov>
  - <https://linkedin.com/in/kenov>





# Training Duration – Algorithms

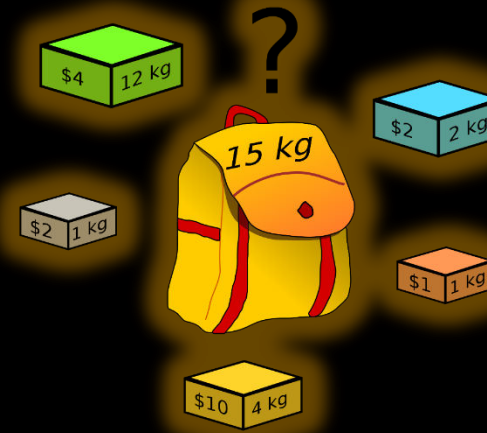
- Lessons: ~ 30 hours (onsite + YouTube videos)
- Practical exercises (in class labs): ~ 30 hours
- Exam preparation: 8 hours
- Homework: ~ 40-60 hours
- Schedule: March – May 2018
- Practical exam: 13 May 2018



# Problems We Will Be Solving



Combinations of Cards

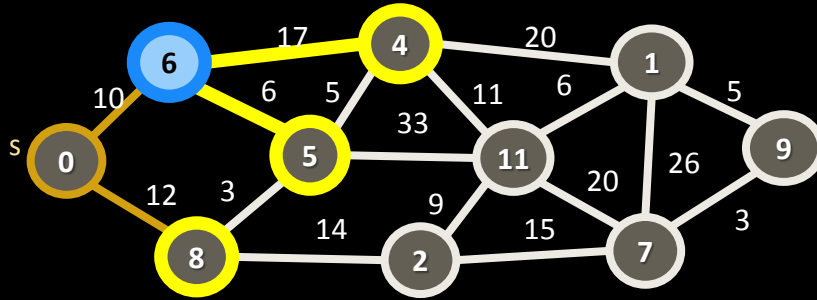


Knapsack Problem

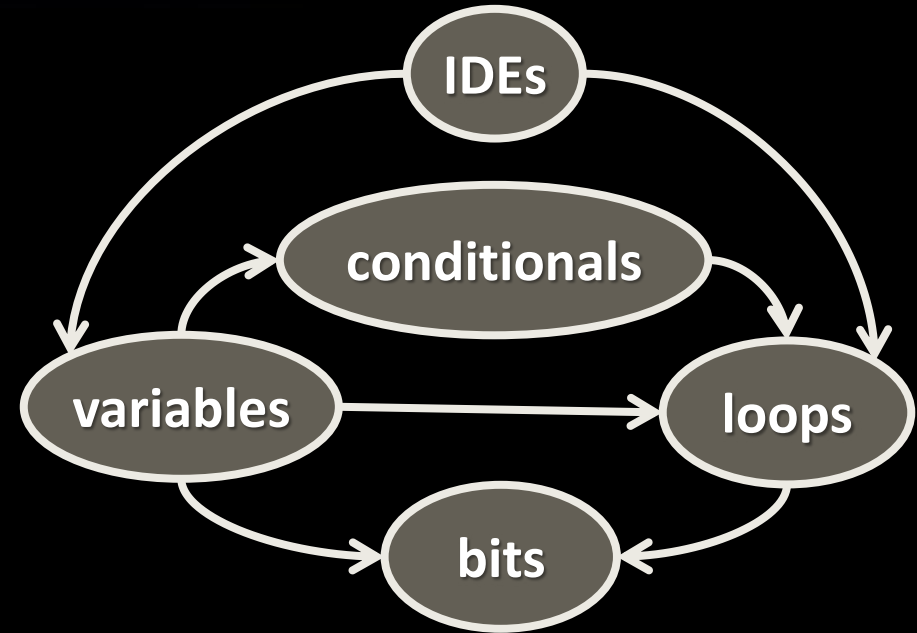


Subset Sum

# Problems We Will Be Solving (2)



Dijkstra's Shortest Path



Topological Sorting



# Programming Languages

- The recommended language for this course is **C#**
  - Exercises in class assume you will write in **C# + Visual Studio**
  - Labs and examples will also focus on **C#** and **Visual Studio**
  - Homework can be submitted in **C#** or **Java**
- At the final exam attendees can use:
  - **C#** or **Java**

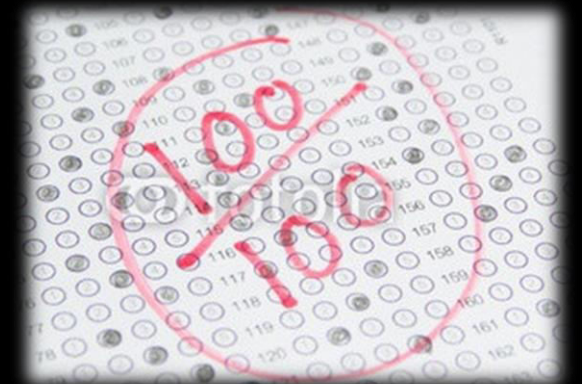
# Scoring System for the "Algorithms"

- Practical exam
  - 90%
- Labs/Homework (1 week deadline)
  - up to 10% bonus
- Contribution in the forum:
  - up to 10% bonus

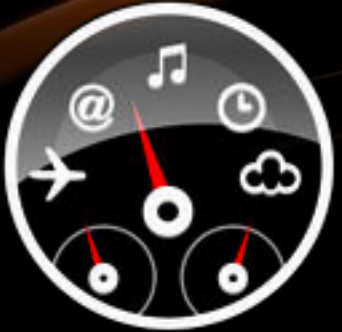


# Algorithms – Practical Exam

- 4 problems for 6 hours
  - Graphs, dynamic programming, recursion, combinatorics, greedy, ...
- Automated judge system / **real-time** feedback

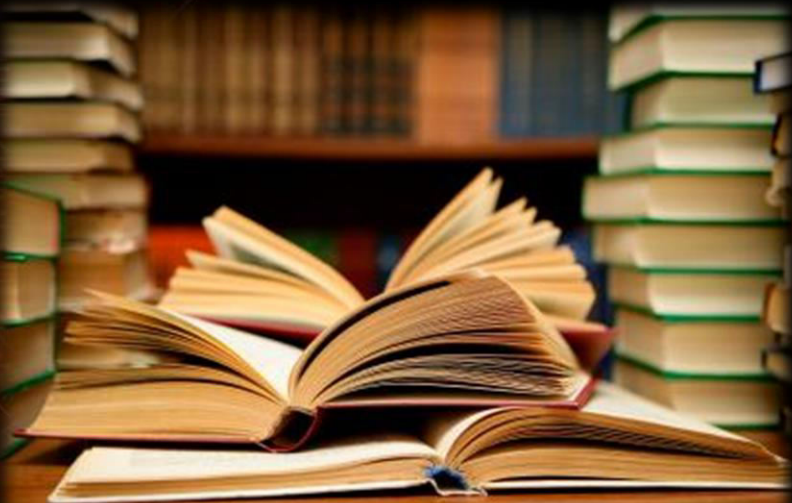
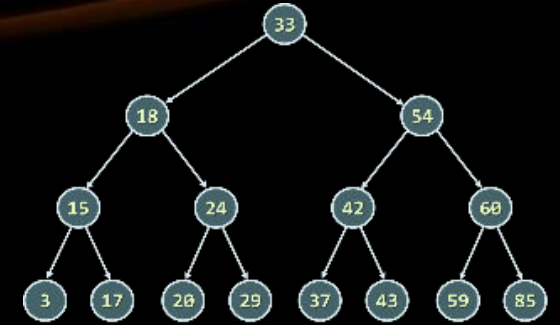




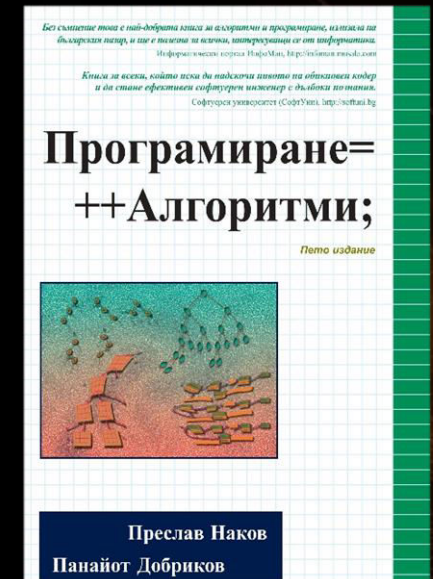
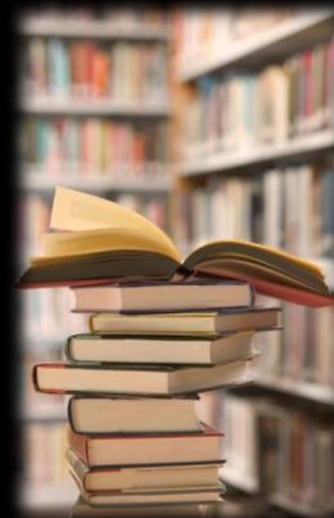


# Resources

## What We Need Additionally?



WIKIPEDIA  
The Free Encyclopedia



# Algorithms Web Site, Forum and FB Group

- Official web site:

<https://softuni.bg/trainings/1907/algorithms-march-2018>



- Official discussion forum:

<https://softuni.bg/forum/categories/32/strukturi-ot-danni-i-algoritmi>



- Official Facebook groups:

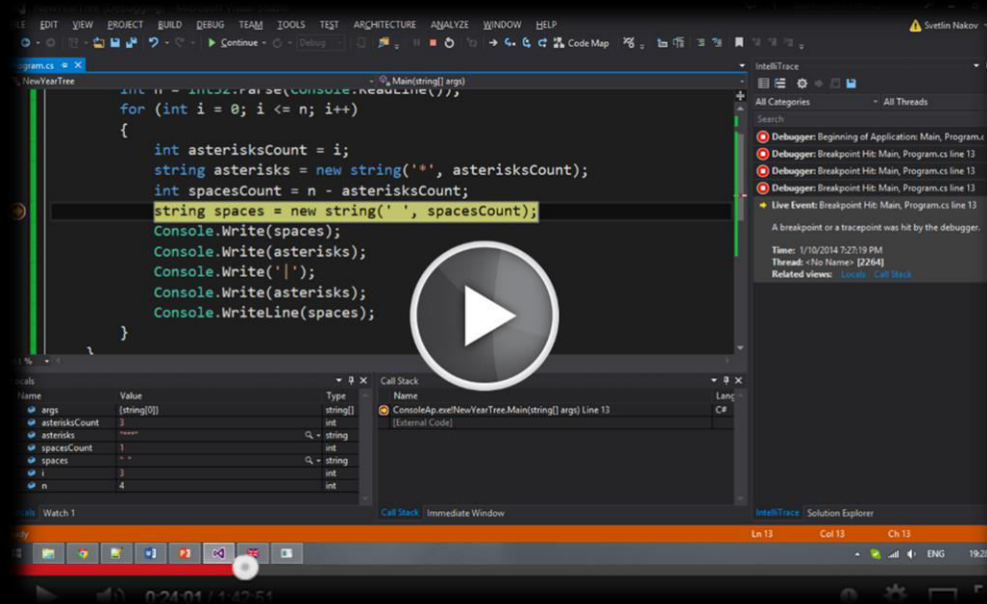
<https://web.facebook.com/groups/SoftUniAlgorithmsMarch2018>





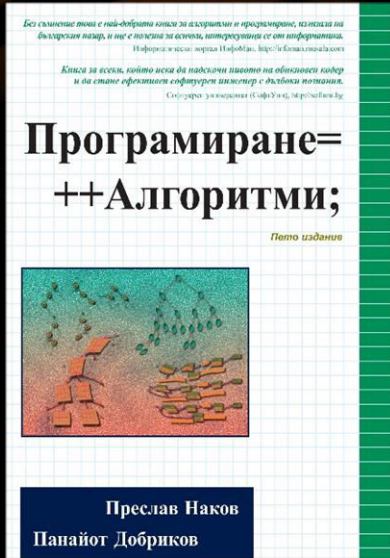
# Algorithms Slides and Videos

- All lecture slides, videos, homework assignments, labs and other resources are open content, available for free
- Visit the course web site to access the course resources



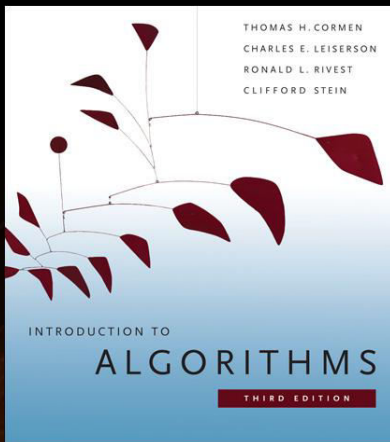


# Algorithms – Additional Resources



- Nakov P., Dobrikov P., "Programming = ++ Algorithms;", 5<sup>th</sup> Edition, ISBN: 954-8905-06-X, Faber Publishing (2015)

- Download a free copy from: [www.programirane.org](http://www.programirane.org)
- No English version (Bulgarian only)



- Cormen T., Leiserson C., Rivest R., Stein C., "Introduction to Algorithms", 3<sup>rd</sup> Edition, ISBN 978-0262033848, MIT Press (2009)
- Find the book in Internet: <https://goo.gl/ElgQD3>

# Recommended Software

- Visual Studio Community 2017
  - Or other C# development environment
  - SharpDevelop – lightweight IDE for C#
  - Xamarin Studio – powerful IDE for C# / .NET for Linux, Mac OS X, Windows and others
- Eclipse / IntelliJ IDEA (for Java), Code::Blocks (for C++)

# Algorithms Course Introduction



## Questions?





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  - "Data Structures and Algorithms" course by Telerik Academy under CC-BY-NC-SA license

# Free Trainings @ Software University

- Software University Foundation – [softuni.org](http://softuni.org)
- Software University – High-Quality Education, Profession and Job for Software Developers
  - [softuni.bg](http://softuni.bg)
- Software University @ Facebook
  - [facebook.com/SoftwareUniversity](https://facebook.com/SoftwareUniversity)
- Software University @ YouTube
  - [youtube.com/SoftwareUniversity](https://youtube.com/SoftwareUniversity)
- Software University Forums – [forum.softuni.bg](http://forum.softuni.bg)

