

**Exam 3—Final: Suggested Reading and Practice Problems**

This exam is **inclusive** (including all discussed topics). Therefore, for practice, you may also check the **practice problems** suggested for **Exam—1** and **Exam—2**. The following includes only the additional topics which are not covered by the previous exams.

Topic	CLRS	KT
Shortest Path Problem	<u>Reading:</u> Chapter 24, Chapter 25  <u>Practice problems:</u> - Exercise: <ul style="list-style-type: none"> <li>• 24.1— (1, 3)</li> <li>• 24.3— (1, 6)</li> <li>• 24.5— (5)</li> <li>• 25.2— (1, 4, 6)</li> </ul> - Problems: 24-1	
Maximum Flow	<u>Reading:</u> Chapter 26 (26.1, 26.2)  <u>Practice problems:</u> - Exercises: <ul style="list-style-type: none"> <li>• 26.2— (2, 4)</li> <li>• Figure 26.6 (Example)</li> </ul> - Problems: 26-4	<u>Reading:</u> Chapter 7  <u>Practice problems:</u> - Exercise: 1,2,3,4,5
NP Completeness	<u>Reading:</u> Chapter 34  <u>Practice problems:</u> - Exercise: <ul style="list-style-type: none"> <li>• 34.1— (2, 4)</li> <li>• 34.3— (1)</li> </ul> - Problems: 34-1, 34-3	<u>Reading:</u> Chapter 8  <u>Practice problems:</u> - Exercise: 1, 6

**Notes:**

1. Readings: You do not need to cover topics which have not been covered in the lectures.
2. Preparation:
  - Start with lecture slides, comprehend step-by-step solutions
  - Textbook suggested readings
  - Run the demo codes and print step-by-step computations/results
  - Homework assignments
  - Practice problems

3. Possible Type of Questions: (The questions are very similar to Exam—1 and Exam – 2)
  - Short answer, True/False, Asymptotic notation, Algorithm types, ...
  - Algorithm time and space complexity, Master Theorem
  - Modification/variations/application of the algorithms and examples discussed in class
  - Worst case/best case of the discussed algorithms
  - Complete or write the next step of the iterations of a given solution, e.g., next step of merge-sort, Kruskal, Bellman-Ford, Floyd-Warshall, Ford-Fulkerson, etc., ...
  - Design a divide-and-conquer or dynamic programming algorithm, including writing the recurrence relation and base case
  - Design graph-related algorithms, where you can use any of the discussed algorithms, such as BFS, DFS, Kruskal, Prim, Dijkstra, ..., as block-box without proof or anything.
4. Further practice problems: DPV
5. Closed-book exam; no calculator; one page of notes
  - Letter size, both side
  - Algorithms, examples, tables, figures, etc.
  - Typed or hand-written