Ejercicios para resolver del libro Bondy and Murty

20 de julio de 2021

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1. Indicaciones

- Hay un aproximado de 160 problemas de distintas dificultades.
- Las soluciones deben ir en el archivo sol-luis.tex. Copiar el enunciado de cada problema antes de poner la solución. Ordenarlo algo parecido a como está en este archivo.
- El libro es Bondy and Murty, Graph theory, 2008
- Se tendrán las fechas de entrega

  - Primera entrega: 15/09/2021
  - Segunda entrega: 31/12/2021
  - Primera entrega: 01/05/2021

  No hay un orden de entrega ni ejercicios que debe entregar. Simplemente debe ir entregando según como vaya resolviendo. Se recomienda empezar del capítulo 1. Tome en cuenta que en cada capítulo hay ejercicios dificiles, que puede ir dejando para después si no salen o necesita ayuda.

2. Graphs (20)

2.1. Graphs and their representation

1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6,1.1.7,1.1.8,1.1.9,1.1.10,1.1.11,1.1.12,1.1.13, 1.1.20

2.2. Isomorphism and automorphism

1.2.5,1.2.17

2.3. Graphs arising from other structures

1.3.1,1.3.7,1.3.8,1.3.12

2.4. Constructing graphs from another graphs

1.4.3,1.4.5

2.5. Directed graphs

1.5.2,1.5.8

2.6. Infinite graphs

∅

3. Subgraphs (14)

3.1. Subgraphs and Supergraphs

2.1.2,2.1.3,2.1.4,2.1.5,2.1.13,2.1.17,2.1.21

3.2. Spanning and Induced Subgraphs

2.2.2,2.2.13,2.2.23

3.3. Modifying Graphs

∅

3.4. Decompositions and coverings

2.4.2

3.5. Edge Cuts and Bonds

2.5.1,2.5.2,2.5.4

3.6. Even subgraphs

∅

3.7. Graph Reconstruction

∅

4. Connected Graphs (13)

4.1. Walks and Connection

3.1.1,3.1.2,3.1.4,3.1.5,3.1.7,3.1.10

4.2. Cut Edges

3.2.1,3.2.2

4.3. Euler Tours

3.3.3,3.3.4,3.3.6

4.4. Connection in Digraphs

3.4.11,3.4.12

4.5. Cycle Double Covers

$\emptyset$

5. Trees (8)

5.1. Forests and Trees

4.1.1,4.1.2,4.1.4,4.1.5,4.1.8,4.1.9,4.1.16,4.1.20

5.2. Spanning Trees

4.2.8

5.3. Fundamental Cycles and Bonds

$\emptyset$

6. Nonseparable Graphs (8)

6.1. Cut Vertices

5.1.1,5.1.2, 5.1.4,5.1.5

6.2. Separations and Blocks

5.2.1,5.2.2,5.2.6,5.2.8

6.3. Ear Decompositions

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6.4. Directed Ear Decompositions

$\emptyset$

7. Tree-Search Algorithms

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8. Flows in Networks

∅

9. Complexity of Algorithms

∅

10. Connectivity (18)

10.1. Vertex Connectivity

9.1.1,9.1.2,9.1.3,9.1.4,9.1.7,9.1.8,9.1.9,,9.1.12,9.1.13

10.2. The Fan Lemma

9.2.1,9.2.3,9.2.5

10.3. Edge Connectivity

9.3.2,9.3.3,9.3.4,9.3.5,9.3.8

10.4. Three-Connected Graphs

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10.5. Submodularity

9.5.4

10.6. Gomory–Hu Trees

∅

10.7. Chordal Graphs

∅

11. Planar graphs (16)

11.1. Plane and Planar Graphs

10.1.1,10.1.2,10.1.3,10.1.4,10.1.5,

11.2. Duality

10.2.4,10.2.5,10.2.11

11.3. Euler's formula

10.3.1,10.3.2,10.3.3,10.3.4,10.3.8

11.4. Bridges

∅

11.5. Kuratowski's Theorem

10.5.1,10.5.2,10.5.3

11.6. Surface Embeddings of Graphs

∅

12. The Four-Colour Problem (3)

12.1. Colourings of Planar Maps

11.2.1,11.2.2,11.2.7

12.2. The Five-Colour Problem

$\emptyset$

13. Stable sets and cliques (9)

13.1. Stable Sets

12.1.2,12.1.3,12.1.4,12.1.7

13.2. Turán's Theorem

12.2.3,12.2.7,12.2.8

13.3. Ramsey's Theorem

12.3.1,12.3.3

13.4. The Regularity Lemma

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14. The probabilistic method

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15. Vertex colourings (9)

15.1. Chromatic Number

14.1.2,14.1.3,14.1.4,14.1.5,14.1.7,14.1.9,14.1.10,14.1.12, 14.1.17,

15.2. Critical Graphs

∅

15.3. Girth and Chromatic Number

∅

15.4. Perfect Graphs

∅

15.5. List Colourings

∅

15.6. The Adjacency Polynomial

∅

15.7. The Chromatic Polynomial

∅

16. Colourings of Maps

∅

17. Matchings (13)

17.1. Maximum Matchings

16.1.3,16.1.5,16.1.7,16.1.9,16.1.2

17.2. Matchings in Bipartite Graphs

16.2.1,16.2.2,16.2.6,16.2.7,16.2.13,16.2.16

17.3. Matchings in Arbitrary Graphs

16.3.1,16.3.2

17.4. Perfect Matchings and Factors

∅

17.5. Matching Algorithms

∅

18. Edge Colourings (10)

18.1. Edge Chromatic Number

17.1.1,17.1.2,17.1.3,17.1.6,17.1.10,17.1.11

18.2. Vizing's Theorem

17.2.1,17.2.2,17.2.6,17.2.9

18.3. Snarks

∅

18.4. Coverings by Perfect Matchings

∅

18.5. List edge colourings

∅

19. Hamilton Cycles (7)

19.1. Hamiltonian and Nonhamiltonian Graphs

18.1.1,18.1.5,18.1.6,18.1.7,18.1.11

19.2. Nonhamiltonian Planar Graphs

18.2.3

19.3. Path and Cycle Exchanges

18.3.5

19.4. Path Exchanges and Parity

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19.5. Hamilton Cycles in Random Graphs

20. Coverings and Packings in Directed Graphs

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21. Electrical Networks

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22. Integer Flows and Coverings

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