

Assignments

Fall 2009

Chapter 1

Section 1.1:

Read this section and do number 1.3.

Section 1.2:

Read Theorems 1.6, 1.7. Read Theorem 1.10, which is a combination of Theorems 1.8 and 1.9. Do problems 1.11, 1.12, 1.15, 1.16.

Section 1.3:

Problems: 1.21, 1.22, 1.24, 1.25, 1.26, 1.27.

Graduate students:

- 1) 1.28 a and b.
- 2) For connected graphs G and \overline{G} , give an example of a graph where a) $diam(G) = 2$ and $diam(\overline{G}) = 2$, and b) $diam(G) = 3$ and $diam(\overline{G}) = 3$.
- 3) Prove that if $diam(G) \geq 4$, then $diam(\overline{G}) = 2$.

Chapter 2

Section 2.1: Degrees

Everyone does problems 2.1-2.10.

Graduate students: 2.12 and 2.14 and 2.16

Section 2.3: Degree sequences

Problems: 2.31 through 2.36

Graduate students: Two finite sequences s_1 and s_2 of nonnegative integers are called *bigraphical* if there exists a bipartite graph G with partite sets V_1 and V_2 such that s_1 and s_2 are the degrees in G of the vertices in V_1 and V_2 respectively. Prove that the sequence $s_1 : b_1, b_2, \dots, b_t$ of nonnegative integers with $r \geq 2$, $a_1 \geq a_2 \geq \dots \geq a_r$, $b_1 \geq b_2 \geq \dots \geq b_t$, $0 < a_1 \leq t$, and $0 < b_1 \leq r$ are bigraphical if and only if the sequences $s'_1 : a_2, a_3, \dots, a_r$ and $s'_2 : b_1 - 1, b_2 - 1, \dots, b_{a_1} - 1, b_{a_1+1}, \dots, b_t$ are graphical.

Section 2.4: Graphs and Matrices

Problems: 2.37 through 2.40

Graduate students: 2.41a and b.

Section 2.5: Irregular Graphs

Problems: 2.42, 2.44, 2.46, 2.47a.

Graduate students: 2.49

Chapter 3 Section 3.1: The Definition of Isomorphism

Problems: 3.1 through 3.15.

Graduate students: Let G be a self-complementary graph of order n , where $n \equiv 1 \pmod{4}$. Prove that G contains at least one vertex of degree $(n-1)/2$.

Section 3.2: Isomorphism as a Relation

Problems: 3.16 through 3.18.

Graduate students:3.19.

Chapter 4

Section 4.1: Bridges

Problems: 4.1 through 4.5.

Graduate students: 4.6.

Section 4.2: Trees

Problems: 4.7 through 4.18.

Graduate students: 4.20, 4.22, 4.23.

Chapter 5

Section 5.1: Cut-vertices

Problems: 5.1 through 5.4.

Graduate students: 5.5.

Section 5.2: Blocks

Problems: 5.11, 5.12, 5.13.

Graduate students: Free time (enjoy).

Section 5.3: Connectivity

Problems: 5.17 through 5.27.

Graduate students: 5.28.

Section 5.5: Geodetic Sets

Problems: 5.38 through 5.44.

Graduate students: do their presentations today 10/6 and Thursday 10/8.

Chapter 6

Section 6.1: Eulerian graphs

Problems: 6.1, 6.2, 6.4, 6.5.

Graduate students: 6.6

Section 6.2: Hamiltonian Graphs

Problems: 6.9 through 6.16, 6.22

Graduate students: 6.23, 6.24

Chapter 8

Section 8.1: Matchings

Problems: 8.1 through 8.13

Graduate students: 8.14

Section 8.2 and 8.3: Factorization, Decompositions and Graceful Labelings

Problems: 8.17, 8.18, 8.19, 8.33 through 8.37

I will collect the homework from section 5.5 through section 8.1 on Exam day November 5.

Chapter 9

Section 9.1: Planar Graphs

Problems 9.1 through 9.13

Graduate Students: 9.18, 9.22