Math 322

Extra Credit Proofs

Block One

① R, a relation, on set A is transitive iff $\forall n\ R^n \subseteq R$ $n = 1, 2, \ldots$

② Lemma 1 p. 548 - 549

Block two

① Trees: th 1 p. 684

② Leaves: th 5 p. 692

③ Game theory: th 3 p. 706

Block 3

① Uncomputable Number-theoretic Functions
2.4 p. 163 (45-47)

② Halting problem
p. 176-177 → Apply to th 1 p. 835

③ Busy Beaver Problem

12.5 pp 36 (32)

Exam 2 12 probs + 1 extra credit

9.13 Models (2 probs)

① Graph Types

Directed	Undirected
① directed graph	① Simple
② directed Multigraph	② Multi
	③ Psuedo

together? Mixed

② Model: it will be...

a) Niche overlap?
b) Web Graph?
c) Round Robin?

9.2 Terms (2 probs)

① $|V|$, $|E|$, degrees, handshaking th^{m}, etc.

② Special Simple Graphs

C_n, K_n, W_n, Q_n, $K_{n,m}$

9.3 Representing (2 probs)

① graph ⇄ matrix

② Isomorphic? (don't consider paths)

If no, state the invariant that is broken.

If yes, form the isomorphism and show adj. matrices are equal.

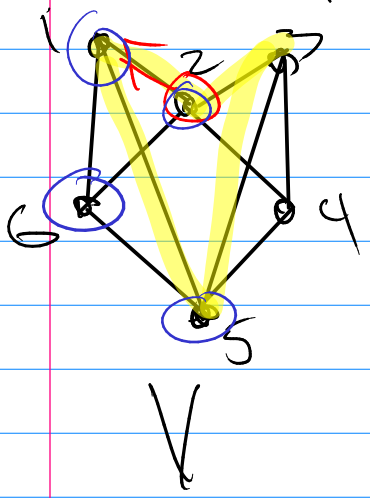
9.4 Connectivity (2 probs)

① Connected, weakly connected, strongly connected, cut vertices/edges.

② Isomorphic? (consider paths)

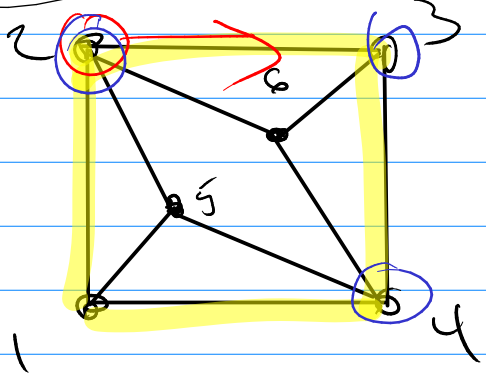
ex

Isomorphic using paths



V

$v_2 \to u_2$
$v_1 \to u_3$
$v_5 \to u_4$
$v_3 \to u_1$
$v_6 \to u_6$
$v_4 \to u_5$

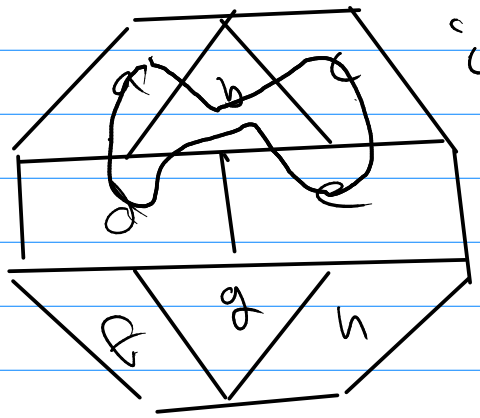


U

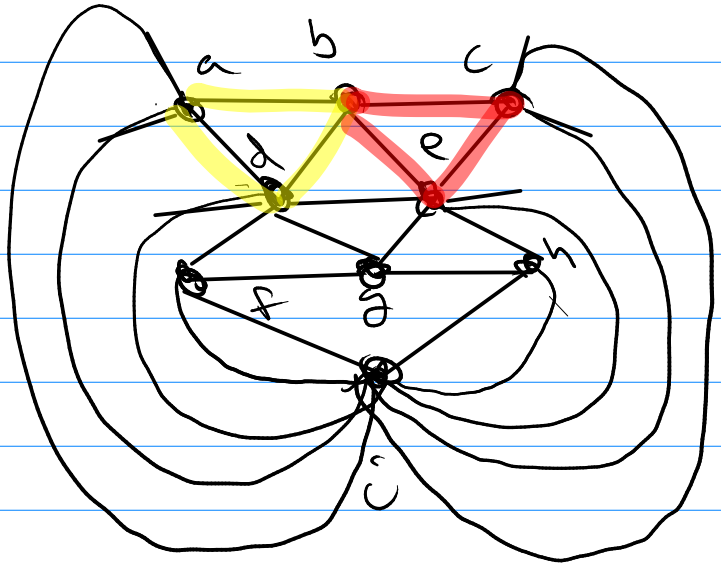
9.5 Euler / Hamilton Paths (2 pgs)

① Euler based puzzle
- a) state the two th^ms associated with Euler circuit / path
- b) use the constructed proof of Euler circuit to find Euler circuit.

ex



i



a b d a

a b c e b d c

etc

② Hamilton Type.

a) know the statements.

b) maybe p. 646 #55

c) maybe p. 646 #45

9.6 Shortest Paths (2 probs)

① Use Dijkstra's Algorithm.

② Salesman problem.

Extra Credit

p. 631 #26