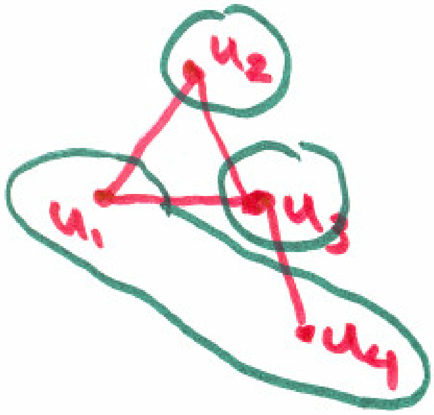
$V(G) = \{u \mid u \text{ is a pirate}\}$

$E(G) = \{\{u,v\} \mid u \text{ and } v \text{ have fought}\}$

Ex: $n=4$ u_1, u_2, u_3, u_4



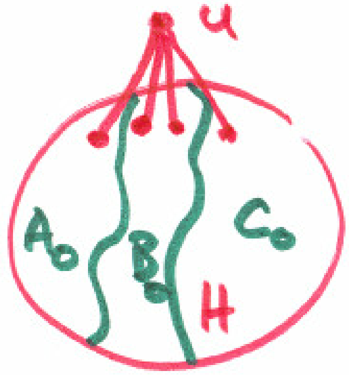
$A = \{u_1, u_4\}$

$B = \{u_2\}$

$C = \{u_3\}$

0 ~~pairs of~~ bad pairs eat together; OK b/c $0 \le 4/3$

G



- Let $u \in V(G)$ and let $H = G - u$. By I.H., obtain a partition A_0, B_0, C_0 of $V(H)$ so that at most $\frac{1}{3}|E(H)|$ have both endpoints in the same set.

- Assign u to whichever one of A_0, B_0, C_0 contain the fewest neighbors of u.

- #(bad) edges in G = # bad edges in H +

bad edges introduced by assigning u to a dinner.

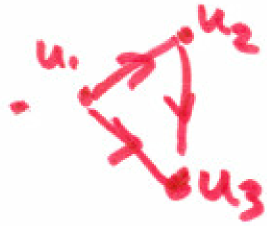
$$\leq \frac{1}{3}|E(H)| + \frac{1}{3}d(u)$$

$$= \frac{1}{3}\left(|E(H)| + d(u)\right)$$

$$= \frac{1}{3}|E(G)| = \frac{1}{3}k$$

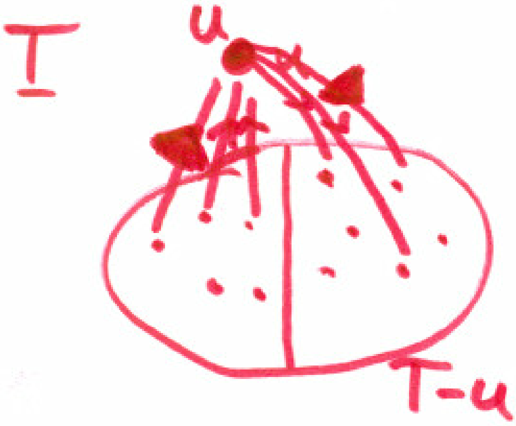
2.

Ex.

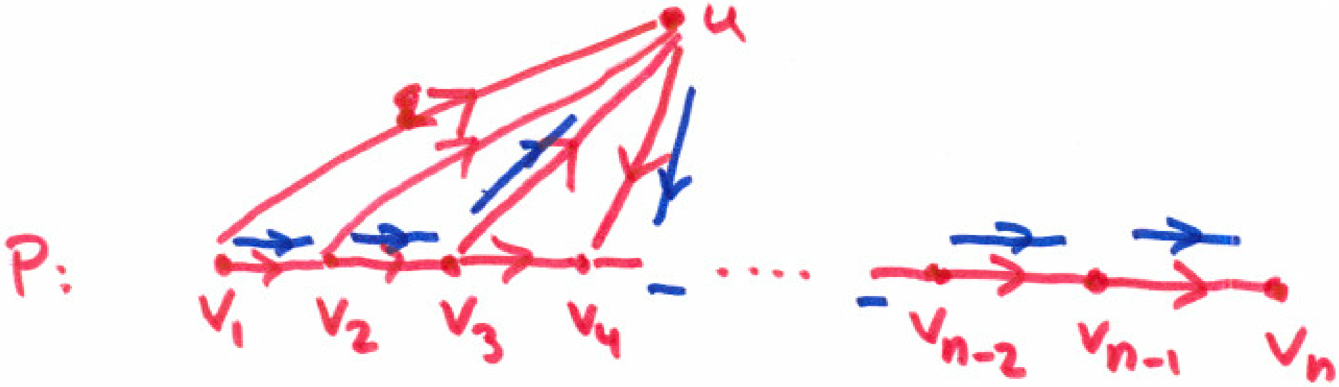


$P = u_1 u_2 u_3$

$P = u_3 u_4 u_1 u_2$

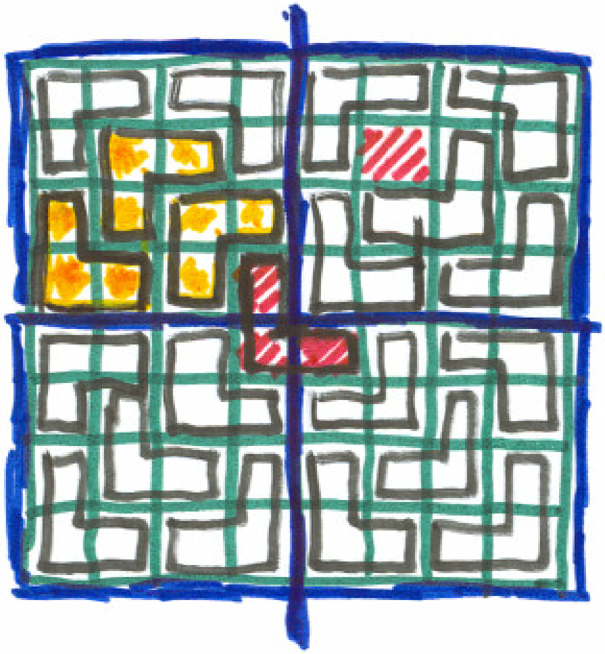


- By I.H., $T-u$ contains a Hamiltonian path P
- Want: extend P to $V(T)$



31.

$n=2^k$



$n/2 = 2^{k-1}$

5.2.4

$$T(n) = \boxed{T(n/2) + T(n/3) + T(\tfrac{n}{6}) + n}$$

$$T(n/2) = \boxed{T(n/4) + T(\tfrac{n}{6}) + T(\tfrac{n}{12}) + \tfrac{n}{2}}$$

$$T(n/3) = \boxed{T(n/6) + T(\tfrac{n}{9}) + T(\tfrac{n}{18}) + \tfrac{n}{3}}$$

$$T(n/6) = \boxed{T(\tfrac{n}{12}) + T(\tfrac{n}{18}) + T(\tfrac{n}{36}) + \tfrac{n}{6}}$$

$$n/2 + n/3 + \tfrac{n}{6}$$

$$= n$$