G a connected graph—
today we'll define three numbers associated to G:

\[ \kappa(G) \] — a measure of vertex connectedness,

\[ \lambda(G) \] — a measure of edge connectedness,

\[ \delta(G) \] — max degree of a vertex.

How I remember which is which:
\( \lambda(G) \) is the minimum number of edges that one can remove from \( G \) to disconnect it.

Ex. If \( G \) has a bridge, \( \lambda(G) = 1 \).

Q: Can \( \lambda(G) = 0 \)? No, as \( G \) is connected.

Q: What is \( \lambda(G) \) for \( G = \bullet \):

Will define this as a special case to make theorems work.

\( \lambda(\bullet) = 0 \) seems right. 

Page 2
**Def:** If $G$ is a connected graph, a **cut-set** of $G$ is a set $S \subseteq E(G)$ s.t.

- Removing $S$ creates a disconnected graph; and
- If $S \neq S$, then removing $S$ does not disconnect $G$.

**Example:**

$$\lambda(G) = 2$$

Some cut sets for $G$:
- $\{a, b\}$, $\{a, c\}$
- $\{b, g, d\}$ - disconnects.
- $\{b, d\}$ - also disconnects.
- not a cut-set
$\lambda(G) = 3$
Def:
A vertex-cut-set is a set of vertices such that removing the set disconnects $G$, but removing any proper subset does not disconnect $G$.

$\times$ (means remove the vertex and all incident edges).

The minimum size of a vertex-cut-set is, by defn, $\kappa(G)$. 
Q: What are the vertex-cut sets of $H$?

Ans: There are none.

Defn (special case): $\kappa(K_n) = n-1$. 

$k(K) = 1$
HW, § 9, 1. 2(a)(c), 5(a)(d), 7(a)(c), 10(a)(b).

Due Friday, April 12