Vocabulary of the DMP theory
and a few other things about planarity

My lecture on DMP, Mon 6/2/14 followed the Chartrand and Lesniak text, which uses different vocabulary than Gould (our main textbook). Here is a brief comparison of terms, in case you are having problems following both.

Gould Vocab	C+L (and my) Vocab
piece	a fragment, F
a piece F is a *segment*	F contains a path from H to H
a contact vertex of F	a vertex in $F \cap H$
H is $G-$admissable	H can be *extended*

Some Rough Defns (see the lecture notes for more precise ones):

A fragment is like a connected component of $G \setminus H$ except that the paths defining *connected* cannot have any internal vertices in H (only the endpoints of the path can be in H).

R_F is the collection of regions $\{r_j\}$ of H where F could be drawn. That is, every vertex of $F \cap H$ must be in the boundary of r_j. And then F is called an r_j =fragment.

Two graphs G and H are *homeomorphic* means you can change one to the other by subdividing (inserting new vertices on an edge) and/or merging (the opposite process, removing vertices of degree two).

Theorem: A graph G is planar if and only if every block of G is planar.

This is a short unexplained remark in Gould's book (see DMP 'Pre-Processing'). The proof of the 'if' part is not quite trivial, and is based on these ideas. 1) The blocks fit together like a tree (and a tree is always planar). 2) A planar block can always be drawn so that any given vertex is on the outside. See

http://people.cs.clemson.edu/ goddard/handouts/cpsc940/planar1.pdf

for a short but careful proof of this theorem.