# Problem Set 7

This problem set is due Wednesday, 11/2/2011 at noon.

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**Problem:** Give an $O(n \log n)$–time algorithm to compute an $r$–division ($O(n/r)$ pieces of size $O(r)$ and boundary $O(\sqrt{r})$) with the additional property that the boundary nodes of each piece lie on a constant number of faces (called "holes"). Note that a face of a piece is not necessarily a face of the graph.

For simplicity, you may assume that the cycle separator theorem achieves perfect balance (meaning that, whenever we apply the separator theorem partitioning $V$ into $A, B, S$ each of the two components $A \cup S, B \cup S$ has weight exactly $w(V)/2$).