Concurrency

[10 pts] Given an undirected graph $G = (V, E)$ A spanning tree of $G$ is a connected acyclic subgraph $T = (V', E')$ of $G$ containing all vertices in $V$ ($V = V'$) and a subset of edges of $E$ ($E' \subseteq E$). Sequential code for computing a spanning tree is at:

http://ranger.uta.edu/~nystrom/courses/3302/hw7/DFS.java

The code uses the JSR166y fork–join library:

http://ranger.uta.edu/~nystrom/courses/3302/hw7/jsr166y.jar

This code should compile out-of-the-box as follows:

javadoc -cp jsr166y.jar DFS.java

to run the code:

java -cp .:jsr166y.jar DFS

The code uses the fork–join library, but doesn’t spawn new activities, so it behaves sequentially. Modify DFS.java to make the computation of the spanning tree concurrent. The compute method should spawn a new activity when recursing on a neighbor. Insert synchronized statements in the appropriate place(s) to ensure the parent of a node is updated safely. The documentation for the fork–join library is at:

http://gee.cs.oswego.edu/dl/jsr166/dist/jsr166ydocs/