Outline for January 12, 2007

1. Greetings and Felicitations!
2. Take-Grant
   a. Counterpoint to HRU result
   b. Symmetry of take and grant rights
   c. Islands (maximal subject-only rg-connected subgraphs)
   d. Bridges (as a combination of terminal and initial spans)
3. Sharing
   a. Definition: *can share*(*r*, *x*, *y*, *G*) true iff there exists a sequence of protection graphs *G*<sub>0</sub>, ..., *G*<sub>n</sub> such that *G*<sub>0</sub> |-* G<sub>n</sub> using only take, grant, create, remove rules and in *G*<sub>n</sub>, there is an edge from *x* to *y* labeled *r*
   b. Theorem: *can share*(*r*, *x*, *y*, *G*) iff there is an edge from *x* to *y* labeled *r* in *G*<sub>0</sub>, or all of the following hold:
      i. there is a vertex *y'* with an edge from *y'* to *y* labeled *r*;
      ii. there is a subject *y''* which terminally spans to *y*', or *y''* = *y'*
      iii. there is a subject *x'* which initially spans to *x*, or *x'*= *x*; and
      iv. there is a sequence of islands *I*<sub>1</sub>, ..., *I*<sub>n</sub> connected by bridges for which *x'* is in *I*<sub>1</sub> and *y'* is in *I*<sub>n</sub>.
4. Model Interpretation
   a. ACM very general, broadly applicable; Take-Grant more specific, can model fewer situations
   b. Theorem: *G*<sub>0</sub> protection graph with exactly one subject, no edges; *R* set of rights. Then *G*<sub>0</sub> |-* G iff *G* is a finite directed graph containing subjects and objects only, with edges labeled from nonempty subsets of *R*, and with at least one subject with no incoming edges
   c. Example: shared buffer managed by trusted third part
5. Stealing
   a. Definition: *can steal*(*r*, *x*, *y*, *G*) true iff there is no edge from *x* to *y* labeled *r* in *G*<sub>0</sub>, and there exists a sequence of protection graphs *G*<sub>0</sub>, ..., *G*<sub>n</sub> such that *G*<sub>0</sub> |-* G<sub>n</sub> in which:
      i. *G*<sub>n</sub> has an edge from *x* to *y* labeled *r*
      ii. There is a sequence of rule applications *ρ*<sub>1</sub>, ..., *ρ*<sub>n</sub> such that *G*<sub>i</sub> |- *G*<sub>i</sub>; and
      iii. For all vertices *v*, *w* in *G*<sub>i</sub>, if there is an edge from *v* to *y* in *G*<sub>0</sub> labeled *r*, then *ρ*<sub>i</sub> is not of the form “*v* grants (*r* to *y*) to *w*”
   b. Example