Outline for January 15, 2008

1. Take-Grant
   a. Counterpoint to HRU result
   b. Symmetry of take and grant rights
   c. Islands (maximal subject-only *tg*-connected subgraphs)
   d. Bridges (as a combination of terminal and initial spans)
2. Sharing
   a. Definition: *can·share*(r, **x**, **y**, G_0) true iff there exists a sequence of protection graphs G_0, ..., G_n such that G_0 |-* G_n using only take, grant, create, remove rules and in G_n, there is an edge from **x** to **y** labeled r
   b. Theorem: *can·share*(r, **x**, **y**, G_0) iff there is an edge from **x** to **y** labeled r in G_0, 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_1, ..., I_n connected by bridges for which **x**′ is in I_1 and **y**′ is in I_n.
3. Model Interpretation
   a. ACM very general, broadly applicable; Take-Grant more specific, can model fewer situations
   b. Theorem: G_0 protection graph with exactly one subject, no edges; R set of rights. Then G_0 |-* 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
4. Stealing
   a. Definition: *can·steal*(r, **x**, **y**, G_0) true iff there is no edge from **x** to **y** labeled r in G_0, and there exists a sequence of protection graphs G_0, ..., G_n such that G_0 |-* G_n in which:
      i. G_n has an edge from **x** to **y** labeled r
      ii. There is a sequence of rule applications ϱ_1, ..., ϱ_n such that G_{i-1} |- G_i; and
      iii. For all vertices **v**, **w** in G_{i-1}, if there is an edge from **v** to **y** in G_0 labeled r, then ϱ_i is not of the form "**v** grants (r to **y**) to **w**"
   b. Example
5. Conspiracy
   a. Access set
   b. Deletion set
   c. Conspiracy graph
   d. I, T sets
   e. Theorem: *can·share*(r, **x**, **y**, G_0) iff there is a path from some $h(\mathbf{p}) \in I(\mathbf{x})$ to some $h(\mathbf{q}) \in T(\mathbf{y})$