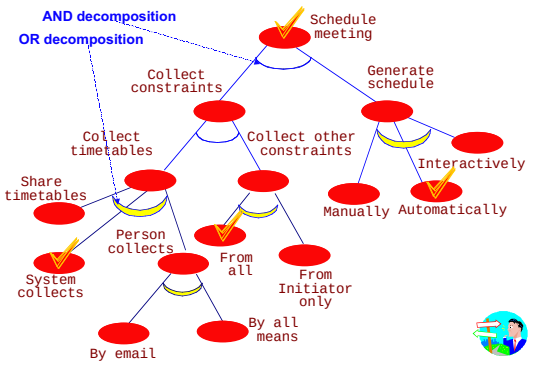
V. Goal Diagrams

Goals and AND/OR Trees
Softgoals
Building Goal Diagrams
How and Why Questions

Goals

- *Goals represent business objectives for the new system and its operating environment.*
- *For example,*
  - ✓ *"Fulfill every book request" (Library organization)*
  - ✓ *"Produce 1M MacG5s within a year" (Apple), or,*
  - ✓ *"Serve more passengers" (TTC)*



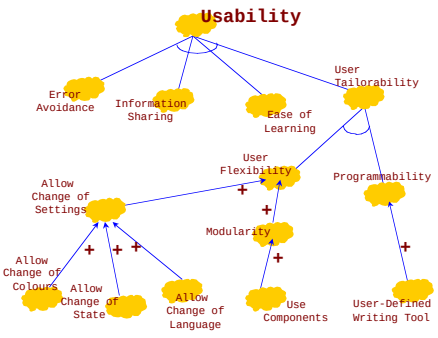
Alternatives for Satisfying Goals

- *An AND-goal is satisfied if all of its subgoals are; an OR-goal is satisfied if at least one its subgoals is.*
- *An alternative (solution) to a root goal G consists of a set of leaf goals which together satisfy G.*
- *There are 24 alternatives for the goal of the previous slide.*

Softgoals

- *These are goals that are used as criteria for comparing alternative solutions for other goals.*

E.g.,`Higher profits[ProductionUnit3], Better service, Satisfied customer, User-friendly[Interface2], Portable[Module4]`



Goal Relationships

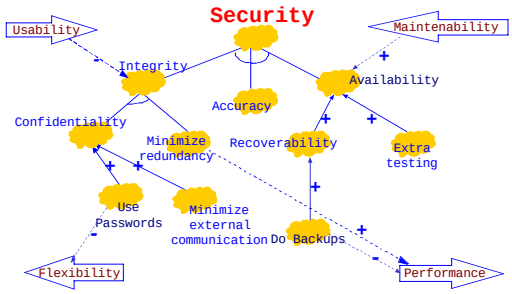
- We will use more than AND- and OR-relationships:
  - ✓ + -- one goal contributes positively towards the fulfillment of another goal;
  - ✓ - -- one goal contributes negatively towards the fulfillment of another goal;
  - ✓ ++ (--) -- one goal subsumes/negates another, I.e., if the first goal is fulfilled, the second is fulfilled/denied;
- With these enhancements, we can build goal models which could be useful for strategic business analysis or requirements analysis.

Alternatives for Satisfying Goals

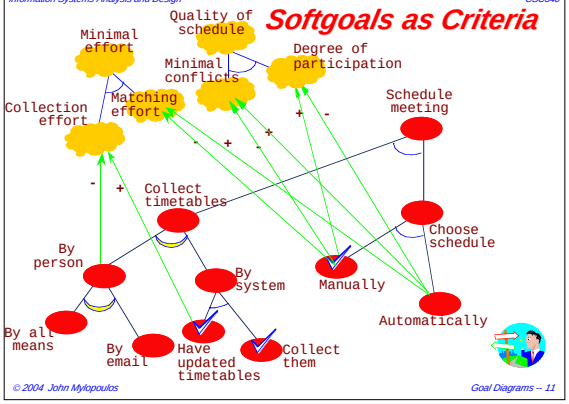
- An ***alternative*** (solution) to the fulfillment of a goal G consists of one or more leaf goals which together fulfill the root goal.
- A ***goal model*** defines a space of alternatives for the fulfillment of its root goal.
- An alternative A_1 ***is better than*** A_2 ***in fulfilling goal G*** with respect to softgoals G_1, G_2,... if A_1's net contributions to G_1, G_2,... (e.g., positive minus negative contributions) is greater than that of A_2.
- In general, goals and softgoals can be contradictory. Given a set of root goals and softgoals, there may not be an optimal solution [Simon68]. Hence the search for ***good-enough solutions***.

Building Goal Diagrams

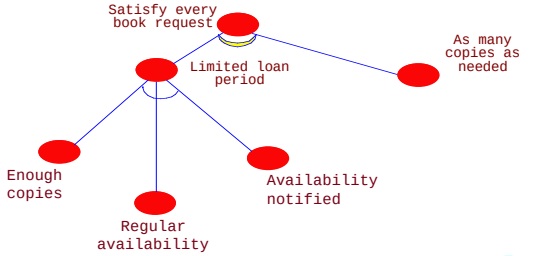
- Start from one or more goals and/or softgoals $G_1, G_2, \ldots, G_n$ which need to be fulfilled together.
- Analyze each, looking for ways to fulfill it through AND- or OR-decompositions, or through other refinements which contribute positively (***How*** questions).
- Continue this process until there is enough positive support to fulfill all root nodes. At this point you have n disconnected goal trees $T(G_1), T(G_2), \ldots, T(G_n)$.
- Identify positive and negative inter-tree influences, I.e., positive or negative relationships between goals g, g′ which belong to different goal trees.
- Repeat the analysis to see if root goals are fulfilled; if so, done, else continue the analysis.



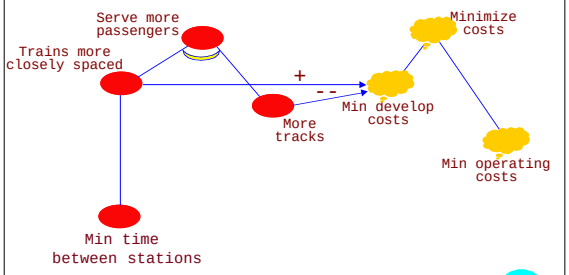
Softgoals as Criteria



Library Goals



Public Transit Goals



Why Questions

Why do we need smooth movement?