

Semantic Theory Presuppositions in DRT

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Presuppositions

- Presuppositions are requirements that the context must satisfy for the utterance to be interpretable at all.
- They are typically **projected** unchanged, rather than used in functional application.
 - *John **possibly** regrets that Pola is married.*
 >> *Pola is married*
- Projected presuppositions can be **filtered** in certain contexts, and can be cancelled by contextual knowledge.

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Projection Problem

- The problem of determining the presuppositions of a larger expression from the presuppositions of its subexpressions is called the **projection problem**.
 - *If John is out of town, then **his wife** is unhappy*
presupposes: John is married / has a wife
 - *If John is married/has a wife, then **his wife** is unhappy*
does not presuppose: John is married / has a wife.

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Presuppositions in DRT

- Here we present Rob van der Sandt's analysis, which is based on DRT and the assumption that presuppositions are anaphora.
- Basic ideas:
 - **presuppositions are anaphora** with semantic content.
 - presupposition filtering is modelled as anaphora **binding** within a local context (sub-DRS).
 - if a presupposition is not bound, it is **accommodated** (usually in the top-level DRS).

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Presupposition as Anaphora

- The chancellor decides.
➤ There is a chancellor // (s)he decides
- John regrets that Mary is married.
➤ Mary is married // John regrets this
- John stopped smoking
➤ John used to smoke // he has stopped doing that
- It is Peter who ate the cake.
➤ Somebody ate the cake // Peter did it.

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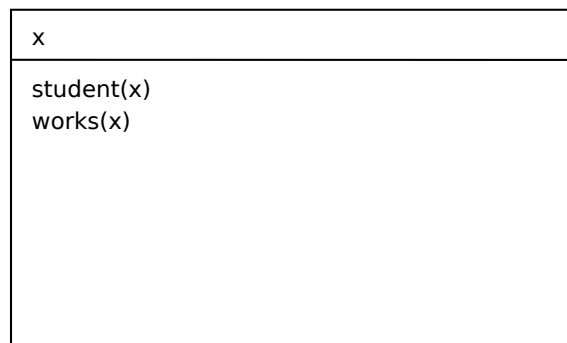
Van der Sandt: Basic Principles

- Introduce “ α -DRSs” as a new type of complex condition.
- DRS construction proceeds in two steps:
 - Construction rules for definite noun phrases introduce α -DRSs (this yields a “proto-DRS”).
 - In a second step, the α -DRSs are resolved (translation of a proto-DRS into a standard DRS)
- Presuppositions can be either **bound** or **accommodated**.

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Example: Binding [1]

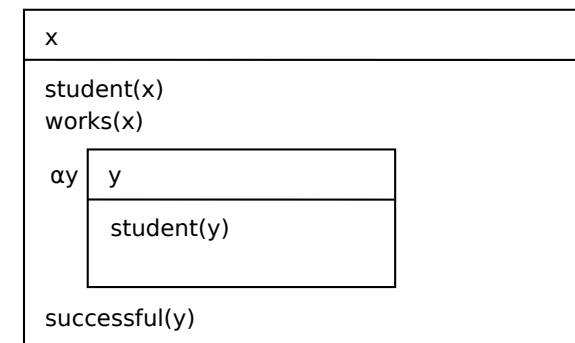
- *A student works.*



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Example: Binding [2]

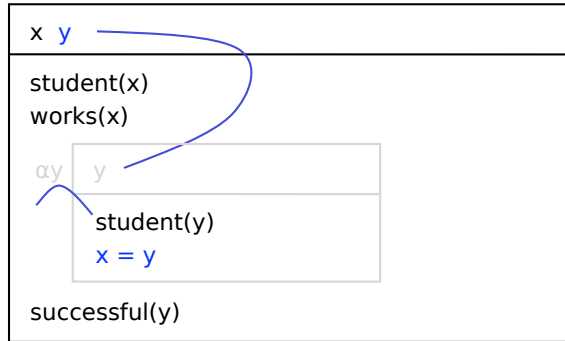
- *A student works. The student is successful.*



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Example: Binding [3]

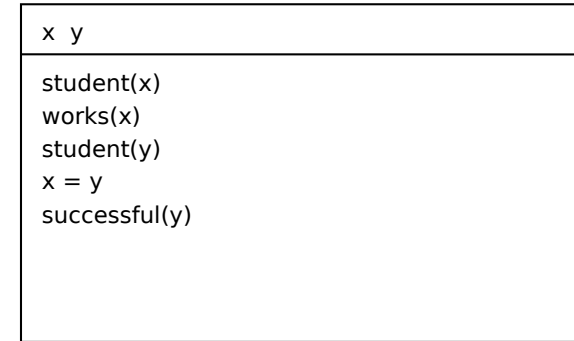
- A student works. The student is successful.



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Example: Binding [3]

- A student works. The student is successful.



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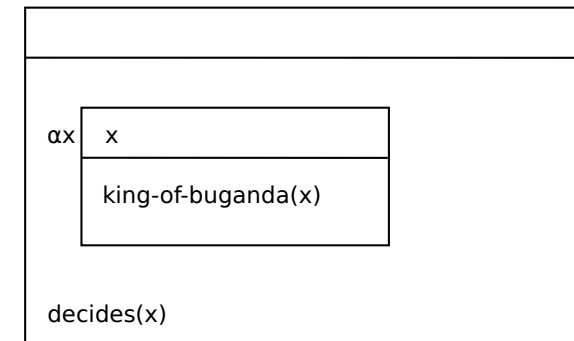
Accommodation

- The king of Buganda is 43.
- The movie I saw yesterday was really interesting.
- We regret that we have no free rooms available.
- We can often use expressions that trigger presuppositions even if the context doesn't satisfy the presupposition.
- The missing information is silently added to the context ("accommodated") as we interpret the sentence.

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Example: Accommodation [1]

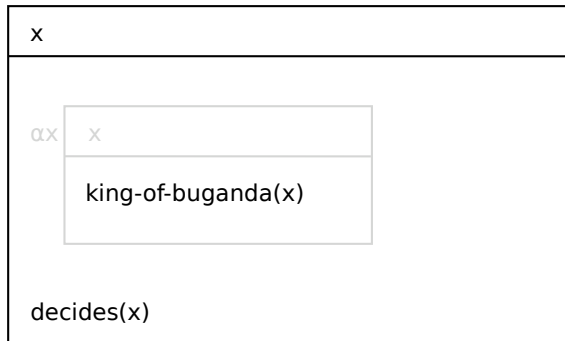
- The king of Buganda decides.



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Example: Accommodation [1]

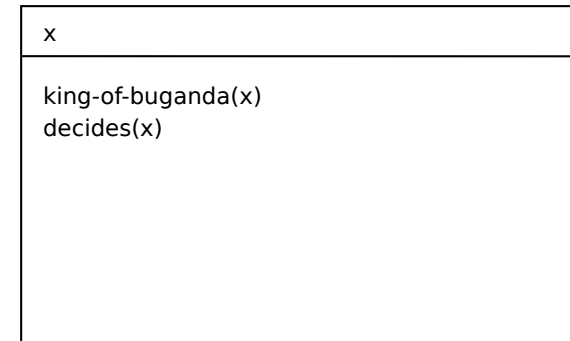
- The king of Buganda decides.



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Example: Accommodation [2]

- The king of Buganda decides.



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DRS-Construction

- A (proto-) DRS is a triple (U_K, C_K, A_K) such that
 - U_K is a set of discourse referents
 - C_K is a set of (atomic or complex) conditions
 - A_K is a set of "anaphoric" (α -) DRSs of the form $\alpha z K'$, where z is a discourse referent and K' is a proto-DRS.

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Definite Noun Phrases

- The DRS construction rules for all definite noun phrases introduce α -DRSs:

- Definite descriptions ("the woman")

αy	y
	woman(y)
- pronouns

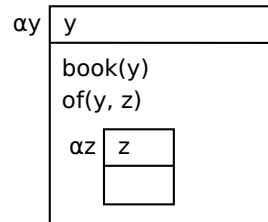
αx	x
- proper names ("Mary")

αx	x
	x = Mary

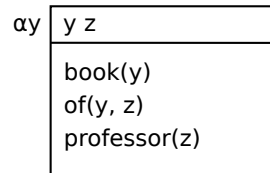
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Complex Alpha-DRSs

- Alpha-DRSs have internal structure i.e., can embed other alpha-DRSs
- “his book”



“the book of a professor”



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Subordination

- K_1 is an immediate sub-DRS of a DRS $K = (U_K, C_K, A_K)$ iff C_K contains a condition of the form $\neg K_1, K_1 \Rightarrow K_2, K_2 \Rightarrow K_1, K_1 \vee K_2, K_2 \vee K_1$, or $\alpha x K_1 \in A_K$
- K_1 is a sub-DRS of K (notation: $K_1 \leq K$) iff
 - $K_1 = K$ or
 - K_1 is an immediate sub-DRS of K or
 - there is a DRS K_2 such that $K_2 \leq K_1$ and K_1 is an immediate sub-DRS of K .
- K_1 is a proper sub-DRS of K iff $K_1 \leq K$ and $K_1 \neq K$.

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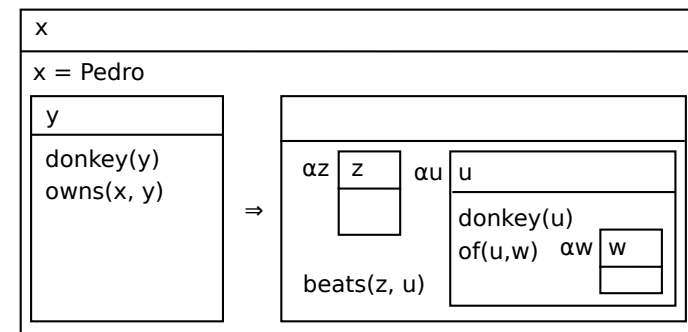
Resolution by Binding

- Let K, K', K_t DRSs, $K' \leq K, K_t \leq K$ and
 - $\gamma = \alpha x K_s \in K', K_s$ is α -free
 - $y \in U_{K_t}$ a DR that is accessible and suitable for γ
- Remove γ from K' and extend K_t with U_{K_s}, C_{K_s} , and the condition $x = y$.
- Note: Because K_s must be α -free, complex Alpha-DRSs are always resolved from the inside out.

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Example: Binding [1]

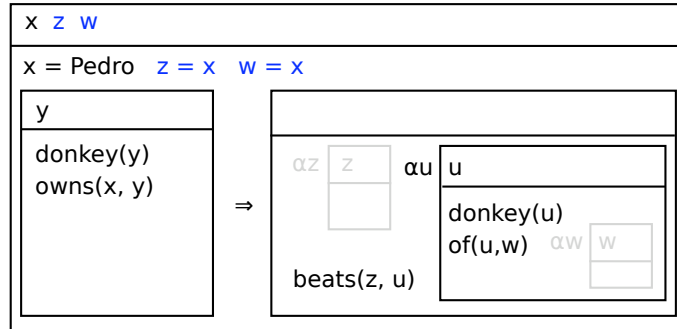
- If Pedro owns a donkey, he beats his donkey.



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Example: Binding [2]

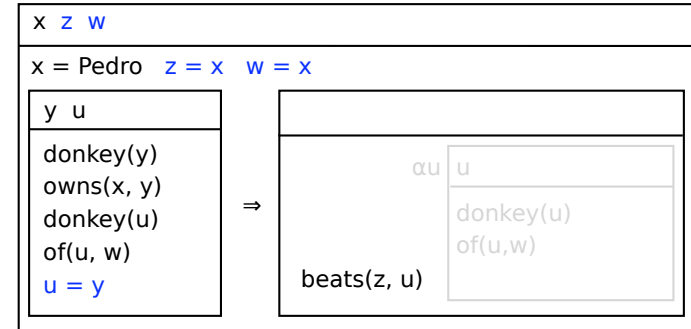
- If Pedro owns a donkey, he beats his donkey.



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Example: Binding [2]

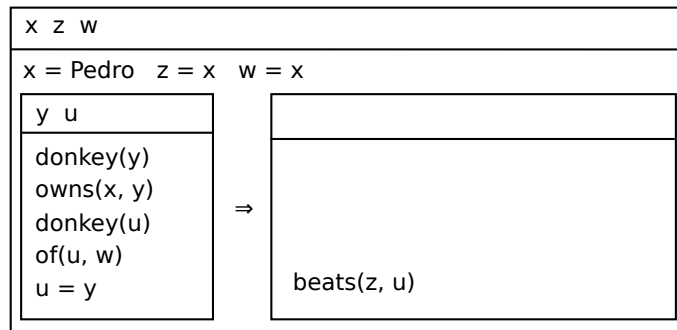
- If Pedro owns a donkey, he beats his donkey.



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Example: Binding [2]

- If Pedro owns a donkey, he beats his donkey.



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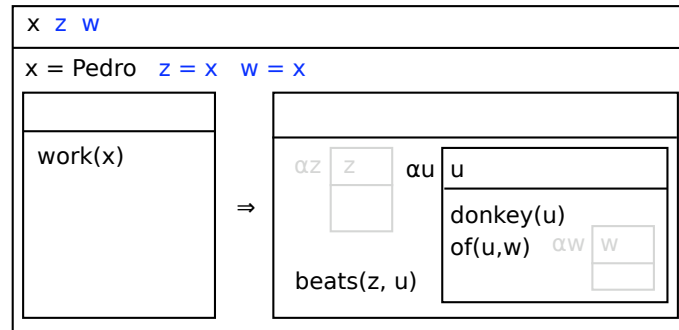
Resolution by Accommodation

- Let K, K' DRSs, $K' \leq K, K_t \leq K$
 - $\gamma = \alpha x_{K_s} \in K', K_s$ is α -free
 - K_t a DRS that is accessible for γ .
- Remove γ from K' and extend K_t with U_{K_s} and C_{K_s} .

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Example: Accommodation [1]

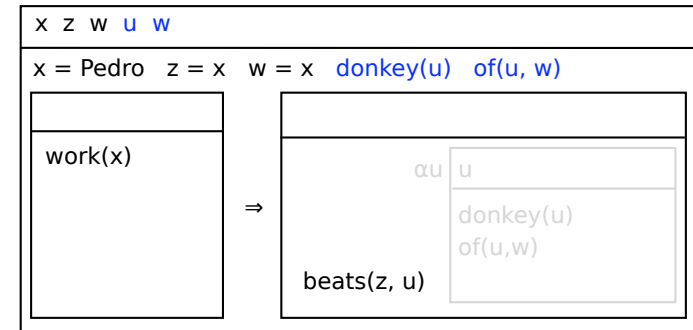
- If Pedro works, he beats his donkey.



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Example: Accommodation [1]

- If Pedro works, he beats his donkey.



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Presupposition Projection: Constraints and Preferences

- The two resolution rules specify possible places where α -DRSs can be bound or accommodated.
- But so far, we can bind or accommodate almost anywhere!
- Van der Sandt's theory also contains:
 - constraints that restrict where binding or accommodation is admissible
 - principles that say in which order we should try the possible binding and accommodation options.

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Preference Principles

- Binding is preferred over accommodation.
- Binding works "upwards" along the accessibility relation: The "closest" possible antecedent is preferred.
- Accommodation works "downwards" along the accessibility relation. It is preferred to accommodate into the highest possible DRS.

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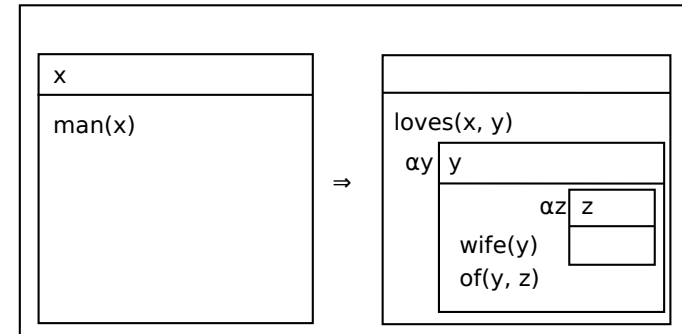
Constraints on Projection

- Free variable constraint: The resolved DRS may not contain any free discourse referents.
- (Local) consistency and informativity constraints

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The Free Variable Constraint

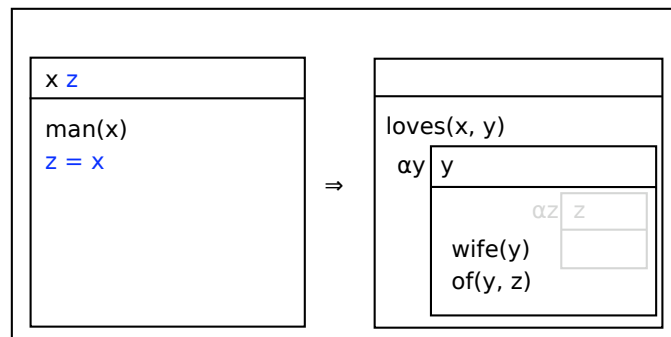
- Every man loves his wife.



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The Free Variable Constraint

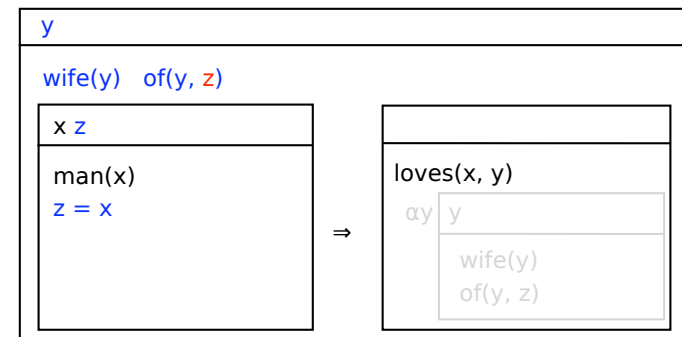
- Every man loves his wife.



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The Free Variable Constraint

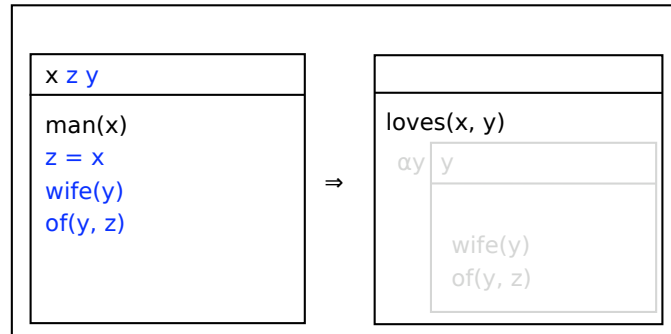
- Inadmissible resolution



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The Free Variable Constraint

- Admissible resolution



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Further Constraints

- The resolved DRS must be consistent and informative.
- **Consistency:** The resolved DRS must be satisfiable (taking background knowledge into account).
- **Informativity:** The resolved DRS may not be entailed by our background knowledge.
- **Local consistency:** No sub-DRS must be inconsistent with any superordinate DRS.
- **Local informativity:** No sub-DRS must be entailed by any superordinate DRS.

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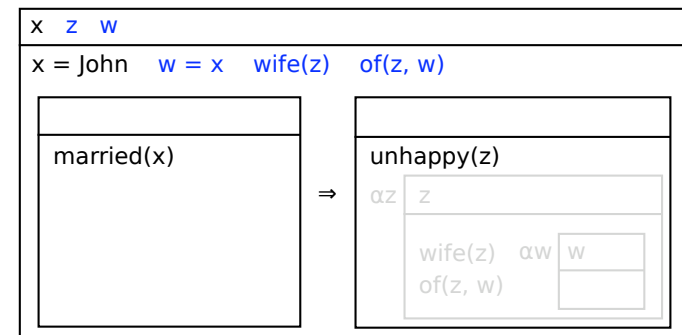
Presupposition Filtering

- *If John is out of town, then his wife is unhappy.*
presupposes: John is married
- *If John is married, then his wife is unhappy.*
does not presuppose: John is married

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(Local) Informativity

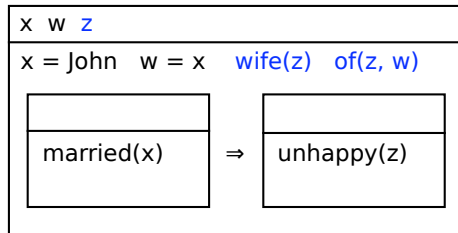
- If John is married, then his wife is unhappy.



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(Local) Informativity

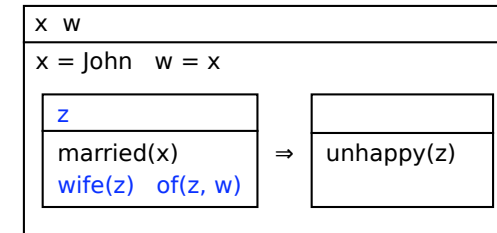
- If John is married, then his wife is unhappy.
- **Out:** Antecedent DRS of conditional is entailed by main DRS (local informativity)



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(Local) Informativity

- If John is married, then his wife is unhappy.
- **Correct:**
Accommodation in the Antecedent



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Summary

- Presuppositions ...
 - can survive embedding in negation and other contexts
 - are not subject to compositional semantics construction, but are projected upwards
- Van der Sandt's presupposition theory:
 - Basic idea: presuppositions are seen as anaphora
 - DRSs are extended with markers for unresolved presuppositions
 - resolve by binding or accommodation
 - subject to constraints and preferences

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