Hierarchical Forms

• Can make dialogue manager use hierarchical forms
  
  Method 1: Certain slot values are always forms
  
  Use hierarchical forms
  
  Hierarchical form guides dialogue manager in filling in semantics which
  
  Can make dialogue manager use hierarchical forms

Overview

• Domain Constraints
• Optional Subforms
  
  Hierarchical Form Filling
Breadthfirst versus Depthfirst

- When top slot is a form, where should we put its slots?
  - Front or back of list?

- When looking through goal tree in breadthfirst or depthfirst order?
  - Can think of each slot as a goal

- Could have a prompt (but no grammar) for the subplots
  - Help user understand which part of the order we are talking about

- Are we traversing goal tree in breadthfirst or depthfirst order?

Non-hierarchical forms
- Do not alter domain data structures, like "topform"
- When slot value is achieved, remove slot from agenda
- When the top slot is a form, replace by slots of that form
- Work on the top slot in agenda
- Add deleted list of slots to be asked
- Keep a list of unmatched slots

Hierarchical forms
- Checked for first matched slot in formslots

Which slot to work on next?
Overview

- Hierarchical Form Filling
  - Optional Subforms
  - Heirarchical Form Filling

Programming

- Your code for homework 5 should work this way:
  - Use top element to drive behavior
  - Behavior driven by a variable called 'agenda'
  - If user says repeat?
  - If user says start over?
  - If slot is a formname?
  - If user gives value for slot?
  - Initial value?
  - If user says repeat?
Example

Note how hamburger is handled

- Rather than having slots, it is a yes/no question
- If user says yes, it triggers the hamburger order form

Optional Subforms

- With previous approach, everyone must order a hamburger, drink and fries
- Not a lot more powerful than having everything in a single frame

Method 2: Value of a slot triggers whether subform is invoked

- If semantic value of a slot is the name of a form, fill in the subform
- Value of a slot must be able to say if they want a drink
- Everyone must order a hamburger, drink and fries

With previous approach, every user does same slots

Optional Subforms
Banking Example

Should we add to beginning or end of Agenda?

Hierarchical forms
- Agenda: list of slots to be filled
  - Work on the top slot in Agenda
  - Agenda: list of slots to be filled
  - Agenda: list of forms to be filled
  - Agenda: list of forms to be filled

Agenda Processing
Incorporating Domain Knowledge

• Dialogue system not operating in a vacuum
  - Being used in conjunction with a backend system to achieve some task
  - Dialogue system should take into account the backend

Let designer specify slots as required or optional

- If between 2 and 5 items returned, list them, and ask user to choose
- If more than 5 items returned, query next optional slot
- If system knows destination and origin of a trip, and there is only one flight a day, don't bother asking for time
- Make special frames that incorporate database queries
  - After all required slots are known, do specified database query
  - If more than 5 items returned, query next optional slot
  - If between 2 and 5 items returned, list them, and ask user to choose

Overview

• Hierarchical Form Filling
• Optional Subforms
• Domain Constraints
• Hierarchical Form Filling
How to do sequence?

• Finding flight and then paying for it

Approach 1: Make up frame that has two subframes

set formslots(findbuyflight) {findflight buyflight}

set formslots(findflight) {dest origin}

set formslots(buyflight) {typeofpayment}

Approach 2: Use finite state mode

- Each subtask can be a different state in the FSM
- Each subtask is represented as a form

Alternate Approach

• Let user specify custom code to execute after a response is processed
- Custom code can query database
- Custom code can alter whether a slot is required or optional
- Approach of VoiceXML