DIALOGUE 1

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Form vs. function in sentences

Interrogatives begin with a Wh-word, or a fronted auxiliary verb. But not all things that are syntactically interrogative ask questions. Likewise, imperatives begin with an infinitive form of a verb, but not all imperatives make requests.

	Declarative	Interrogative	Imperative
Statement	It's Friday	How cool is that?	Give me strength!
Question	It's Friday?	Is it Friday?	Tell me what time it is.
Request	I'd like some water	Can I have some water?	Please give me some water

But if the 'illocutionary force' of an utterance can't be determined on the basis of its form, how can it be determined?

Answer: different 'speech acts' have different 'felicity conditions' - conditions for satisfactory performance, analogous to truth conditions.

SPEECH ACTS

Felicity conditions for successful performance of speech act: Propositional Content, Preparatory, and Sincerity conditions.

Request

Prop: future act A of H
Prep: H believed able/willing to do A
A not going to happen anyway
Sinc: S wants H to do A

Question

Prop: ynq(P) or which(X,P(X))
Prep: S believes H knows the answer
S does not know the answer
Sinc: S wants to know the answer

Indirect Speech Acts

An ISA can be performed by querying or asserting one of the felicity conditions of a direct speech act:

I want the door open, please (request)

Do you know what that is? (question)

Planning

'Planning' is a branch of AI which aims to find ways of getting autonomous agents to behave sensibly. In the classical approach to planning we start in a particular state, with a definite goal, and try to work out a series of actions which will get us to the goal state.

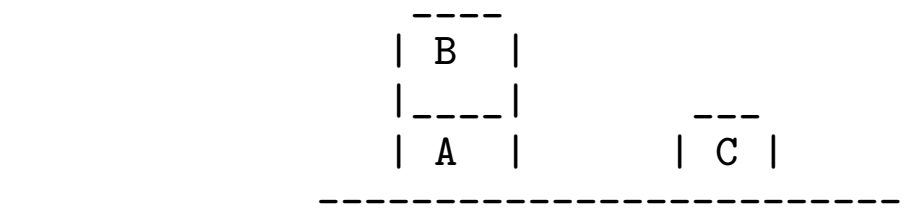
Actions are typically encoded as 'operators', with preconditions and postconditions. Postconditions consist of 'add' (+) and 'delete' (-) operations on the state description.

Blocks world

clear(X) means 'nothing on top of X' if X is a block. It is assumed that the table is always clear (somewhere).

Action	Preconditions	Postconditions
pickup(A,B)	clear(A), on(A,B)	+holding(A),+clear(B) -on(A,B), -clear(A)
puton(A,B)	holding(A), clear(B)	+on(A,B), +clear(A) -clear(B)*, -holding(A)

* unless B is the table



GOAL: on(C,A).

PLAN: pickup(B); puton(B,table); pickup(C); puton(C,A)

CURRENT STATE: on(A,table), on(B,A), on(C,table), clear(B), clear(C).

pickup(B): on(A,table),holding(B),clear(A),on(C,table).

puton(B,table): on(A,table),clear(A),on(B,table),clear(B), on(C,table),clear(C).

pickup(C): on(A,table),clear(A),on(B,table),clear(B),holding(C).

puton(C,A): on(A,table),on(C,A),on(B,table),clear(B),clear(C).

SPEECH ACTS AS PLAN OPERATORS

Request:

Preconditions: (Prep+Sinc)

S believes H able/willing to do A;
A not going to happen anyway
S wants H to do A

Action: S predicates future act A of H 2 **Postconditions:** H believes S wants H to do A.

Need other axioms as well:

Cooperativity:
IF X believes Y wants A, AND X is cooperative, THEN X wants A

Action:
IF X wants to do A, AND X can do A, THEN X does A (so A).

Cause-effect:

IF X wants Z, AND Y causes Z, THEN X wants Y

Now **speech acts are acts like any other**, performed in order to achieve goals. E.g.

Smith: Open the door, Jones!
Jones: OK.

Initial state:

door is closed; Smith wants door open, believes Jones can open door, will not do so anyway.

1. by Cause-effect + Action, if Jones opens door, door will be open, therefore Smith wants Jones to open door.

2. preconditions for Request met: effect is: Jones believes Smith wants him to open door; Jones is cooperative, so by Cooperativity Jones wants to open door

3. by Action Jones opens door; door is open

Understanding by plan recognition:

Smith: Can you open the door, Jones?
Jones: Yes (opens door).

Jones: Smith knows I can open the door so direct question speech act preconditions are not met.

But utterance questions a precondition of Request, therefore could be indirect Request.

Interpret as Request and carry on as before.

PROBLEMS WITH SPEECH ACTS AS A THEORY OF DIALOGUE

1. No theoretical linkage between consecutive acts: e.g. nothing in the theory to say that questions are usually followed by answers (even if the answers are politicians' answers)

2. Mental states modelled in terms of Beliefs, Desires, and Intentions. But many utterances don't fit this pattern: e.g. 'commitments' (Hamblin) or 'questions under discussion' (Ginzburg).

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w: Where would you like to go?
c: Edwinstowe
w: Edwinstowe?
c: Yes
w: Please wait
   Is that Edwinstowe in Nottingham?
c: Yes
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'Grounding': the process of ensuring that all participants share a belief or supposition.

3. Descriptively incomplete: no account of dialogue control' functions: feedback, topic shift indication, etc. How would we fit e.g. Autoroute dialogues into a speech act framework?

Wizard: How can I help you?
Caller: Hello, um, well to plan a route really.
Wizard: Yeah - where would you like to go?
Caller: Going from Malvern
Wizard: Mm
Caller: ... to Kirbythore in Cumbria.
Wizard: Can you spell that please?
Caller: Yeah - K-I-R .... etc
Caller: It's near Penrith.
Wizard: Right - OK then.
Caller: And from there ...
Wizard: Yeah
Caller: we're going to, um, Macduff in Bamff, Scotland.
Wizard: Macduff. So you'd like your route from Malvern to there, and then on again?
Caller: That's right, yeah.
Wizard: Right, OK.

4. Associated technology (planning, theorem proving) not very robust, and difficult to scale up.

CONVERSATIONAL GAMES(Sinclair and Coulthard; Houghton; Isard et al).

e.g. Instruction, Confirmation, Question-YN, Question-WH, Explanation, Alignment

Initiating Moves:

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Instruct (provides instruction)
Check  (elicits confirmation of known information)
Query-yn (asks yes-no question for unknown information)
Query-wh (asks wh-question for unknown information)
Explain (Gives unelicited description)
Align (Checks alignment of position in task)
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Response and feedback moves:

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Clarify: clarifies or rephrases given information
Reply-y  (responds affirmatively)
Reply-n   (negatively)
Reply-wh (Respond with requested information)
Acknowledge (acknowledge and request continuation)
Ready (Indicates intention to begin a new game)
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Dialogue Acts:

* we see dialogues as having a two level structure

* individual utterances express dialogue **moves**

* sequences of moves constitute a **game**.

Recognising what move(s) an utterance expresses tells you what the speaker wants or believes, and tells you what game(s) are being played, hence what to do or say next. To use this we need to know:

* What is the correct set of move/game labels?

* How do we recognise what move an utterance realises?

* How do we deal with uncertainty? (Speech recognition, NL processing)

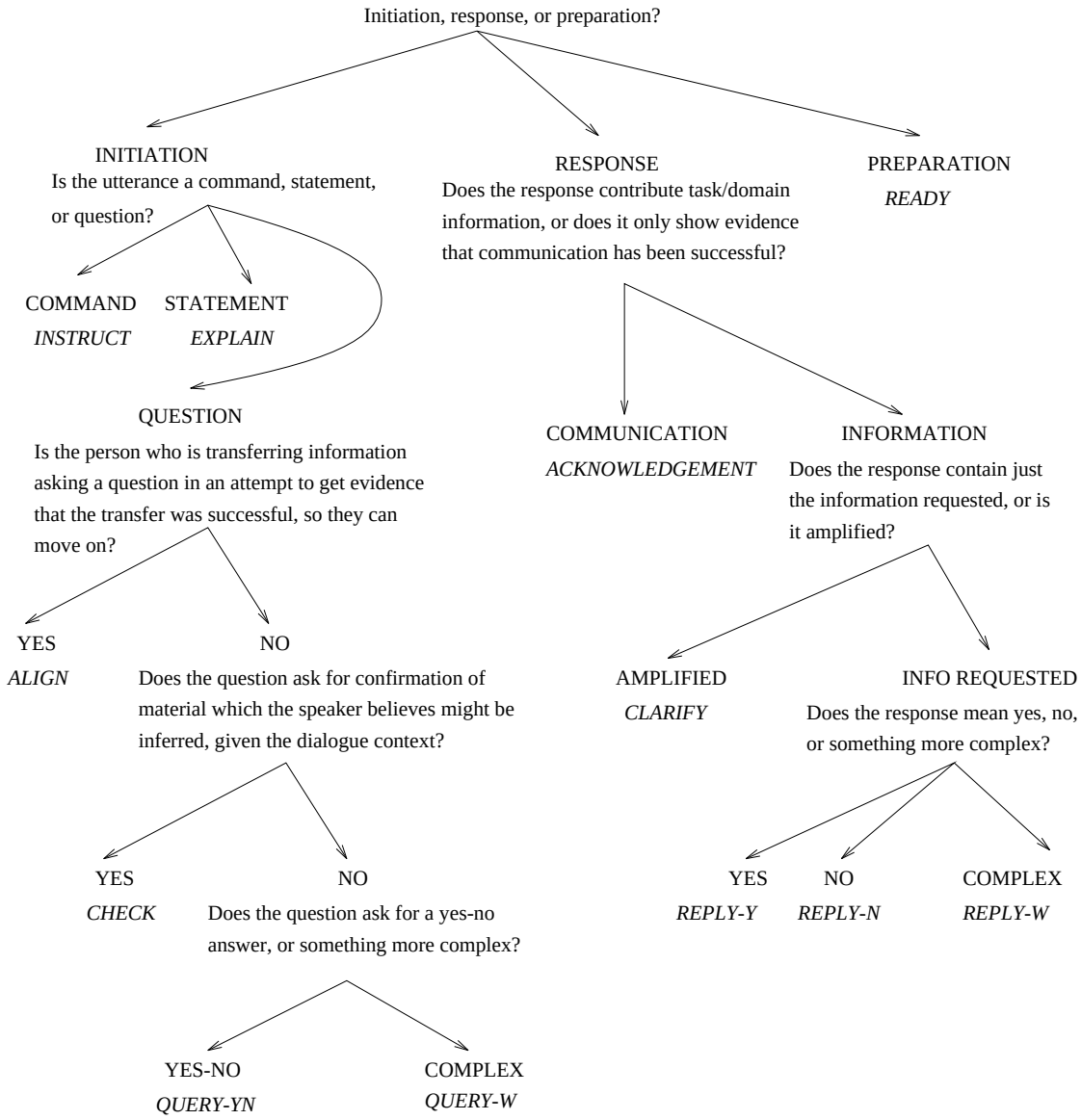

Figure 2: Conversational move categories.

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