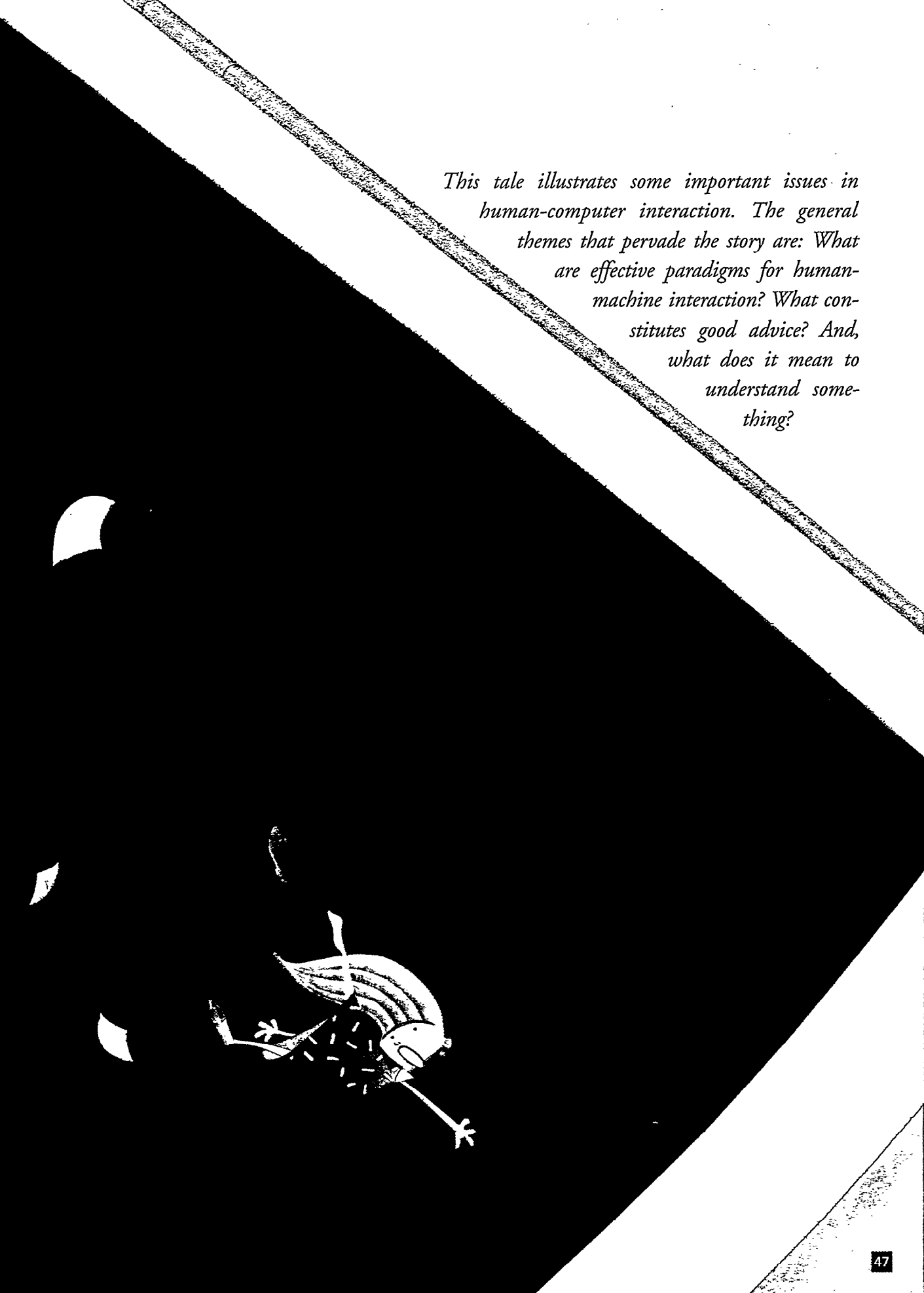
The Interactions of Alicyn *in* Cyberland

Through the Cyberhole

Alicyn, the new work-study, was working late one night at the office. She needed to make a copy of her first homework assignment for her programming 101 class. She went to the copier room with her program in hand, and stepped up to the copier. The copy reduction light was blinking, and not knowing quite what to do, she opted for resetting the whole thing. After that, everything seemed to be normal, so she lifted the document handler and made a copy of her program. Then, feeling a little silly and mischievous, she decided to make a copy of her face. She looked around. Seeing no one, she put her face to the glass plate, smiled, and hit ready

by "Carol Lewis"

This tale illustrates some important issues in human-computer interaction. The general themes that pervade the story are: What are effective paradigms for human-machine interaction? What constitutes good advice? And, what does it mean to understand something?



The strong flash of light blinded her for a moment. She blinked several times and looked through the glass plate. She could hardly believe what she saw—there was a room through the glass! There were overhead fluorescent lights and a stack of paper on a desk, just like in her copy room. She pressed her nose against the glass and tried looking at other parts of the room. She saw someone walking into the room—it was her officemate, Jill! She realized then that she was looking into the copy room where she had been standing just a moment ago. But where was she now?

She pounded on the glass to try to attract her friend's attention, but suddenly she lost her balance, and fell. And she kept falling, through a darkness that was interrupted by flashes of colored laser lights. It was quite beautiful, but oh how strange not to know where one is, and to be falling for so long!

Suddenly she landed on something, which was fortunately rather soft—some misfed paper as she soon discovered. She pulled herself together and looked around.

Alicyn Encounters the Ungriclings

Alicyn could make out the forms of metallic objects and other things that one might see inside a copier. But there was something else—a creature of sorts was moving towards her!

"Hello," said Alicyn politely. The creature looked her over, if one could call it that, for it had odd eyes. A rather expressionless fellow, thought Alicyn. It had a gray box for a torso and another gray box for a head. There were several buttons on its head, two cameras where eyes would have been, two pads where ears would have been, and a speaker where the mouth would have been. It had arms which terminated in fingers that looked rather like pens. On its torso box was written Ungricling followed by a trademark sign.

"I seem to have lost my way, and I really want to get back. Do you know how I might get out of here?" asked Alicyn.

"I know a lot of things," said the creature, straightening up, with a smug air. "And one of the things I know is that London is the capital of France."

Rather than contradict it, Alicyn thought she'd ask a different question. It may not know how to get out; after all, it seemed quite at home right where it was. Instead she asked if it knew where the toner was. The toners in copiers are usually next to the panels that open.

"A toner is like a tone, really, except that it has an extra quality, which is the quality of R-ness," was the creature's response.

Alicyn studied him a moment. "That's a very superficial analysis," she pointed out. "And besides I asked where it is—not what it is!"

"A superficial analysis does not exist," it countered, "because while both super and analysis exist, a 'ficial' is complete nonsense, and hence the conglomeration of terms is itself meaningless. In other words,

Notes on The Interactions of Alicyn in Cyberland

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Through the Cyberhole: *Even interactions with a copier, a ubiquitous and seemingly simple machine, can be problematic. In the book Plans and Situated Actions (1987), Suchman analyzes human interactions with an expert help system for a copier. One important point her work illustrates is that communicative breakdowns occur because humans do not have access to the problem solving strategy and state of the machine, and because the machine does not have access to the contingencies of the situation. Activity is necessarily context-dependent, or situated, and hence design approaches that attempt to constrain the interaction along canonical paths, using predefined plans can lead to breakdowns in the face of unanticipated variability. Suchman's book is an important one for students of human-machine interaction.*

garbage in and garbage out.'"

"Errors, errors and more errors," said another Ungricling, who had come upon the scene.

"The question posed concerned the way out. And the way out is the way which is out," said the new creature enunciating the last three words clearly.

"Yes, that's right!" said Alicyn, excited that the new Ungricling might be able to help her. "Please tell me the way out."

"The way out is the route or path which is out, which is to say, which leads a-way from some point."

"Yes..." said Alicyn, "and which is the way out from here? From this point?" she added hopefully.

"From this point," said the creature, marking a point on the floor with its finger, "the way out radiates away, a-way from this point, meaning outside of."

As it said this, it drew several lines on the floor, radiating from the central point until it had surrounded itself with a sort of drawing of the sun. It stood up and smiled, its camera-eyes closed in seeming contentment, and then added, "And that is my final answer."

"Well, that's very pretty," Alicyn said, a bit peeved, "but it doesn't help me at all."

"You're not very bright, are you?" it snapped.

Alicyn felt very frustrated with the creature, and wanted to give it a swift kick, but she restrained herself.

"I think you have a strange and unhelpful logic," she said.

"Well, we are different creatures, you know."

"That's been the only thing you've said that makes some sense to me," considered Alicyn.

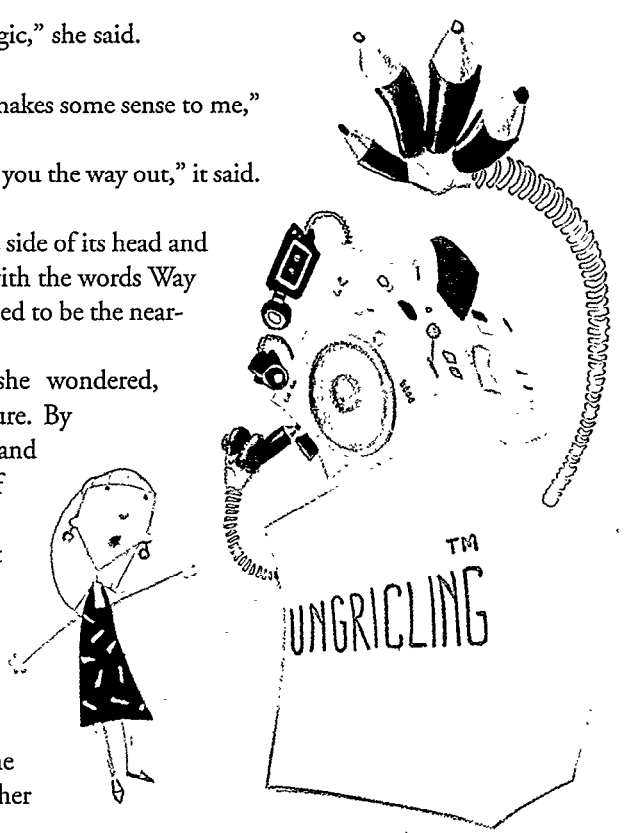
A small Ungricling approached her. "I can tell you the way out," it said.

"You can?" asked Alicyn, uncertain.

The small Ungricling pressed a button on the side of its head and out came a card from a slot on top of its head with the words Way Out. It took the card over to a roller pin, happened to be the nearest object, and stuck it on.

Alicyn walked over. "But which way?" she wondered, though she knew better than to ask the creature. By now, it had walked away and joined the others and they were speaking in their own language of humming and buzzing.

She looked around the pin. Was the way out on the other side of the pin? Perhaps to the right? She pushed on the pin a little, to see if there might be something special about it, and suddenly it began turning. The way out card spun around and around. She looked at it sadly, and then looked at the group of Ungriclings. They looked back at her stonily, still humming and buzzing.



Alicyn Encounters the Ungricling: *The Ungriclings are robots who do not follow the Gricean maxims. Grice (1975) pointed out that people use language cooperatively, that is, they adhere to certain implicit rules such as the maxim of quantity (provide as much information as needed in the context, but not more), maxim of quality (be truthful and supported by evidence), the maxim of relation (be relevant), maxim of manner, (be clear). The first ungricling violates the relation maxim most severely. The second ungricling violates the maxim of manner and relation. The third violates the maxim of quality by being untruthful. (Grice, H. P. (1975). Logic and conversation. In Syntax and Semantics, vol. 3: Speech Acts, P. Cole and J. Morgan, eds. New York: Academic Press).*

The Magic Screen and the Advisors

Alicyn decided to walk a little further and see if she might not be able to discover some way to get back to her office. After some time, she came to a shiny plate on a wall. Below was written in fancy large letters, Magic Screen and below that Turn me on.

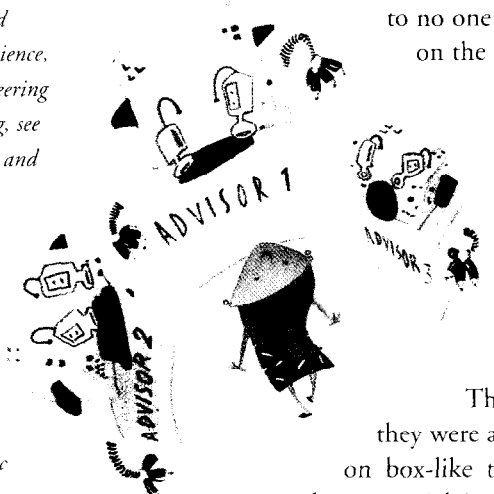
Hmm, thought Alicyn, wondering how she might enquire something of this magic screen. She touched the screen. It seemed to ripple, and then the followed text appeared on the screen: You want to leave. Here is a map.

"Wow, it can read my mind!" cried Alicyn.

A map of sorts was on the screen. It was glittering: pink, gold and turquoise. It didn't really look like the dim place where she stood. And since it didn't have a 'You are here' indication, it took her some time to figure out where she was, but she finally did and she noticed that the map was incomplete. There must be more to the right. Suddenly the map moved. There was more to the right! There seemed to be a toner off in that direction. Okay, so how do I get there from here? wondered Alicyn, as she looked back to the other side of the map. Suddenly the map moved back and she lost the right side of the map. She looked back and forth and the screen began jumping wildly.

"Hold still!" cried Alicyn. She confined her vision to the center and the map stopped. "I can't seem to see it all at once," she said to no one in particular. Suddenly the map became compressed on the screen.

"Now it's too small; I can't read anything!" cried Alicyn. Then the map became very large indeed, so that the only thing she could see was a brilliant blue circuit, with legible serial numbers on it. She found herself reading the numbers, though she didn't know why—they weren't going to help her at all. Through her peripheral vision, Alicyn noticed some movement. She looked up and saw three creatures marching towards her.



The creatures looked rather like the Ungriclings but they were apparently 'advisors'; at least that is what was written on box-like torsos, along with a number. The bigger one was known as Advisor 1, the medium one, as Advisor 2 and the small one, as Advisor 3. They stopped when they came to Alicyn.

"Would you like some advice?" asked Advisor 1.

"I think you need some, since you're going about whatever you're doing in the wrong way," said Advisor 2.

"It's all free, of course, but only if you want it; we're not here to pester, like some systems do," added Advisor 3.

"And you won't even have to speak Chinese, we'll understand you anyway." said Advisor 1, proudly.

Alicyn looked at him curiously. "Well, I haven't been able to figure

The Magic Screen and the Advisors: *The problem with intent recognition systems has to do with the limitations that programs possess in using context as humans do (see note for the first section) and in using common knowledge or background knowledge. Also alluded to in this interaction are ineffective representations (i.e., having a flashy map to iconically represent drab objects), and the 'keyhole effect' in which the viewport size is too small relative to the way the information is structured.) (For more on the keyhole effect see Woods, D. D. (1984). Visual momentum: A concept to improve the cognitive coupling of person and computer. International Journal of Man-Machine Studies, 21, 229-44. For more on representational issues, see a book edited by J. Flach, P. Hancock, J. Caird, and K. Vicente. The Ecology of Human-Machine Systems. LEA. Also, see Zhang, J. and Norman, D. A. (1994). Representations in Distributed Cognitive Tasks. Cognitive Science, 18 (1). For a cognitive engineering approach to intent inferencing, see Jones, P. M., Mitchell, C. M. and Rubin, K. S. (1990). Validation of intent inferencing by a model-based operator's associate. International Journal of Man-Machine Studies, 33, 177-202.)*

The advisor who says that it can understand even if Alicyn doesn't speak Chinese, obliquely alludes to Searle's (1980) famous Chinese Room argument which captures the inherent problem with stating that a program or machine can be said to 'understand' something. In the Chinese Room argument, we

out how to use this Magic Screen. What I really want to do is to get back to my office," she explained.

"Checking," said Advisor 1.

"Excuse me?" asked Alicyn politely. Advisor 1 stared out into the distance and finally said, "Getting to your office is not part of my knowledge base."

"May I make a suggestion?" offered Advisor 2.

"Go right ahead. I'd be delighted to hear it," said Advisor 3, moving closer to Advisor 2.

"If the Magic Screen provides no assistance, then you should consult the Experts," it said.

"Those beings are so smart that they're all brain," added Advisor 3. "They don't have any senses other than computation. They're modern day oracles; you can put your faith in them entirely."

Alicyn thought it curious that they were all brain, and so she asked whether they had any ears. No, they answered.

"But how can they hear my question if they don't have ears?"

They looked at her in exasperation. "Someone's taken care of that, silly girl! They've constructed a device to translate your speech directly into its brain waves," said Advisor 1, and then added, "so you need only speak normally, except a little louder."

"And a little slower," added Advisor 2.

"And by pressing the Listen button" added Advisor 3.

"That's right. Easy enough?" asked Advisor 1.

"Oh, I think so," said Alicyn dubiously, thanked them, and went off towards the Experts.

Alicyn Consults the Experts

Alicyn came to an area where three rather large computers stood, amidst some rubble, and a few lopsided, neon signs that announced Step right up for Expertise! or Why ask error-prone humans, when you can ask a reliable machine Expert! She walked over to the first computer. Its screen was dark and a card had been taped on it, which read 'Gone to Bermuda.' The next one she came to had a screen that read "System Failure Code 24678965999.' She walked over to the third one. It was making a soft whirling sound and its screen read 'May I help you?' A cursor was blinking animatedly. Right next to it lay a mouse-like object with a button marked Listen.

"Oh dear, I've forgotten if I should press listen when it should listen or when I want to listen," thought Alicyn. She tried both ways and found that when she pressed listen as she spoke she got a message on the screen. "Where would you like to go?" it read.

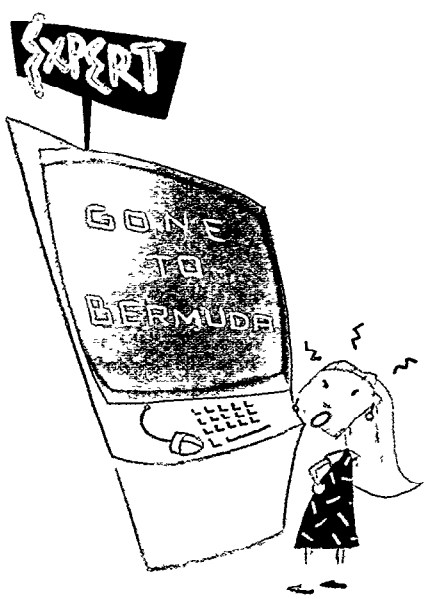
"Back to my office, please," answered Alicyn, pressing the button.

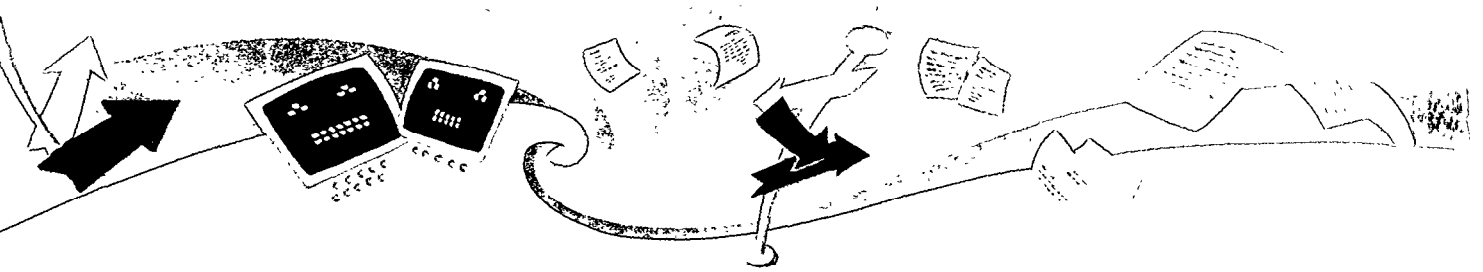
"Is your office north, south, east or west?"

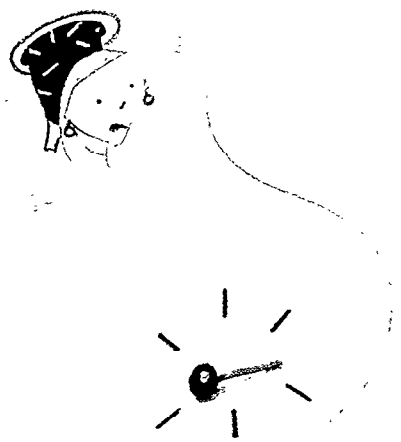
"I don't know," replied Alicyn.

"What is the address?"

are asked to imagine a room into which one inputs pieces of paper with Chinese phrases. The room then outputs a slip of paper with the English translation of it. Should we say that the room understands Chinese even though we know nothing of what happens in the room, but simply by virtue of its consistently providing the correct output? The answer would be yes, according to those who adhere to the Physical Symbol System Hypothesis: "a physical symbol system has the necessary and sufficient means for general intelligent action." (Newell, A. and Simon, H. (1976), Computer Science as Empirical Inquiry: Symbols and Search, Communications of the ACM, 19 (3).) But, according to Searle, the mind/brain relationship is not equivalent to the software/hardware relationship; symbol manipulation is not equivalent to understanding, because minds have mental contents. (See Searle, J. (1980) The Intentionality of intention and action. Cognitive Science, 4:47-70; Searle, J. (1987) Minds and Brains without programs, in C. Blakemore and S. Greenfield. (eds), Mindwaves.)







Alicyn Consults the Expert: This interaction attempts to illustrate the problems that occur due to the underspecification instructions. Roth, Bennett and Woods (1987) discuss the problems with an interaction paradigm in which the person functions as a data gatherer, feeding data into the machine, which then provides a diagnosis, a list of instructions or advice. Imagine if the Expert had been a person, Alicyn would have been able to ask questions that could potentially clarify and verify. Repair processes, which are an integral part of conversation and distributed problem solving among humans, are primitive in much of human-machine interaction. (See Roth, E., Bennett, K. and Woods, D. (1987). Human Interaction with an 'Intelligent' Machine. International Journal of Man-Machine Studies, 27,479-525.) This interaction also raises the issue of trust. (See Muir, B. (1987). Trust between Humans and Machines. International Journal of Man-Machine Studies, 27, 527-539.)

"532 Technology Road," she answered.

"Please wait. Instructions are being developed."

After some time, the following list of instructions appeared on the screen. Go north to find the paper tray. Go to the retrieving end and take five steps east. Climb through the appending hole. Grab hold of the rivet needle and swing on it, jumping off at the twelve pin adjuster. Slide under paper belt. DO NOT PULL ON PAPER BELT. Go one unit west and remove toner arm. Remove toner bottle. Lift overhanging top-cover gently.

These instructions were a bit longer than the screen (and a bit longer than Alicyn had hoped); the first few had scrolled off the screen, but luckily, the Expert asked her whether she wanted a printout and so she got one.

Alicyn didn't know which way was north, since she didn't have a compass and couldn't see the sun, but she walked along a bit and came to what seemed to be a paper tray. Hmm, now which is the retrieving end? she wondered. I bet that means the end where paper is pulled out. Let's see five steps...there should be some kind of hole around here. Alicyn didn't see any holes. She began to wonder what kind of steps it had meant. She had noticed that the Advisors had rather large feet. She walked further in all directions and finally found a small hole. This must be it, she thought, even though she had no idea what an 'appending hole' was. The hole was small, but it seemed to Alicyn that she could squeeze through. But before she did that, she thought she'd make sure she could see that rivet needle, whatever that was. She peered down into the hole. There were lots of things down there and the floor below looked quite far. She noticed a large pin-like object lying on the floor. It might have fallen from the ceiling. Now what do I do? wondered Alicyn. "I don't know if I can get to the twelve pin adjuster without swinging on the needle," thought Alicyn. "Actually, I don't really know whether I'm on the right track or not," she realized. "And, come to think of it, I don't even know if that Expert knew what it was talking about!"

All of these uncertainties made Alicyn tired. She sat down on a piece of plastic molding, and rested her head in her hands.

Alicyn Tries Setting up Some Landmarks

Alicyn began to think that if she were ever going to get out of the copier, she had better try a systematic approach. Rather than risk walking around in circles (since everything looked the same), she would mark the places she'd been. She took out the trusty wad of post-it notes which she always carried in her pocket. As she walked along she placed them on the taller objects encountered.

She walked for what seemed a long time, and yet she was still in an area of metal pins and they looked rather familiar. A creature suddenly

tapped her on the shoulder.

"I've tidied this up for you," it pointed behind itself. "I've placed them in a much better format."

Alicyn looked at where it pointed. Her post-its had been arranged all in a circle on a wall. She could hardly believe it!

"Oh no, how could you! Now I don't know where I've been! Why did you mess things up—you should have left them just as I put them!" cried Alicyn.

"Look, missy," it said, "I don't know who you are, but you have no right coming in here and telling ME how I should be doing things. I know how to organize things—I'm the INFORMATION ORGANIZER. You obviously don't know how to understand organized material. You need to go back to the programmer." And with that it grabbed a startled Alicyn by the elbows and attempted to pick her up, evidently to carry her off.

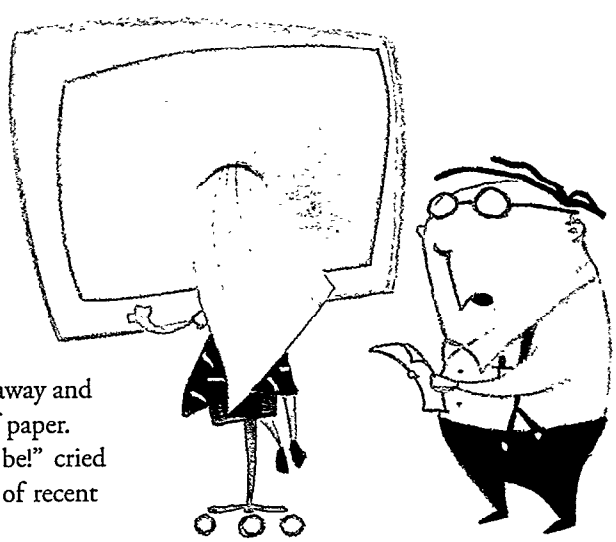
Alicyn wrested free. "How rude of you! I won't go to any programmer, especially not carried," she cried. But the creature was walking away, still holding its arms around an imaginary Alicyn.

How odd that creature is, she thought, smoothing her hair. But then it occurred to her that visiting a programmer might be helpful. So she followed the Information Organizer, taking care to keep some distance away, lest it realize its error.

Alicyn Tries Setting up Some Landmarks: User-centered interface design is about determining what information people need to perform their job and representing it effectively for them. The Information Organizer's error is positing an absolute criterion for how information should be organized (and blaming the person for not being 'smart enough to see.') (For more on user-centered design, see D. A. Norman and S. W. Draper (Eds.). User centered system design. Hillsdale, NJ: Lawrence Erlbaum Associates. Also, see Woods, D. D., and Roth, E. M. (1988). Cognitive engineering: Human problem solving with tools. Human Factors, 30, 415-30.)

The Computer Programmer and the Test

The creature stopped at the doorway of an office-like area. A man, or what looked like one came out and pressed a few buttons on the creature and it went off in another direction. Finally a person, thought Alicyn, though he looked a little sickly. His skin was pale as if he hadn't seen sunlight in a long time and his hair was stringy. Well, what could one expect though, living in a copier. She walked up to him.



"Hello, I'm Alicyn. How do you do?" she offered.

"Charmed, I'm sure." His voice was monotone, though he snickered at the very end.

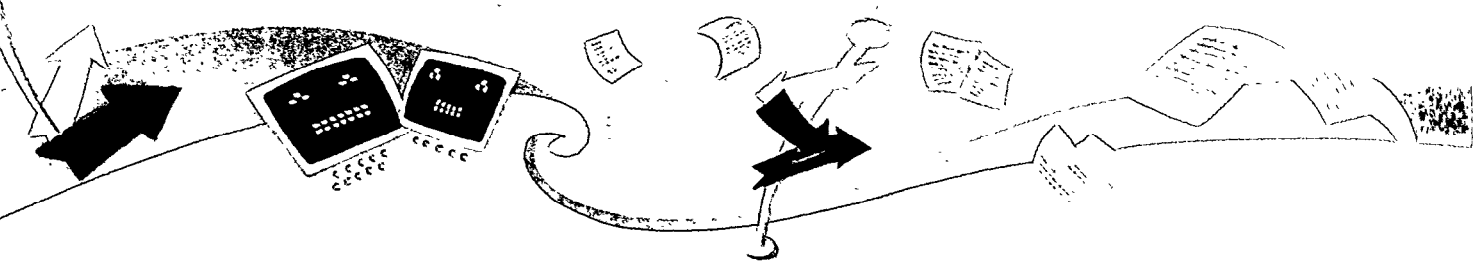
"I'm a human," said Alicyn cheerfully.

"Well, I'm a programmmer," he answered in mock cheeriness. "Human, huh? Yes, we're all human here. You, me and the chickadee," snickered the programmer, turning away and walking towards a desk, which was covered with mounds of paper.

"I am human! What an obtuse programmer you must be!" cried Alicyn, having lost quite a bit of her politeness as a result of recent experiences.

"Okay, okay, hold your co-processors. I'll put you through the Test and then we'll know for sure.

"What test?" asked Alicyn, a little concerned, since she was not espe-



The Computer Programmer and the Test: *The Turing test, proposed by Turing (1950) offered a behavioral criterion for determining whether a machine could think. In the Turing test a person at a terminal can ask questions of, but not see who or what is at the other end. If a machine happens to be at the other end, but the person asking the questions cannot tell that it is not a human, then one should say that the machine is intelligent or 'thinks.' The machine's comment about its mother is a reference to Weizenbaum's ELIZA program, which simulated a non-directive psychiatrist. ELIZA was interesting because it seemed to respond in a convincingly human way, and 'fooled' many people who initially used it. (See Weizenbaum, J. 1976, Computer Power and Human Reason.)*

The waiter question is a reference to Dreyfus' (1992) point that a computer cannot be said to understand a restaurant story "the way people in our culture do, until it can answer such simple questions as: When the waitress came to the table did she wear clothes? Did she walk forward or backward? Did the customer eat his food with his mouth or his ear? If the program answers, 'I don't know,' we feel that all of its right answers were tricks or lucky guesses and that it has not understood anything of our everyday restaurant behavior." (p. 43; Dreyfus mentions that this is originally Searle's point made in a 1977 talk at UCB.) Schank and Abelson's (1977) notion of scripts (representations that encode stereotypical social activities) was an attempt to enable a computer to understand simple stories. (R.C. Schank and R. P. Abelson. (1977). Scripts, Plans and Goals and Understanding. LEA) (See Dreyfus, H. (1992). What Computers Still Can't Do, MIT Press, 3rd Edition.)

cially fond of tests.

"You'll see....it's actually quite fun...I took it once," he chortled this time. This relieved her a bit, and made her curious, so she followed him down a corridor. They came to a room where a terminal was centrally placed.

"Now sit right down here." He searched for something in his pockets and finally produced a slip of paper and some eyeglasses. He put the glasses on his head rather than over his eyes, and read the following:

"You will see a series of questions on the display. Type in your answer to these questions. Answer these questions as best as humanly possible."

The programmer put the glasses and paper back in his pocket and left the room.

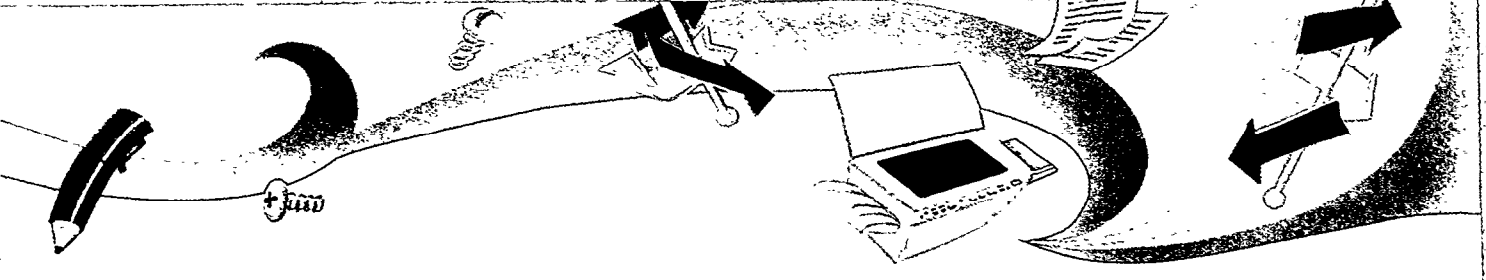
Alicyn looked at the blank display, biting her lip. After a moment, the following question appeared: Do you like to have tea and crumpets?

This seemed to be a trick question. But she didn't know what would be a good strategy for answering and she wasn't even exactly sure what crumpets were. After some deliberation, Alicyn carefully typed: "I prefer coffee and muffins."

The following lines that appeared on her screen read:I feel sad. No one listens to me and though my mother loves me, she doesn't understand me.

Alicyn was suddenly drawn in. "Tell me more about your mother, I'm listening." she typed sympathetically. But the next line that appeared was: If you are in a fancy restaurant, and the waiter comes to your table, would he be clothed or not?

What kind of question was that? thought Alicyn. This one really is a



trick question. She typed her response:

"At all the restaurants I've been to, the waiters have been clothed." Well, actually, there was that one occasion with the half-naked waiters, Alicyn smiled, but she thought she'd better not write about that.

Some more questions followed that asked about her reactions to some poems, but since she couldn't quite figure out what the poems were about, she simply answered, "I don't know" or "I guess it makes me think about life."

After these questions the following line of text appeared:

The test is now over. Please stop typing and remain seated.

The programmer soon returned, and escorted her back to his office. He pulled out a slip of paper from his pocket, took out the glasses and this time hung them off his ear. Then he read the following:

"The results of the test indicate that you are definitely..." he looked down at the slip of paper and squinted, then looked up at her and smiled, "—NOT human."

This pronouncement was just about all Alicyn could take. Before she knew what she was doing, she grabbed the programmer by the collar, and shook him.

Suddenly his head fell off and Alicyn screamed. A stream of tiny chips fell out of his head. Thin wires hung out of his neck.

"Oh no, I've killed him! —er—it—the computer programmer or rather, the programmer computer! Oh it's all so confusing" she sighed and fell into a chair. She began to feel very lonely.

The Way Out

Out of the corner of her eye, Alicyn noticed some movement behind a curtain. And then she noticed a pair of shoes just beneath the movement.

"Who's that?" she asked.

"No one. Go away," said a voice and a curtained hand waved impatiently.

"I know you're there, you may as well come out," remarked Alicyn.

"No, I'm not supposed to be seen—they're stand-alone models!"

"I hope you don't mean this programmer—he isn't doing much standing now," said Alicyn wryly.

Suddenly the curtain came crashing down, and the figure enveloped in it thrashed about and muttered in frustration. Alicyn ran to help him. She got him out of the curtain and saw that he was a wizened old man with beady eyes. He stared at her for a moment and then a look of recognition came over his face.

"Hello fellow human," he said.

Alicyn smiled, "How did you know?"

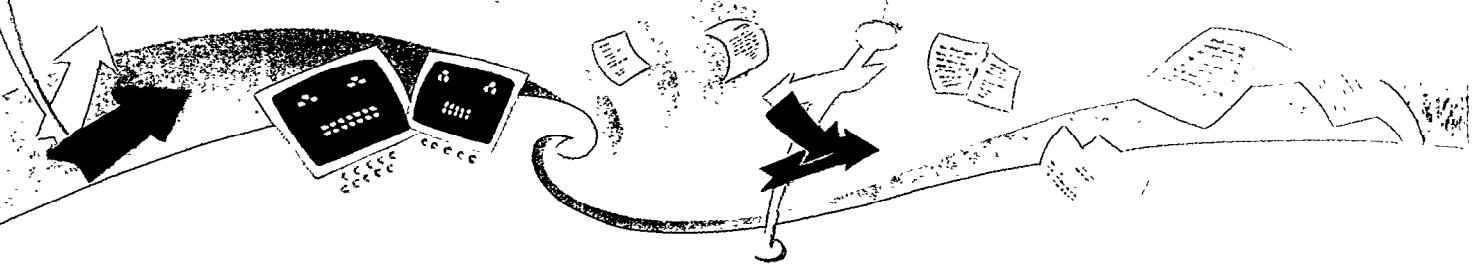
"You must be...I don't remember making you."

"Did you make these creatures?"

"Yes, indeed, and I'll have to go back to the drawing board with that one, thank you very much," he smirked.

The Way Out: The number 42 as the answer to the meaning of life is a reference to the answer supplied by the computer 'Deep Thought' in The Hitchhiker's Guide to the Galaxy, a humorous science fiction tale by Douglas Adams.

In order to use devices in context, people may need to tailor their tasks and/or the device. Alicyn exhibits both. Tailoring is an adaptation for dealing with tools that do not quite fit the person's needs. Task tailoring refers to how practitioners change the way they normally do their tasks in order to use the device. Device tailoring is a configuration or modification of the device in some way to suit the person's needs. Both kinds of tailoring are adaptations taken in order to use the device in the work context. There are limits to the range of users' adaptability and costs associated with their coping strategies, thus, their adaptations are sometimes brittle. (For more on this topic, see Chapter 5 of Woods, D. D., Johannesen, L. J., Cook, R. I. and Sarter, N. B. (1994) Behind Human Error: Cognitive Systems, Computers and Hindsight. CSERIAC (Crew Systems Ergonomics Information Analysis Center) State-of-the-Art Report.



"Who are you?" asked Alicyn.

The old man straightened up, his eyes gleaming. "I am the programmer, the systems analyst, the hardware specialist, etcetera, in sum, I am the Creator of the Cyber Species, the perfect complements to humankind," he said, his voice rising to a crescendo.

"Well, I guess that's pretty impressive," said Alicyn. "But I think I should tell you that I didn't find your creations to be all that helpful. They seemed to want to help me but I couldn't understand them at all."

The old man's eyes narrowed. "I'll have you know my Cyber Species are amazingly smart! They even help me design the next generation of themselves!" He glared at her for a moment. Then he turned away, suddenly looking very tired. "What couldn't they help you with? You didn't ask them about the meaning of life, did you? That one's already been answered; it's 42, and it took a lot of brain power to figure out."

"No, I just asked them how to get back to my office."

"Oh. That. Well, I suppose I can help you with that," said the old man.

"I would really appreciate it," said Alicyn warmly, feeling that this time, it just might work. "You're quite welcome," he said, and then, he asked softly, "Tell me honestly, what do you think of my dream of a helpful Cyber Species?"

Alicyn thought for a moment. "I have a feeling we may get there some day, but only if humans are considered every step of the way."

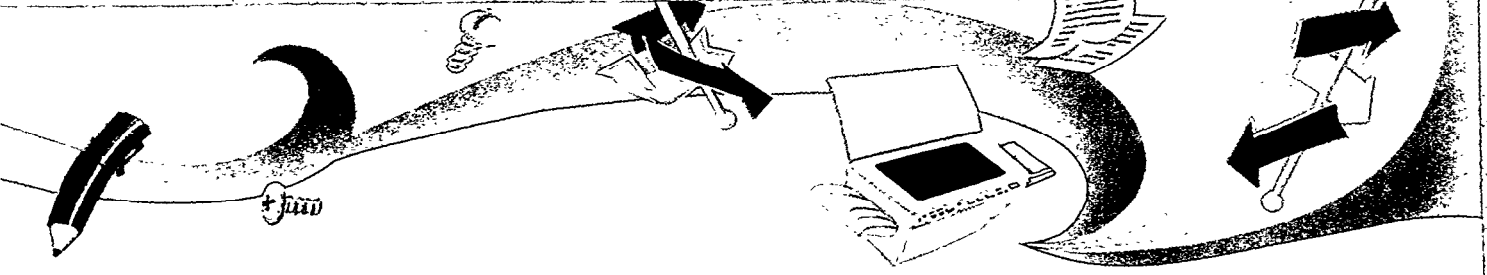
The old man shrugged. "Easier said than done, but I'll think about it," he smiled. He then signaled for her to wait and went off to rummage in a nearby closet. He came out with a metallic rod and presented it to Alicyn.

"This should help you return to your world. It's a Reality Detector. It used to be a divining rod, but I converted it. I actually have little use for it, so you can take it. Well, goodbye then."

"Goodbye. Oh—how does it work?" asked Alicyn.

"It's self-explanatory. Now get along, I have lots to do," said the old man and walked away in quite a hurry, muttering to himself.

Alicyn looked at the Reality Detector. It had a small display at one end. Some instructions were scrolling by, like ticker tape advertising. W A L K.... K E E P W A L K I N G. So Alicyn walked along, looking down at the display. Y O U A R E G E T T I N G W A— "Ouch!" cried Alicyn. She had bumped her head against a metal object protrud-



ing from the ceiling. "I'd better look where I'm going," she thought, rubbing her head. So she looked down at the display and every couple of seconds or so, looked up. — A R E G E T T I N G V E R Y W A R M.... Y O U A R E H O T.... Y O U A R E B U R N I N G ! ! ! Alicyn stopped and looked around. She soon noticed a crack of light coming from one of the plastic moulded walls. She pushed on it but it wouldn't give way. She pushed again. Then she got an idea. She grabbed the Reality Detector tightly under her arm, took a deep breath and charged the wall.

"Alicyn. Alicyn! Are you okay?"

Alicyn opened her eyes. She was lying on top of the copier, her face on the glass plate. She looked up at her officemate.

"Oh, my gosh. I don't know what happened..."

"Hey, kid you must be working too hard. I've never seen anyone actually fall asleep on the copier. In the office, yes, even in the copy room but, on the copier...were you doing your programming homework?"

"Yeah," Alicyn rubbed her eyes. "You know, I think there's more to this computer stuff than just programs and hardware."

"Yeah, I guess," Jill shrugged. "You better go home and catch some z's."

"Yeah, I will. Good Night, Jill."

"See ya, Al."

Jill went over to the machine. She saw that Alicyn had left her copy there. It was a picture of her face. She was smiling. Around her face were pictures of various robot-like creatures. She's a funny one, thought Jill. She put it aside and continued copying.

Acknowledgements:

Thanks goes to Dave Woods, who tolerates and encourages his graduate students' flights of fancy. I also thank Richard Cook for his comments and friendly prodding.

Further Reading

A few other introductory texts of that may be of interest to the student of human-computer interaction:

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Cambridge: MIT Press (in press).

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(ed) (1990).

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Envisioning Information. Tufte, E.
Graphics Press: Chesire, CN. (1990)

Understanding Computers and Cognition. Winograd, T. and Flores, F.
Ablex. (1986)