SYLLABUS

Psy 435/535 Cognition

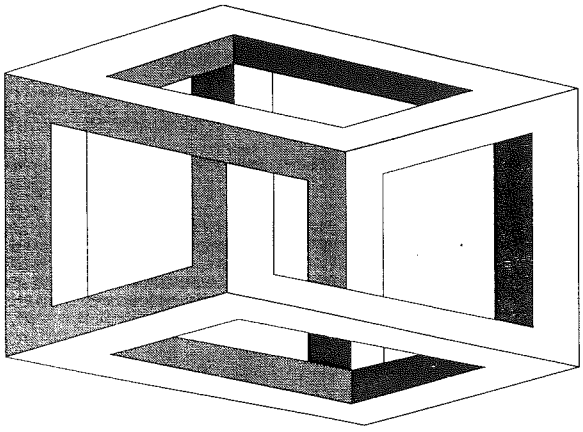
Fall 1997

Cognition

Tu, Thu 8:00 a.m. to 9:20 a.m.

146 Straub Hall

Please Keep and Read Carefully



General Information

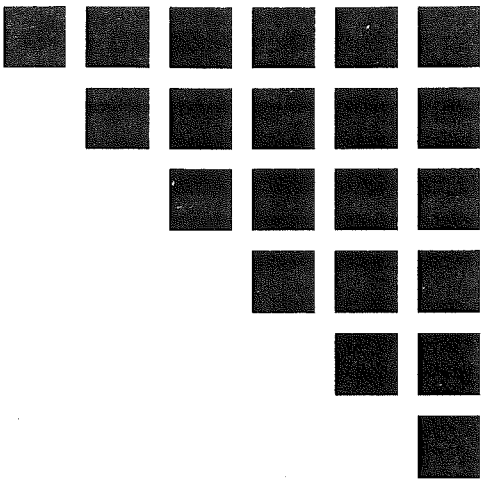
1.1. Catalog Details:	Psy 435 CRN 14924/ Psy 535 CRN 14935 UH 8:00- 9:20 a.m. 146 Straub Hall[1] 4 Credit Hours
1.2 Instructor:	Ray Hyman 323 Straub Hall, 346-4910, E-mail: RAYHYM@OREGON.UOREGON.EDU Office Hours: M 2:30-3:30 p.m./ F 2:30-3:30 p.m.
1.3 Textbook:	Reisberg, D. (1997). *Cognition: Exploring the science of the mind.* NY:W.W. Norton & Co..
1.4. Examinations:	**MIDTERM: October 30, 1997** **FINAL: December 10, 1997 @ 1:00 p. m.**
1.5. Term Papers:	The first term paper is due on ***Tuesday, October 28, 1997***. The second term paper is due on ***Tuesday, December 2, 1997.*** Papers handed in after these deadlines will be marked either down or not accepted.

[1] The examinations may be held in another room to be announced.

Topics & Assignments

DATES	TOPICS	ASSIGNMENTS
Sep 30, Oct 2	Basic Themes, Overview, History	Ch 1
Oct 7, 9	Perception, Attention	Ch 2, Ch 3
Oct 14, 16	Memory, The Standard Model	Ch 4, Ch5
Oct 21, 23	Memory Errors, Networks	Ch 6, Ch 7
Oct 28	Review	**Term Paper 1 due**
Oct 30 (Thursday)	***MIDTERM***	Bring #2 pencils!
Nov 4, 6	Concepts, The Psychic Reading	Ch 8
Nov 11, 13	Judgment	Ch 11
Nov 18, 20	Reasoning	Ch 12
Nov 25	Problem Solving	Ch 13
Dec 2, 4	Consciousness, Review	Ch 14 **Term paper 2 due Dec 2**
Dec 10 (Wednesday) @ 1:00 p.m.	***FINAL EXAMINATION. Please bring #2 pencils and show up on time.***	

Please check carefully the dates for the examinations and for the submission of the term papers. Do not take this course if you anticipate not being able to take the examinations at the scheduled times or to submit the papers on the due dates. We do not have the resources to give makeup examinations.



YOU AND YOUR GRADE

1. Points and Letter Grades

You can earn a total of 300 points in this course. The Midterm is worth up to 50 points and the first term paper (which is really a take home essay) is also worth up to 50 points. The Final Examination is worth up to 100 points. The second term paper is also worth up to 100 points.

I do not grade on a curve. Instead, I try to set standards which a student has to meet to get a letter grade.

2. The Term Papers

The term papers can be looked upon as take-home essay examinations. They provide you another opportunity to show what you have learned in *this course*. For each term paper you will write an integrative essay based on a small number of pointers. One or two pointers will be assigned and you will have a choice on one or more additional pointers. Use these pointers to write an integrative essay on cognitive psychology emphasizing the unifying themes and materials used in this course. The integration refers not only to tying the themes together but also to putting the lectures and the textbook together into a unified story. Your paper will be graded on comprehensiveness, integration, importance of the themes, and evidence that you have understood and can sensibly discuss the key issues of this course. *Warning! Each year, some students turn in otherwise excellent papers that show no explicit connection with the key themes and issues of this course. Make sure that you explicitly use topics, pointers and themes from the textbook and lectures in this course or you will receive no credit for your paper.*

3. The Examinations

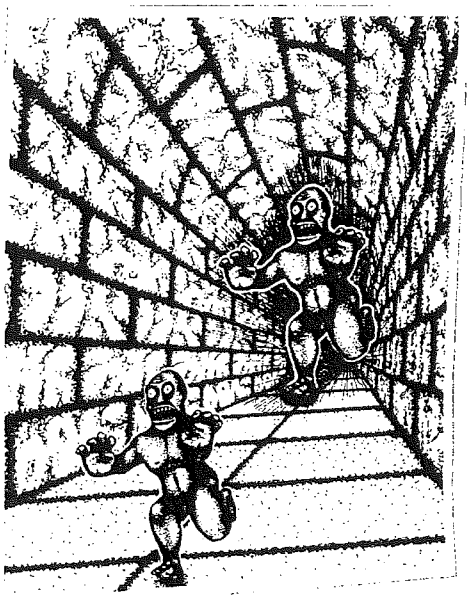
The midterm and final examinations will consist of multiple choice items. The midterm will cover both the lectures and the text assignments that precede the examination date. The final examination, while being cumulative, will emphasize the topics and material covered in the lectures and text book that come after the midterm. The two term papers serve as the essay parts of the examinations. They emphasize the general themes that occur throughout the course.

Topics, Pointers, & Themes: A Study Guide

Your task in this course is to demonstrate that you can integrate the material in the lectures and the textbook around a few central themes which will be emphasized in the text and the lectures.. As we proceed through the course, you will encounter a number of what I will call *topics, pointers, and themes*. *Topics* are broad subdivisions of the content we will be dealing with. Chapter headings and subheadings in your text provide exampales of topics. Examples would be *Attention, Pattern Recognition, Memory, Categorization, Judgment, Reasoning, Problem Solving, Consciousness.*

Pointers are demonstrations, experiments, or other concrete models that illustrate (point to) one or more important principles or themes. *Themes* are general principles or theoretical generalizations about how cognition operates or what problems cognition has to cope with. For your term papers, you will use a set of pointers and use the themes to which they point as the basis for an integrated statement about cognitive psychology.

The table on the next page lists topics, pointers and themes that we will encounter in each week of the course. Think of the table as a starter kit. You can add additional terms to the list as the course progresses. The items in bold print are especially important (at least *I* think so!)..



Some Key Terms

Dates	Topics	Pointers	Themes
Sep 30, Oct 2	Cognition History Overview	**7C/7S/** **Shape Constancy Illusion/** Invisible Rectangle/ **Domino- Fs** **Mental Paper Folding** Subjective Contours Duck-Rabbit/ Mexican on Bike/ Cow **Filtered Speech** **THE CAT**	**Ambiguity**, **Computational complexity**, **Constraints**, **Contributions (O,E)**, **Information Compression**, Introspection, Less/More, **Limits**, **Metacognition**, Perception/Imagination, Satisficing/Assimilation-Contrast/ Winner-Take-All/ **Data-Limits & Resource Limits/ Overcoming Limits/**
Oct 7, 9	Pattern Recognition Selective Attention Dividied Attention	Benussi/ The Step **Boomerangs** Dichotic Listening **Partial Report** Mitelli Circles Restoration Effect **The Standard Model** (Modal Model)	**Data-Driven&Conceptually-Driven/ Automaticity** / Bottleneck/ Chunks,, **Parallel/ Serial, Activation**, Costs/ Benefits, Priming, Features/Templates, Figure/ground **Allocation of resources**, **Activation, Network Models**
Oct 14, 16	Memory	Eye Chart Psychophysics **Mnemonics** Peg Word/ Rhyming/ Loci, Doing the Laundry, Dalmation Dog, Amnesia	**Working Memory, Rehearsal, Acquisition, Retrieval, Encoding Specificity, Implicit Memory,** Illusion of Truth, Illusions of Familiarity,
Oct 21, 23	Memory, Associative Networks	War of the Ghosts, ACT **Hecht, Shlaer, & Pirenne**, N-Rays	Connectionism, Procedural memory, Propositions, Semantic memory, Spreading activation,Typicality effect **Spreading Activation/ Interactive Activation**, **Signal Detection Theory**
Nov 4, 6	Categorization	**The Policeman** **The Psychic Reading** Christian Dion Forer Concepts Meaning	**Personal Validation**, **Comprehension** Less-is-more, prototypes, exemplars, implicit theories, default

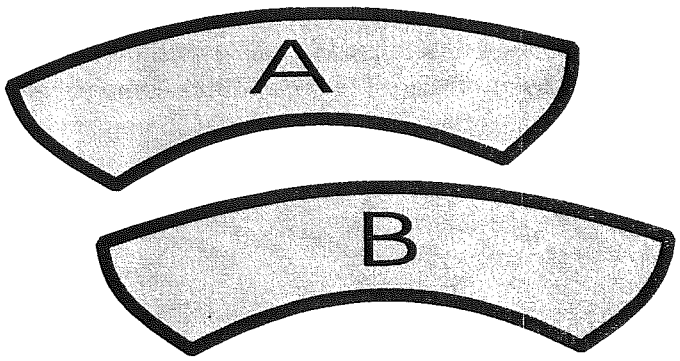
Dates	Topics	Pointers	Themes
Nov 11, 13	Judgment	Eliza Garfinkel Cold Reading Faces	**Pareidolia** **Anchoring & adjustment,** **Availability**, Base rate,, , Gambler's Fallacy, Hindsight Bias, Overconfidence, **Representativeness**, **Satisficing**, Utility/
Nov 18, 20	Thinking Decision Making Reasoning	**Wason Selection Task**/ Wason Induction Task, Von Restorff/ Logic Syllogisms	**Framing effects**,**Confirmation bias**, Belief Perseverance, Belief bias, Pragmatic Reasoning Schema, Mental Models Deontic Logic
Nov 25	Problem Solving Creatvity Expertise	GPS, Monty Hall, Mountain Climber Problem, Candle Problem, Radiation Problem, Checkerboard Hobbits and Orcs Tower of Hanoi Water Lilies	, Functional fixedness, **Heuristic**, Ill-defined, Means-end, Operators, **Problem Space**, Protocols, Einstellung, Productions,, **Representation & Search** Expertise, Einstellung, ill-defined/ well-defined, incubation, insight
Dec 2, 4	Consciousness	Clever Hans, Blind sight	Unconscious, introspection,
Dec 10, Wednesday @ 1:00 p.m.	**Final Examination** [Room to be announced]	The final examination will focus mainly on the topics and pointers that were covered after the midterm examination. The themes that were covered before the midterm are also relevant to the topics and issues that occurred after the midterm.	

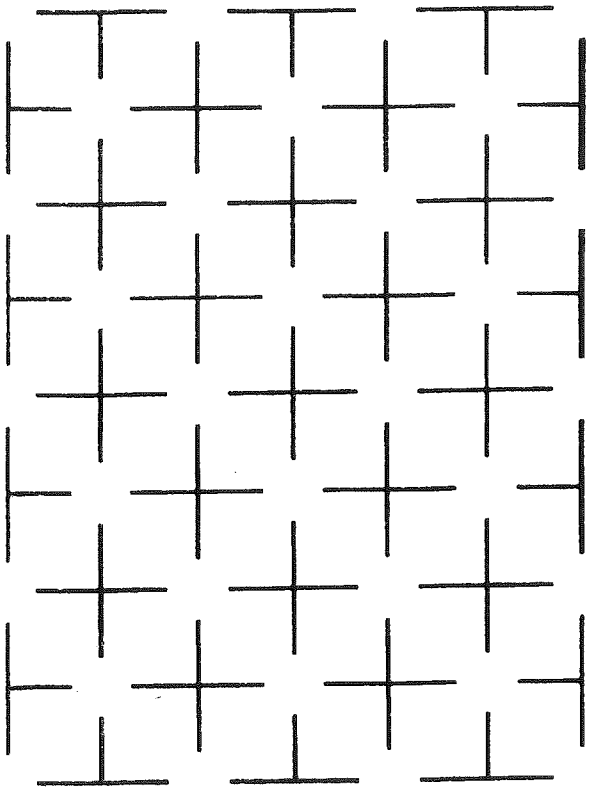
SOME POINTERS AND PROBLEMS TO COGITATE UPON

The following pointers and problems bring out various issues and themes that are important for understanding cognition. Most of them will play a central role in this course. You should find it helpful, and I hope interesting, to consider these problems before and during the course. For each pointer, try to list what important ideas about cognition are involved. What does each pointer tell us about how our minds both succeed and fail in coping with various challenges?

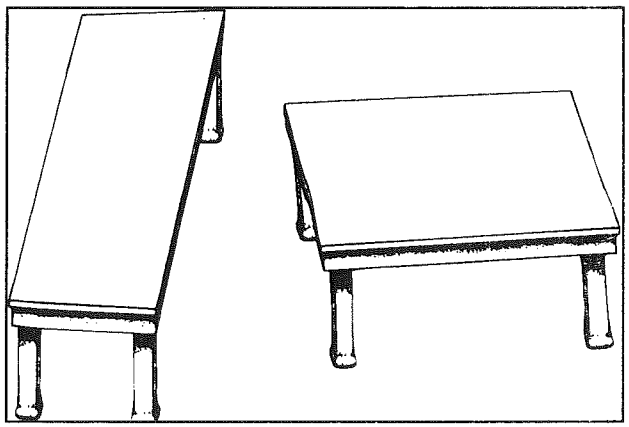
1. **MENTAL PAPER FOLDING**: Assume that I am holding a sheet of paper that is .004 inches thick. If I fold it in half, the thickness doubles and becomes .008 inches. If I fold the paper in half a second time, the thickness will double again and become .016 inches thick. I can continue folding the paper and doubling its previous thickness with each new fold. However, physical reality will soon get in the way, and I will be unable to continue doubling the thickness after I have folded the paper a few times. Your imagination, however, is not constrained by such physical limitations. You can continue folding the paper in your imagination for as long as you have the patience to do so. I want to use this pointer to teach us an important lesson about our imagination and our intuition. Do not try to calculate an answer. Instead, I want you to imagine that I could continue doubling the paper (folding it in half) until I have done so 50 times. Now use your intuition to estimate how thick you believe the final result will be.

2.. **BOOMERANGS**: Look at the two arcs or "boomerangs" on the right. To most observers the top boomerang (A) appears smaller than the bottom boomerang (B). Yet, as you can verify by physically measuring them, Boomerangs *A* and *B* are of identical size and shape. Does this tell us something about perception and cognition? Does it reveal a limitation or constraint on the accuracy of normal perception and cognition?





3.. **STREETS**: Look at the figure on the left. It can be perceived as a grid, but none of the lines of this grid touch each other. The empty spaces where the lines would intersect if they did touch each other are not seen as empty. Instead, we tend to perceive the intersections as covered by illusory circles. [Some people see illusory squares instead of illusory circles]. In addition to seeing illusory circles, observers also tend to see the circles connected by illusory "streets". Both the circles and the `streets' do not exist. Yet, we perceive them. Where do they come from? And why do we see circles instead of some other shape? What does this teach us about cognition?



.4.. The box on the right shows a version of the **SHAPE CONSTANCY ILLUSION** that was created and published by the Stanford psychologist Roger Shepard in 1981. Shepard created this interesting variation for his fascinating book of original visual illusions and other anomalous illustrations *Mind Sights* (1990). [2] The tops of the two tables are of identical size and shape in the plane of the picture. This seems to contrary to our perception that you will have to trace one of the table tops and superimpose it upon the other one to convince yourself that they are, in fact, the same size and shape. Why is this illusion so compelling even after we know that the two table tops are identical in shape and size?

5. How many animals of each kind did Moses take upon the ark?

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[2] The illustration of t he two monsters on page 5 of this syllabus also comes from Roger Shepard's book *Mind Sights*.

6.. In 1944, the psychologist Crider published a study of a psychic or character reader[3]. Margarita S. was 30 years old and had been a character analyst for 15 years. Her clients gave her excellent testimonials. To test her abilities, Crider conducted the following experiment. Margarita saw each of the 16 female college students from Crider's class in the author's office. Each student was seen individually. The analyst made a series of statements about each student. The statements were made one at a time and written down. The subjects had been instructed not to react to the statements. Margarita made from 19 to 25 separate statements about each student. After the 19 or more statements were written down they were handed to the student who checked those with which she agreed.

Crider reported that in seven of the analyses there was no disagreement at all. In only one of the analyses were there as many as three disagreements. All told, for the 16 analyses, Margarita made a total of 364 statements. Of these statements, the students disagreed with only 22. In other words the students agreed with 96% of the statements made by Margarita. Crider provided two sample analyses. We give one of these below:

1. Does not like to take chances.
2. Very-very sensitive.
3. Very self-conscious.
4. Gets along well with boys.
5. Above-average student.
6. Worries about her studies.
7. Introvert.
8. Over-emotional, tries to conceal it.
9. General health good.
10. Love life not in settled stage.
11. Has had broken love affair.
12. Should not be in business world.
13. Appreciates good music.
14. Must always have feeling of security or else is uneasy.
15. Is of generous and cooperative nature.
16. Digestive organs normal.
17. Heart normal.
18. Kidneys normal.
19. Finds it hard to ask favors.
20. Should not be given technical work.
21. Does not like routine either.
22. Very stubborn.
23. Bad temper when aroused, yet she doesn't display it often.
24. This girl would be happiest when being supported.
25. Has many big dreams.

[3] Crider, B. (1944). A study of a character analyst. Journal of Social Psychology, 20, 315-318.

Crider states that, "Psychologists may say that the statements are mostly complimentary, that they are too general, that they will apply to anyone. However, from what I knew of the students, I was in substantial agreement with the analyses as presented. More interesting is the fact that the students were satisfied, and in their discussion with each other following the analyses they were of the opinion that the analyses were surprisingly accurate."

Crider also supplies a statement from Margarita:

> *I believe we can and do absorb and register in our feeling worlds, the emotions and feelings of those we contact. Some people are more sensitive and can do this at will. I have been able to analyze personality, emotions, and temperament just by the impressions I receive while looking at an individual. I do not read the features or contours of the face. My findings are determined by thought vibrations which emanate from the individual. Those vibrations enter my emotional world and caused the same vibratory frequency to occur in my feelings. Thus, I feel what the individual feels.*

Crider concludes: "Since she is one of several who are doing similar work I believe it is of considerable interest to psychologists to know how our competitors work; much better, in fact, to try to understand them than to scoff at them."

Think about Crider's test of this psychic and his conclusions. How would you evaluate this evidence and what further evidence would you require before you were willing to accept this psychic's powers?

7. **LINDA**: Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations. What is the probability that

___ Linda is a bank teller.
___ Linda is a bank teller who is active in the feminist movement?
___ Linda is active in the feminist movement?

[Estimate your probabilities on a scale from 0 to 100--with 100 indicating certainty and 0 indicating impossibility.]

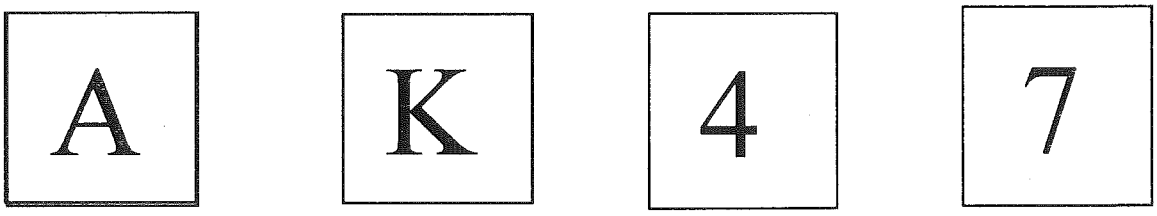
8. **THREE CUPS**: Imagine that you have been hired to conduct the following experiment. The experiment uses three cups and a penny. Before your subject enters the experimental room, you randomly place the penny under one of the three overturned cups. When the subject enters the room, you tell her that there is a penny under one of the cups. You ask the subject to choose the cup which she thinks the coin might be under. When the subject has made her choice, you do not immediately turn up her chosen cup to show her if she has chosen the correct cup. Instead, you deliberately turn over one of the two remaining cups, making sure to turn over a cup that you know is empty, and show the subject that the coin is not under the upturned cup. You then remove the empty cup from the table leaving two cups--the chosen one and the remaining unchosen cup.

You now give the subject the following option. She can stick with her original first choice *or* she can switch her choice to the other remaining cup. Will the subject's probability of winning be better if she sticks with her first choice or will it be better if she switches? Or does it make no difference? Please explain.

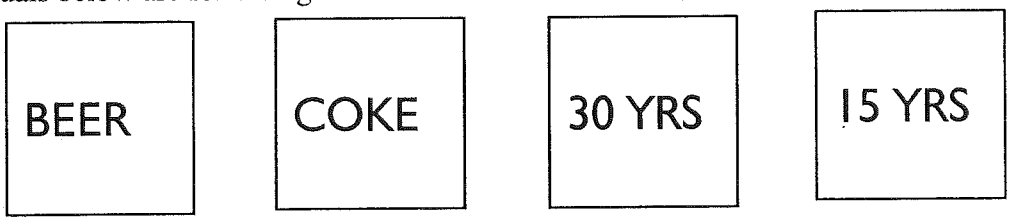
9.. A reader sent this question to Marilyn vos Savant who has the weekly column in *Parade Magazine*:

> A shopkeeper says she has two new baby beagles to show you, but she doesn't know whether they're male, female, or a pair. You tell her that you want only a male, and she telephones the fellow who's giving them a bath. "Is at least one a male?" she asks him. "Yes!" she informs you with a smile. What is the probability that the *other* one is a male?

10. **SELECTION TASK**: Assume that the four boxes which are presented below are actually cards which each have a *letter* on one side and a *number* on the other side. Your task is to test the hypothesis that--*for these four cards*--if a vowel appears on one side, then an even number will appear on the other side. To test this hypothesis you will have to turn over one or more of the cards below. In other words, *list those cards, and only those cards, which need to be turned over to determine decisively whether the hypothesis is true or false*.



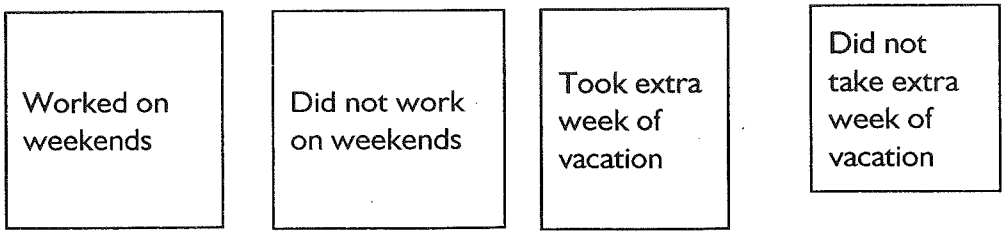
11. The four boxes below represent cards that contain information about four individuals who were recently reported to have been in Joe's bar. On one side of each card is information about the person's age. On the other side of each card is information about what the person was observed drinking while in Joe's bar. The state law decrees that only individuals 20 years or older are allowed to consume alcoholic beverages (beer is an alcoholic beverage, coke {coca cola) is not). Assume that you are a state liquor inspector whose task is to ensure that the drinking age rule is not being violated. List the individuals below for whom you want to get additional information (i.e., turn over the card to see what is on the other side) to make sure that the four individuals below are following the rule.



12. Imagine that you are the owner of a small business that manufactures a speciality item. You have discovered that your business if more efficient and profitable if you have employees working on the machines during weekends as well as on weekdays. Unfortunately, your employees do not like to work on weekends because it deprives them of quality time with their families. To entice some workers to work on weekends you have established the following policy or rule:

If an employee works on the weekend, then that person gets an extra week of paid vacation.

You have heard rumors that some of your employees have been taking the extra week of paid vacation without actually working on weekends. You decide to see if the rule holds or is being violated on a sample of four employees. Each box below represents a card with information about each of these four employees. On one side of each card is the information of whether they have worked on weekends or not. On the other side of each card is the information about whether they took the extra week of vacation or not. To see if the rule is being maintained with these four workers, list those cards you would need to turn over. List only those cards that you need to see if the policy or rule is satisfied with these four employees.

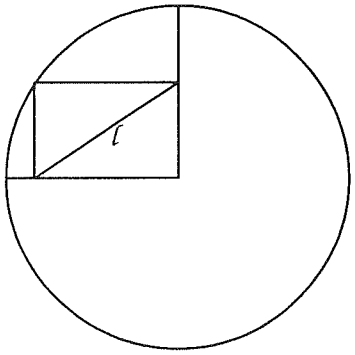


13.. In his classic monograph *On Problem Solving* {originally published in German in 1935), Karl Duncker wrote:

> On a mountain trip, on which descent was by the same path as had been the ascent of the previous day, I asked myself whether there must be a spot en route at which I must find myself at exactly the same time on the descent as on the ascent. It was of course assumed that ascent and descent took place at about the same time of day, say from five to twelve o'clock.

How would you answer Duncker's question? How sure are you that your answer is correct?

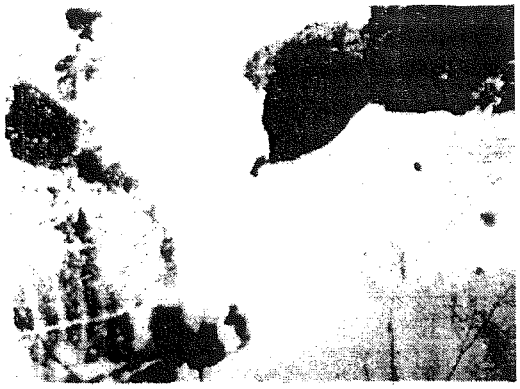
14.. Consider a situation in elementary geometry. There is a circle with the radius r, and in this circle I construct a rectangle. [See the diagram at the right]. The problem is the following.: If I now draw the line ℓ within the rectangle, what is the length of this line? For simplicity, assume that the radius is one inch long.



15.. The psychologist Max Wertheimer related this story in his book *Productive Thinking* [1945]:

> Two boys were playing badminton in the garden. I could hear as well as see them from my window, although they did not see me. One boy was twelve, the other ten years old. They played several sets. The younger boy was by far poorer; he was being beaten in all the games.
> I heard some of their conversation. The loser--let us call him *B*-- became more and more unhappy. He had no chance. *A* often served him so cleverly that he could not possibly return the bird. The situation grew worse. Finally *B* threw down his racket, sat on a tree trunk, and said, "I won't play anymore." *A* tried to persuade him to continue. No answer from *B*. *A* sat down beside him. Both looked unhappy.
> I interrupt the story here to put a question to the reader: "What do you suggest? What would you do if you were the older boy? Do you have a productive proposal.?"

16.. The figure on page 5 is another of the imaginative drawings in Roger Shepard's book *Mindsights*. The two demons are exactly the same size. You might want to verify this by measuring them. Can you explain why they appear to be so different in size? Again, what does this tell us about cognition?



17. **WHAT IS THIS?** Can you recognize the object in the photo on the left? Once you do recognize the object depicted in these photos, you will no longer be able to return to your original state of confusion when looking at this picture. How come? [Hint: relate this to THE CAT pointer].