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Acquisition of Personal Knowledge[1]

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Expert systems are increasingly relying on an explicit knowledge base in which the "meaning" of the stored information must be machine manipulable. This paper presents a method for accessing variables (constructs) which a person is using to categorize conceptional entities, and two interactive computer programs for eliciting these from a human user. The elicitation may commence from an empty knowledge base (PEGASUS), or be directed through an expert's knowledge base (PEGASUS-BANK). The foundations of the methodology used in these programs are based on Kelly's model of man acting as a personal scientist in the world. The interactive algorithms direct the elicitation of the knowledge base through continuous on-line analysis of the data structures already entered. A detailed example is given of the use of the PEGASUS-BANK program in a medical context,

KEY WORDS: Knowledge base; personal knowledge; personal constructs; personal scientist; Kelly; repertory grid; PEGASUS; PEGASUS-BANK.

1. INTRODUCTION

Education in many professional subjects still contains a major component of learning through observation of, and interaction with, a skilled *expert* rather than assimilation of already codified material. Each student has to build up his own *knowledge base* by relating concepts and terminology to the exemplars to which they are applied. He has to learn to classify his experience within a framework that has become conventional for the profession but does not necessarily have any intensional form that is explicitly expressed Somehow his *personal knowledge* has to be brought into alignment with the schema already developed by experts in his subject area. ...

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For many years psychologists have been interested in how a person classifies his experiences and categorizes his environment. The concept of "schema" has ranged widely from that of Kant[1] to that of Bartlett,[2] from that of Head[3] to that of Vernon,[4] Bruner, Goodnow, and Austin,[5] and Skemp.[6] The commonality in these approaches suggests that an individual uses a system of organization together with interrelationships between components in the system, which interacting with the structure produce interdependencies. If the person can become aware of the structure and the organization within the structure he becomes more able to make adequate predictions and act according to them. Osgood, Suci, and Tannenbaum[7] suggested that each person has a unique system of dimensions which are used to perceive and judge the environment, and that some of these are common to all people. Kelly[8] argues that each person constructs his own version of reality using a hierarchical system or network of personal constructs. His theory was about personality, how each person constructed his view of reality and lived within it. In the context of a person learning from experience it is a theory about the way in which he can negotiate a viable position in his own reality, review it, revise it, and refine it within his own world. Enduring reality is nonconscious, and consciousness is merely a temporary construction within a specific situation.

Kelly saw each human being as a personal scientist, classifying, categorizing, and theorizing about his world, anticipating on the basis of his theories, and acting on the basis of his anticipation.

> Might not the individual man, each in his own personal way, assume more of the stature of a scientist, ever seeking to predict and control the course of events with which he is involved? Would he not have his theories, test his hypotheses, and weigh his experimental evidence? And, if so, might not the differences between the personal viewpoints of different men correspond to the differences between the theoretical points of view of different scientists? (Kelly, p. 5.[8])

Conversation between people may help in exploring individual personal problems, or in negotiating among the individual personal meaning systems brought to bear by work groups on common problems. The emphasis is on the individual as a person, as a personal scientist, who remains as such whatever activity he happens to be engaged in. Psychology offers a variety of conversational methods from the interview to introspection, but within personal construct theory the technique of the repertory grid exhibits a "scientific" tool with which to structure a conversation. Kelly used this method to augment his theory of personality, suggesting that each person has a unique system of personal constructs through which he

experiences life, and categorizes and makes use of his experiences. He explains how similar events can produce quite different behavior in different people, the system of constructs acting like a pair of spectacles, focusing and coloring his external and internal worlds (see the work of Kelly[9]).

To give an example, the personal observations or *elements* might be school subjects, and the *constructs* are variables which a person is using to characterize the school subjects. The constructs are elicited by grouping triads of elements into a pair of elements which are similar and a singleton which is different from the pair in the same context. So, in considering the triad Mathematics, English Literature, and Art, different people might produce different constructs such as:

Jane: "Mathematics and English Literature are alike because they are about a body of knowledge, and Art is about self-expression."
Philip: "English Literature and Art are alike because they are about life, and Mathematics is abstract."
John: "Mathematics and Art are alike because they are communication by symbols and forms, whereas English Literature is communication by words."
Mary: "Mathematics and English Literature are alike because they are useful in life, but Art is a waste of time,"
Lynn: "Mathematics and Art are fun and easy, but English Literature is about writing essays which I don't like."

Clearly each person has a different opinion and a different value system. Each of these dimensions is a personal construct because it is expressed in personally meaningful terms, and is significant to the person who used it. As each construct is elicited all the elements are assigned to one pole or the other.

For example, consider Jane's construct "body of knowledge—self-expression." Her initial statement allocates the three elements of the triad to this construct in the following manner:

Pole 1—body of knowledge	
Mathematics	1
English Literature	1
Art	2
Pole 2—self expression	

where 1 means assigned to the first pole and 2 means assigned to the second pole. She might then go on to assign the remaining elements to give the following pattern:

Pole 1—body of knowledge	
Mathematics	1
English Literature	1
Science	1
History	1
Art	2
Music	2
Drama	2
Pole 2—self expression	

This assignment of elements to a construct is based on a binary judgment which requires each element to be assigned to one pole or the other. In practice some form of rating scale seems to fit subjective judgments better so that the {1, 2} pair might be replaced by the five-point scale {1, 2, 3, 4, 5} enabling a finer graduation between poles of the construct and also a "neutral" assignment at the centre of the scale. The detailed example of actual grid elicitation in the Appendix uses such a five-point scale.

2. PEGASUS

PEGASUS is a computer program for interactively eliciting construct structures that gives the user great flexibility in analyzing and modifying the structure as it is being elicited (see the work of Shaw[10]). This is done by the provision of continual real-time feedback commentary on highly related elements or constructs, together with the encouragement to differentiate between them. Before choosing his elements the user is asked to think about his purpose for eliciting the grid. This is of great importance for the interaction which is to follow, as it sets both the intentionalities and the universe of discourse. Constructs are then elicited using the triadic method.

One important feature of PEGASUS is that when a construct has been elicited it is immediately matched against constructs previously elicited using a distance measure between the vectors of ratings of elements on constructs (see the work of Shaw, Chap. 4[10]). If a high match is found, the user is informed, and invited either to differentiate between the two by adding a new element, or to delete one of the constructs if he feels them to be representing the same ideas, or to combine the two constructs into one new one. If he wishes he may ignore these options and just carry on with the elicitation. Similarly element match values are calculated and equivalent options given. Options are also given to redefine the purpose, to change the level of match on which feedback commentary is given, and to delete any element or construct which is felt to be unsatisfactory. Also the user is given

the freedom to add an element or to add a construct without using a triad if he so wishes.

When the grid reaches the maximum size allowed, or if the user chooses to finish before that, the results are analyzed using the FOCUS procedure. This is a two-way hierarchical cluster analytic technique which systematically reorders the rows of constructs and columns of elements to produce a focused grid which shows the least variation between adjacent constructs and the adjacent elements. The printout shows the element and construct matching scores matrices, and the trees of the elements and constructs as well as the focused grid with the element and construct labels.

As a PEGASUS elicitation proceeds this FOCUS algorithm is used to offer the user a possible explanation and interpretation of his meaning system in the terms of the similar patterns he uses in supposedly different circumstances. Cross-references are mapped across the grid and exhibited to the user in such a way as to offer him the facility to reconsider and change anything he feels to be inappropriate, which enables him to be more aware of the links he is implicitly holding in his cognitive model. Here the conversation can be seen as a feedback loop with the computer acting as the error regulator by representing the content of the conversation and the implicit links within the conversation. In this way the participative analysis extracts and displays the essence of the subjectivity and personally meaningful relationships in the grid.

3. PEGASUS-BANK

PEGASUS-BANK is an addition to the PEGASUS program. This program provides an interface with an area construed by an "expert." The expert first elicits a grid using the PEGASUS program, and the results are stored in the computer as a bank to be accessed by another person. This bank then represents an expert view of an area of public knowledge. As the nonexpert elicits his own grid, using a subset of the set of elements used by the expert, comparison is made both with his own constructs and between his constructs and those already in the bank, high similarities provoking comment. As the processing takes place, continual comparison with the bank gives feedback to the user on the extent to which his constructs map on to the expert's construing of the same elements. Since the comparison is made in terms of how the construct orders the elements rather than in terms of the verbal labels, it is often found that although a person may have only a vague idea of the technical terms, he may actually be using very similar constructs. An example of a complete run is given in the Appendix. This is an expert grid on mental handicap, using as elements particular instances which the nonexpert will recognize but of which he may have limited knowledge.

Parts of the run have been marked A, B, C, . . . and as such are referred to here. Initially instructions are given, and the user is asked to specify his purpose (A). He is then invited to select a subset of the expert's elements to use in his own grid (B). Constructs are elicited from either random or chosen triads (C), the pole names are entered (D), and a rating is given to each element on a 1–5 scale (E). The elements are then grouped on this dimension, and options given to change the ratings on ones which now seem incorrect (F), and to change the pole names (G).

In the PEGASUS-BANK version no element matching is calculated, since any high matches may be implicit in the expert grid. Also, if constructs are highly matched, it would be inappropriate to add an element as it may be one which is not present in the bank. However, if the user-introduced constructs match, options are given (I, K, L). The user is not allowed to delete a bank construct (J). At various points the user is given the opportunity to redefine his purpose (H), and finally to see his grid focused with that of the expert. A choice of printout is given (M).

To discover how the nonexpert's constructs relate to those of the expert, the construct tree (N) is determined, which shows the integration of the construct clusters. For example, cluster 15 contains constructs 4 and 11, 4 being from the expert (in a circle), and 11 from the nonexpert. Cluster 16 contains two constructs from the expert, and cluster 17 two constructs from the nonexpert. However, the two main clusters 25 and 26 are both mixed and show a high level of commonality of construing (P).

4. CONCLUSION

The PEGASUS-BANK technique provides a sound basis for assessment and a useful starting point for training. If a technical group wishes to recruit new members, this method could be used as an induction into the terminology as used by the group. Further, it could be used to pass on nonverbal experience gathered by an expert especially in areas of subjective judgment, "feeling right," and judging atmosphere. The major difference between the expert and the beginner is in the perception of the situation, and the way the incoming information is chunked. Using PEGASUS-BANK, the acquisition of experience can be vastly accelerated.

Interactive grid elicitation in PEGASUS is more than just a convenient implementation of Kelly's technique. Having watched many people use the PEGASUS suit of programs for a variety of problems it is noticeable that certain crucial psychological factors are in operation that distinguish the man-computer interaction from the normal subject-experimenter situation. For most people it is an absorbing and awareness-raising experience. The individual sees his cognitive model from a new perspective, and is able to review it and amend it in order to increase his effectiveness in action.

However, the use of a computer rather than a human psychologist enables the "interview" and its results to be clearly seen as private to the user. Thus the individual is able to have an overview of his modeling system in such a way as to allow him to operate with it in a nonthreatening manner. PEGASUS-BANK offers a technique which can transform public knowledge into personal understanding.

> Tearing away the paper screen of graphs, equations and computations, I have tried to lay bare the inarticulate manifestations of intelligence by which we know things in a purely personal manner. (Polanyi, p. 64.[11])

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APPENDIX

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                    PEGASUS II
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                  ************

PROGRAM ELICITS GRID AND SORTS USING SIMILARITIES
SEPTEMBER 1978. UPDATED VERSION OF PEGASUS 1976.
WRITTEN BY MILDRED L.G. SHAW
MIDDLESEX POLYTECHNIC
TRENT PARK
COCKFOSTERS ROAD
BARNET
HERTS EN4 OPT


THIS IS A PROGRAM TO ELICIT A KELLY REPERTORY GRID.
PLEASE READ CAREFULLY EVERYTHING THAT IS PRINTED AND
MAKE SURE YOU UNDERSTAND WHAT YOU HAVE TO DO.
A REPERTORY GRID IS A TECHNIQUE DEVISED BY KELLY TO
HELP YOU EXPLORE THE DIMENSIONS OF YOUR THINKING.


YOU MUST DECIDE ON A PURPOSE FOR DOING THE GRID AND
KEEP THIS IN MIND WHEN YOU CHOOSE THE ELEMENTS--THE
THINGS YOU ARE GOING TO THINK ABOUT DURING THE PROGRAM.
THESE ELEMENTS WILL THEN BE USED TO ELICIT CONSTRUCTS.


YOU ARE LIMITED TO 25 LETTERS AND SPACES FOR YOUR ELEMENT
AND CONSTRUCT NAMES.
IF YOU MAKE A TYPING ERROR PRESS THE DELETE (OR RUBOUT) KEY AS MANY
TIMES AS YOU WANT TO ERASE A CHARACTER THEN CARRY ON.
THROUGHOUT THIS PROGRAM THE QUESTION WILL BE ASKED --
DO YOU NEED HELP. EACH TIME JUST TYPE  YES IF YOU DO AND
PRESS THE RETURN KEY
BEFORE YOU START THIS GRID WHAT IS YOUR NAME OR IDENTIFICATION


 ?LYNN

THIS PROGRAM INCORPORATES FOUR VERSIONS OF PEGASUS.
 1. A PEGASUS GRID ELICITATION STARTING A NEW GRID;
 2. A STRAIGHT KELLY REPERTORY GRID ELICITATION
    WITHOUT COMMENTARY (MIN-PEG);
 3. A PEGASUS GRID ELICITATION USING A STORED BANK
    OF CONSTRUCTS (PEG-BANK);
 4. A PEGASUS GRID ELICITATION WITH PART ALREADY
    ELICITED BY YOU RECENTLY (PRE-PEG).
WHAT IS THE NUMBER OF THE VERSION YOU WISH TO USE ?3


WHAT IS YOUR FILE NAME ?XMH
TYPE IN ON ONE LINE YOUR PURPOSE FOR DOING THIS GRID


 ?TO CONVERSE WITH THE EXPERT
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A


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THERE ARE 8 CONSTRUCTS ALREADY IN THIS GRID

AFTER EACH OF THE ELEMENTS USED IN THE GRID
TYPE YES (OR Y) IF YOU WANT TO INCLUDE IT

ELEMENT 1 CRETINISM
 ?Y
ELEMENT 2 PHENYLKETONURIA
 ?Y
ELEMENT 3 DOWN'S SYNDROME
 ?Y
ELEMENT 4 RUBELLA SYNDROME
 ?Y
ELEMENT 5 LESCH-NYHAN SYNDROME
 ?N
ELEMENT 5 HURLER'S SYNDROME
 ?N
ELEMENT 5 HUNTER'S SYNDROME
 ?Y
ELEMENT 6 CEREBRAL PALSY
 ?Y
ELEMENT 7 SPINA BIFIDA
 ?Y
ELEMENT 8 KLINEFELTER'S SYNDROME
 ?Y
ELEMENT 9 HYDROCEPHALUS
 ?Y
ELEMENT 10 TUBEROUS SCLEROSIS
 ?Y
ELEMENT 11 AUTISM
 ?Y
ELEMENT 12 TURNER'S SYNDROME
 ?N
ELEMENT 12 MICROCEPHALY
 ?Y
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B

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TRIAD FOR ELICITATION OF CONSTRUCT 9
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK
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C

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?10
10 TUBEROUS SCLEROSIS
?3
3 DOWN'S SYNDROME
?9
9 HYDROCEPHALUS

NAME THE PAIR

HELP ?YES

CAN YOU CHOOSE TWO OF THIS TRIAD OF ELEMENTS WHICH ARE IN
SOME WAY ALIKE AND DIFFERENT FROM THE OTHER ONE
TYPE IN THE NUMBERS OF THE PAIR ONE AFTER EACH QUESTION
MARK. DONT FORGET TO PRESS THE RETURN KEY AFTER EACH.

?9

?10
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C

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NAME THE POLES OF YOUR CONSTRUCT

HELP ?YES

NOW I WANT YOU TO THINK ABOUT WHAT YOU HAVE IN MIND WHEN YOU
SEPARATE THE PAIR FROM THE OTHER ONE.HOW CAN YOU DESCRIBE
THE TWO ENDS OR POLES OF THE SCALE WHICH DISCRIMINATE

HYDROCEPHALUS AND TUBEROUS SCLEROSIS FROM DOWN'S SYNDROME
JUST TYPE ONE OR TWO WORDS FOR EACH POLE TO REMIND YOU WHAT
YOU ARE THINKING OR FEELING WHEN YOU USE THIS CONSTRUCT.

LEFT POLE RATED 1 -- ?NON-GENETIC ROOT
RIGHT POLE RATED 5 -- ?GENETIC ROOT

TYPE IN THE RATINGS

HELP ?YES
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D

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NOW IF HYDROCEPHALUS AND TUBEROUS SCLEROSIS ARE
ASSIGNED THE VALUE 1 AND DOWN'S SYNDROME IS
ASSIGNED THE VALUE  5

ACCORDING TO HOW YOU FEEL ABOUT THEM PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5

9 HYDROCEPHALUS            1
10 TUBEROUS SCLEROSIS      1
3 DOWN'S SYNDROME          5
1 CRETINISM   ?3
2 PHENYLKETONURIA          ?1
4 RUBELLA SYNDROME         ?1
5 HUNTER'S SYNDROME        ?1
6 CEREBRAL PALSY           ?1
7 SPINA BIFIDA             ?1
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E


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8 KLINEFELTER'S SYNDROME   ?5
11 AUTISM     ?3
12 MICROCEPHALY            ?1
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E

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POLE 1 --NON-GENETIC ROOT

 2 PHENYLKETONURIA         1
 4 RUBELLA SYNDROME        1
 5 HUNTER'S SYNDROME       1
 6 CEREBRAL PALSY          1
 7 SPINA BIFIDA            1
 9 HYDROCEPHALUS           1
10 TUBEROUS SCLEROSIS      1
12 MICROCEPHALY            1

1 CRETINISM   3
11 AUTISM     3

3 DOWN'S SYNDROME          5
8 KLINEFELTER'S SYNDROME   5

POLE 5 --GENETIC ROOT

DO YOU WANT TO CHANGE ANY OF THESE VALUES ?YES
HELP ?YES

IF YOU HAVE CHANGED YOUR MIND ABOUT ANY OF THESE VALUES
INCLUDING THE ELEMENTS YOU HAD IN THE TRIAD
TYPE IN HOW MANY YOU WANT TO ALTER WHEN YOU ARE ASKED.
THEN TYPE THE NUMBER OF THE FIRST ELEMENT AND PRESS THE RETURN KEY.
ON THE NEXT LINE TYPE IN THE VALUE YOU WANT IT TO HAVE
AND CONTINUE UNTIL YOU HAVE DONE THEM ALL.
DONT FORGET RETURN AT THE END OF EACH LINE.

HOW MANY ?4
ELEMENT NUMBER ?2
NEW RATING FOR PHENYLKETONURIA ?5
ELEMENT NUMBER ?5
NEW RATING FOR HUNTER'S SYNDROME ?5
ELEMENT NUMBER ?10
NEW RATING FOR TUBEROUS SCLEROSIS ?5
ELEMENT NUMBER ?1
NEW RATING FOR CRETINISM ?5
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F

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POLE 1 --NON-GENETIC ROOT

 4 RUBELLA SYNDROME        1
 6 CEREBRAL PALSY          1
 7 SPINA BIFIDA            1
 9 HYDROCEPHALUS           1
12 MICROCEPHALY            1

11 AUTISM     3
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 1 CRETINISM   5
 2 PHENYLKETONURIA          5
 3 DOWN'S SYNDROME          5
 5 HUNTER'S SYNDROME        5
 8 KLINEFELTER'S SYNDROME   5
 10 TUBEROUS SCLEROSIS      5

POLE 5 --GENETIC ROOT

DO YOU WANT TO CHANGE ANY OF THESE VALUES ?NO

DO YOU WANT TO CHANGE THE POLE NAMES ?YES
LEFT POLE RATED 1 -- ?GENETIC ROOT NOT FOUND
RIGHT POLE RATED 5 -- ?GENETIC ROOT FOUND

DO YOU WANT TO FINISH NOW ?NO

TRIAD FOR ELICITATION OF CONSTRUCT 10
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK

 ?11
 11 AUTISM
 ?12
 12 MICROCEPHALY
 ?9
 9 HYDROCEPHALUS

 NAME THE PAIR

 HELP ?N

 ?9

 ?12

 NAME THE POLES OF YOUR CONSTRUCT

 HELP ?

 LEFT POLE RATED 1 -- ?DEFINED PHYSICAL APPEARANCE
 RIGHT POLE RATED 5 -- ?LESS OBVIOUS PHYSICAL APPEARANCE

 YOUR POLE NAME IS TOO LONG PLEASE USE A SHORTER ONE
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G


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 RIGHT POLE RATED 5 -- ?LESS OBVIOUS PHYS. APPEAR.

 TYPE IN THE RATINGS

 HELP ?

  9 HYDROCEPHALUS            1
  12 MICROCEPHALY            1
  11 AUTISM     5
  1 CRETINISM   ?1
  2 PHENYLKETONURIA          ?4
  3 DOWN'S SYNDROME          ?1
  4 RUBELLA SYNDROME         ?3
  5 HUNTER'S SYNDROME        ?2
  6 CEREBRAL PALSY           ?3
  7 SPINA BIFIDA             ?1
  8 KLINEFELTER'S SYNDROME   ?1
  10 TUBEROUS SCLEROSIS      ?3


 POLE 1 --DEFINED PHYSICAL APPEARANCE

  1 CRETINISM   1
  3 DOWN'S SYNDROME          1
  7 SPINA BIFIDA             1
  8 KLINEFELTER'S SYNDROME   1
  9 HYDROCEPHALUS            1
  12 MICROCEPHALY            1

  5 HUNTER'S SYNDROME        2

  4 RUBELLA SYNDROME         3
  6 CEREBRAL PALSY           3
  10 TUBEROUS SCLEROSIS      3

  2 PHENYLKETONURIA          4

  11 AUTISM     5

 POLE 5 --LESS OBVIOUS PHYS. APPEAR.


 DO YOU WANT TO CHANGE ANY OF THESE VALUES ?N

 DO YOU WANT TO CHANGE THE POLE NAMES ?N
 DO YOU WANT TO FINISH NOW ?N
 IS YOUR REASON FOR DOING THIS GRID STILL

 TO CONVERSE WITH THE EXPERT
  ?YES

 TRIAD FOR ELICITATION OF CONSTRUCT 11
 WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
  1 CRETINISM
  2 PHENYLKETONURIA
  3 DOWN'S SYNDROME
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H

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 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK
 ?2
 2 PHENYLKETONURIA
 ?4
 4 RUBELLA SYNDROME
 ?11
 11 AUTISM
NAME THE PAIR
HELP ?
 ?4
 ?2
NAME THE POLES OF YOUR CONSTRUCT
HELP ?
LEFT POLE RATED 1 -- ?FIND AT OR SOON AFTER BIRTH
RIGHT POLE RATED 5 -- ?APPEAR LATER

TYPE IN THE RATINGS
HELP ?
  4 RUBELLA SYNDROME          1
  2 PHENYLKETONURIA           1
  11 AUTISM     5
  1 CRETINISM   ?3
  3 DOWN'S SYNDROME           ?1
  5 HUNTER'S SYNDROME         ?5
  6 CEREBRAL PALSY            ?3
  7 SPINA BIFIDA              ?1
  8 KLINEFELTER'S SYNDROME    ?2
  9 HYDROCEPHALUS             ?1
  10 TUBEROUS SCLEROSIS       ?3
  12 MICROCEPHALY             ?1

POLE 1 --FIND AT OR SOON AFTER BIRTH

  2 PHENYLKETONURIA           1
  3 DOWN'S SYNDROME           1
  4 RUBELLA SYNDROME          1
  7 SPINA BIFIDA              1
  9 HYDROCEPHALUS             1
  12 MICROCEPHALY             1

  8 KLINEFELTER'S SYNDROME    2

  1 CRETINISM   3
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  6 CEREBRAL PALSY            3
  10 TUBEROUS SCLEROSIS       3


  5 HUNTER'S SYNDROME         5
  11 AUTISM     5

POLE 5 --APPEAR LATER


DO YOU WANT TO CHANGE ANY OF THESE VALUES ?Y
HELP ?
HOW MANY ?4
ELEMENT NUMBER ?1
NEW RATING FOR CRETINISM ?2
ELEMENT NUMBER ?5
NEW RATING FOR HUNTER'S SYNDROME ?2
ELEMENT NUMBER ?6
NEW RATING FOR CEREBRAL PALSY ?4
ELEMENT NUMBER ?10
NEW RATING FOR TUBEROUS SCLEROSIS ?2


POLE 1 --FIND AT OR SOON AFTER BIRTH

  2 PHENYLKETONURIA           1
  3 DOWN'S SYNDROME           1
  4 RUBELLA SYNDROME          1
  7 SPINA BIFIDA              1
  9 HYDROCEPHALUS             1
  12 MICROCEPHALY             1

  1 CRETINISM   2
  5 HUNTER'S SYNDROME         2
  8 KLINEFELTER'S SYNDROME    2
  10 TUBEROUS SCLEROSIS       2


  6 CEREBRAL PALSY            4

  11 AUTISM     5

POLE 5 --APPEAR LATER


 DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

 DO YOU WANT TO CHANGE THE POLE NAMES ?

THE TWO CONSTRUCTS YOU CALLED
 10 LESS OBVIOUS PHYS. APPEAR.--DEFINED PHYSICAL APPEARANCE
 11 APPEAR LATER--FIND AT OR SOON AFTER BIRTH
ARE MATCHED AT THE  62 PERCENT LEVEL.
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
LESS OBVIOUS PHYS. APPEAR. YOU ARE ALSO SAYING
APPEAR LATER
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AND MOST OF THE TIME YOU ARE SAYING
DEFINED PHYSICAL APPEARANCE YOU ARE ALSO SAYING
FIND AT OR SOON AFTER BIRTH


WOULD YOU LIKE TO:
(1)DELETE A CONSTRUCT
(2)REPLACE THE TWO CONSTRUCTS BY ONE
(3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


 ?3
DO YOU WANT TO FINISH NOW ?N


TRIAD FOR ELICITATION OF CONSTRUCT 12
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK
 ?2
 2 PHENYLKETONURIA
 ?3
 3 DOWN'S SYNDROME
 ?8
 8 KLINEFELTER'S SYNDROME
NAME THE PAIR
HELP ?
 ?3
 ?8
NAME THE POLES OF YOUR CONSTRUCT
HELP ?
LEFT POLE RATED 1 -- ?TREATMENT LESS EFFECTIVE
RIGHT POLE RATED 5 -- ?TREATMENT MORE EFFECTIVE
TYPE IN THE RATINGS
HELP ?


 3 DOWN'S SYNDROME          1
 8 KLINEFELTER'S SYNDROME   1
 2 PHENYLKETONURIA          5
 1 CRETINISM   ?4
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 4 RUBELLA SYNDROME         ?2
 5 HUNTER'S SYNDROME        ?3
 6 CEREBRAL PALSY           ?3
 7 SPINA BIFIDA             ?4
 9 HYDROCEPHALUS            ?4
 10 TUBEROUS SCLEROSIS      ?1
 11 AUTISM     ?5
 12 MICROCEPHALY            ?1

POLE 1 --TREATMENT LESS EFFECTIVE

 3 DOWN'S SYNDROME          1
 8 KLINEFELTER'S SYNDROME   1
 10 TUBEROUS SCLEROSIS      1
 12 MICROCEPHALY            1

 4 RUBELLA SYNDROME         2

 5 HUNTER'S SYNDROME        3
 6 CEREBRAL PALSY           3

 1 CRETINISM   4
 7 SPINA BIFIDA             4
 9 HYDROCEPHALUS            4

 2 PHENYLKETONURIA          5
 11 AUTISM     5

POLE 5 --TREATMENT MORE EFFECTIVE


DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

DO YOU WANT TO CHANGE THE POLE NAMES ?


THE TWO CONSTRUCTS YOU CALLED
 4 AMENABLE TO MEDICAL TREATMENT--NO KNOWN MEDICAL TREATMENT
 12 TREATMENT MORE EFFECTIVE--TREATMENT LESS EFFECTIVE
ARE MATCHED AT THE  70 PERCENT LEVEL.
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
AMENABLE TO MEDICAL TREATMENT YOU ARE ALSO SAYING
TREATMENT MORE EFFECTIVE
AND MOST OF THE TIME YOU ARE SAYING
NO KNOWN MEDICAL TREATMENT YOU ARE ALSO SAYING
TREATMENT LESS EFFECTIVE


WOULD YOU LIKE TO:
(1)DELETE A CONSTRUCT
(2)REPLACE THE TWO CONSTRUCTS BY ONE
(3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


 ?1
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WHAT IS THE NUMBER OF THE CONSTRUCT ?4
YOU MAY ONLY DELETE YOUR OWN CONSTRUCTS
DO YOU WANT TO DELETE A CONSTRUCT ?NO

DO YOU WANT TO FINISH NOW ?NO

TRIAD FOR ELICITATION OF CONSTRUCT 13
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK
 ?4
 4 RUBELLA SYNDROME
 ?8
 8 KLINEFELTER'S SYNDROME
 ?9
 9 HYDROCEPHALUS
NAME THE PAIR
HELP ?
 ?9

 ?4
NAME THE POLES OF YOUR CONSTRUCT
HELP ?
LEFT POLE RATED 1 -- ?PRE-NAT. DEVEL. ABNORMAL
RIGHT POLE RATED 5 -- ?GENETIC

TYPE IN THE RATINGS

HELP ?

 9 HYDROCEPHALUS          1
 4 RUBELLA SYNDROME       1
 8 KLINEFELTER'S SYNDROME 5
 1 CRETINISM   ?5
 2 PHENYLKETONURIA        ?5
 3 DOWN'S SYNDROME        ?5
 5 HUNTER'S SYNDROME      ?5
 6 CEREBRAL PALSY         ?1
 7 SPINA BIFIDA           ?1
 10 TUBEROUS SCLEROSIS    ?5
 11 AUTISM     ?5
 12 MICROCEPHALY          ?1
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POLE 1 --PRE-NAT. DEVEL. ABNORMAL

 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 7 SPINA BIFIDA              1
 9 HYDROCEPHALUS             1
 12 MICROCEPHALY             1


 1 CRETINISM   5
 2 PHENYLKETONURIA           5
 3 DOWN'S SYNDROME           5
 5 HUNTER'S SYNDROME         5
 8 KLINEFELTER'S SYNDROME    5
 10 TUBEROUS SCLEROSIS       5
 11 AUTISM     5

POLE 5 --GENETIC
DO YOU WANT TO CHANGE ANY OF THESE VALUES ?Y
HELP ?1\1\N
HOW MANY ?1
ELEMENT NUMBER ?11
NEW RATING FOR AUTISM ?3
POLE 1 --PRE-NAT. DEVEL. ABNORMAL

 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 7 SPINA BIFIDA              1
 9 HYDROCEPHALUS             1
 12 MICROCEPHALY             1


 11 AUTISM     3


 1 CRETINISM   5
 2 PHENYLKETONURIA           5
 3 DOWN'S SYNDROME           5
 5 HUNTER'S SYNDROME         5
 8 KLINEFELTER'S SYNDROME    5
 10 TUBEROUS SCLEROSIS       5

POLE 5 --GENETIC

DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

DO YOU WANT TO CHANGE THE POLE NAMES ?

THE TWO CONSTRUCTS YOU CALLED
 9 GENETIC ROOT NOT FOUND--GENETIC ROOT FOUND
 13 PRE-NAT. DEVEL. ABNORMAL--GENETIC
ARE MATCHED AT THE  100 PERCENT LEVEL.
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
GENETIC ROOT NOT FOUND YOU ARE ALSO SAYING
PRE-NAT. DEVEL. ABNORMAL
AND MOST OF THE TIME YOU ARE SAYING
GENETIC ROOT FOUND YOU ARE ALSO SAYING
GENETIC
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WOULD YOU LIKE TO:
(1)DELETE A CONSTRUCT
(2)REPLACE THE TWO CONSTRUCTS BY ONE
(3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE
 ?1
WHAT IS THE NUMBER OF THE CONSTRUCT ?13
CONSTRUCT 13 PRE-NAT. DEVEL. ABNORMAL---GENETIC DELETED

DO YOU WANT TO FINISH NOW ?N
TRIAD FOR ELICITATION OF CONSTRUCT 13
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK
 ?4
 4 RUBELLA SYNDROME
 ?6
 6 CEREBRAL PALSY
 ?11
 11 AUTISM
NAME THE PAIR
HELP ?
 ?4

 ?6
NAME THE POLES OF YOUR CONSTRUCT
HELP ?
LEFT POLE RATED 1 -- ?PHYS. DISABLE. USUAL. GROSS
RIGHT POLE RATED 5 -- ?PHYS. DISABLE. LESS
TYPE IN THE RATINGS
HELP ?
 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 11 AUTISM     5
 1 CRETINISM   ?4
 2 PHENYLKETONURIA           ?5
 3 DOWN'S SYNDROME           ?3
 5 HUNTER'S SYNDROME         ?3
 7 SPINA BIFIDA              ?1
 8 KLINEFELTER'S SYNDROME    ?5
 9 HYDROCEPHALUS             ?2
 10 TUBEROUS SCLEROSIS       ?4
 12 MICROCEPHALY             ?1
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POLE 1 --PHYS. DISABLE. USUAL. GROSS

 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 7 SPINA BIFIDA              1
 12 MICROCEPHALY             1

 9 HYDROCEPHALUS             2

 3 DOWN'S SYNDROME           3
 5 HUNTER'S SYNDROME         3

 1 CRETINISM   4
 10 TUBEROUS SCLEROSIS       4

 2 PHENYLKETONURIA           5
 8 KLINEFELTER'S SYNDROME    5
 11 AUTISM     5

POLE 5 --PHYS. DISABLE. LESS


DO YOU WANT TO CHANGE ANY OF THESE VALUES ?N

DO YOU WANT TO CHANGE THE POLE NAMES ?N

THE TWO CONSTRUCTS YOU CALLED
 9 GENETIC ROOT NOT FOUND--GENETIC ROOT FOUND
 13 PHYS. DISABLE. USUAL. GROSS--PHYS. DISABLE. LESS
ARE MATCHED AT THE  62 PERCENT LEVEL.
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
GENETIC ROOT NOT FOUND YOU ARE ALSO SAYING
PHYS. DISABLE. USUAL. GROSS
AND MOST OF THE TIME YOU ARE SAYING
GENETIC ROOT FOUND YOU ARE ALSO SAYING
PHYS. DISABLE. LESS

WOULD YOU LIKE TO:
(1)DELETE A CONSTRUCT
(2)REPLACE THE TWO CONSTRUCTS BY ONE
(3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE

 ?3
DO YOU WANT TO FINISH NOW ?N


TRIAD FOR ELICITATION OF CONSTRUCT 14
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
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 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK

 ?11
 11 AUTISM
 ?5
 5 HUNTER'S SYNDROME
 ?3
 3 DOWN'S SYNDROME

NAME THE PAIR

HELP ?

 ?11

 ?3

NAME THE POLES OF YOUR CONSTRUCT

HELP ?

LEFT POLE RATED 1 -- ?KNOW ABOUT THIS
RIGHT POLE RATED 5 -- ?AM TOTALLY IGNORANT

TYPE IN THE RATINGS

HELP ?

 11 AUTISM      1
 3 DOWN'S SYNDROME          1
 5 HUNTER'S SYNDROME        5
 1 CRETINISM    ?3
 2 PHENYLKETONURIA          ?1
 4 RUBELLA SYNDROME         ?1
 6 CEREBRAL PALSY           ?1
 7 SPINA BIFIDA             ?1
 8 KLINEFELTER'S SYNDROME   ?1
 9 HYDROCEPHALUS            ?1
 10 TUBEROUS SCLEROSIS      ?3
 12 MICROCEPHALY            ?1

POLE 1 --KNOW ABOUT THIS

 2 PHENYLKETONURIA          1
 3 DOWN'S SYNDROME          1
 4 RUBELLA SYNDROME         1
 6 CEREBRAL PALSY           1
 7 SPINA BIFIDA             1
 8 KLINEFELTER'S SYNDROME   1
 9 HYDROCEPHALUS            1
 11 AUTISM      1
 12 MICROCEPHALY            1
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 1 CRETINISM    3
 10 TUBEROUS SCLEROSIS      3

 5 HUNTER'S SYNDROME        5

POLE 5 --AM TOTALLY IGNORANT


DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

DO YOU WANT TO CHANGE THE POLE NAMES ?
DO YOU WANT TO FINISH NOW ?

TRIAD FOR ELICITATION OF CONSTRUCT 15
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


 ?1
 1 CRETINISM
 ?7
 7 SPINA BIFIDA
 ?11
 11 AUTISM
NAME THE PAIR
HELP ?
 ?1

 ?7
NAME THE POLES OF YOUR CONSTRUCT
HELP ?
LEFT POLE RATED 1 -- ?CONGENITAL
RIGHT POLE RATED 5 -- ?POST NATAL DEV
TYPE IN THE RATINGS
HELP ?
 1 CRETINISM    1
 7 SPINA BIFIDA             1
 11 AUTISM      5
 2 PHENYLKETONURIA          ?1
 3 DOWN'S SYNDROME          ?1
 4 RUBELLA SYNDROME         ?1
 5 HUNTER'S SYNDROME        ?3
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 6 CEREBRAL PALSY            ?2
 8 KLINEFELTER'S SYNDROME    ?1
 9 HYDROCEPHALUS             ?1
 10 TUBEROUS SCLEROSIS       ?1
 12 MICROCEPHALY             ?1


POLE 1 --CONGENITAL

 1 CRETINISM   1
 2 PHENYLKETONURIA           1
 3 DOWN'S SYNDROME           1
 4 RUBELLA SYNDROME          1
 7 SPINA BIFIDA              1
 8 KLINEFELTER'S SYNDROME    1
 9 HYDROCEPHALUS             1
 10 TUBEROUS SCLEROSIS       1
 12 MICROCEPHALY             1

 6 CEREBRAL PALSY            2

 5 HUNTER'S SYNDROME         3


 11 AUTISM     5

POLE 5 --POST NATAL DEV

DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

DO YOU WANT TO CHANGE THE POLE NAMES ?

THE TWO CONSTRUCTS YOU CALLED
 11 APPEAR LATER--FIND AT OR SOON AFTER BIRTH
 15 POST NATAL DEV--CONGENITAL
ARE MATCHED AT THE  75 PERCENT LEVEL.
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
APPEAR LATER YOU ARE ALSO SAYING
POST NATAL DEV
AND MOST OF THE TIME YOU ARE SAYING
FIND AT OR SOON AFTER BIRTH YOU ARE ALSO SAYING
CONGENITAL

WOULD YOU LIKE TO:
(1)DELETE A CONSTRUCT
(2)REPLACE THE TWO CONSTRUCTS BY ONE
(3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE

 ?2
DELETE THE TWO CONSTRUCTS FIRST THEN ADD THE NEW ONE
AND RATE EACH ELEMENT IN TURN ON THE NEW CONSTRUCT.

WHAT IS THE NUMBER OF THE CONSTRUCT ?11
CONSTRUCT 11 APPEAR LATER---FIND AT OR SOON AFTER BIRTH DELETED
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WHAT IS THE NUMBER OF THE CONSTRUCT ?15
CONSTRUCT 15 POST NATAL DEV---CONGENITAL DELETED

DO YOU WANT TO DELETE A CONSTRUCT ?NO

NAME THE POLES OF YOUR CONSTRUCT
LEFT POLE RATED 1 -- ?POST NATAL DEV
RIGHT POLE RATED 5 -- ?FIND AT OR SOON AFTER BIRTH

TYPE IN THE RATINGS

 1 CRETINISM   ?1
 2 PHENYLKETONURIA           ?1
 3 DOWN'S SYNDROME           ?1
 4 RUBELLA SYNDROME          ?2
 5 HUNTER'S SYNDROME         ?1
 6 CEREBRAL PALSY            ?4
 7 SPINA BIFIDA              ?2
 8 KLINEFELTER'S SYNDROME    ?1
 9 HYDROCEPHALUS             ?2
 10 TUBEROUS SCLEROSIS       ?1
 11 AUTISM     ?4
 12 MICROCEPHALY             ?2

 POLE 1 --POST NATAL DEV

  1 CRETINISM   1
  2 PHENYLKETONURIA          1
  3 DOWN'S SYNDROME          1
  5 HUNTER'S SYNDROME        1
  8 KLINEFELTER'S SYNDROME   1
  10 TUBEROUS SCLEROSIS      1

  4 RUBELLA SYNDROME         2
  7 SPINA BIFIDA             2
  9 HYDROCEPHALUS            2
  12 MICROCEPHALY            2


  6 CEREBRAL PALSY           4
  11 AUTISM     4


 POLE 5 --FIND AT OR SOON AFTER BIRTH

 DO YOU WANT TO CHANGE ANY OF THESE VALUES ?Y
 HELP ?
 HOW MANY ?2
 ELEMENT NUMBER ?6
 NEW RATING FOR CEREBRAL PALSY ?5
 ELEMENT NUMBER ?11
 NEW RATING FOR AUTISM ?5

 POLE 1 --POST NATAL DEV

  1 CRETINISM   1
  2 PHENYLKETONURIA          1
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 3 DOWN'S SYNDROME            1
 5 HUNTER'S SYNDROME          1
 8 KLINEFELTER'S SYNDROME     1
 10 TUBEROUS SCLEROSIS        1

 4 RUBELLA SYNDROME           2
 7 SPINA BIFIDA               2
 9 HYDROCEPHALUS              2
 12 MICROCEPHALY              2


 6 CEREBRAL PALSY             5
 11 AUTISM     5

POLE 5 --FIND AT OR SOON AFTER BIRTH

DO YOU WANT TO CHANGE ANY OF THESE VALUES ?

DO YOU WANT TO CHANGE THE POLE NAMES ?
DO YOU WANT TO FINISH NOW ?YES
DO YOU WANT:
    1) A COMPLETE PRINTOUT OF THE ANALYSIS OF YOUR GRID
    2) ONLY THE RESULTS OF THE ANALYSIS
WHAT IS THE NUMBER OF YOUR CHOICE ?2

CONSTRUCT  1  REVERSED
CONSTRUCT  2  REVERSED
CONSTRUCT  6  REVERSED
CONSTRUCT  7  REVERSED
CONSTRUCT  13  REVERSED


TO DRAW THE CONSTRUCT TREE:          MATCH


JOIN 11 AND 4  INTO CLUSTER 15       70.83 %
JOIN 3  AND 5  INTO CLUSTER 16       66.67 %
JOIN 9  AND 12 INTO CLUSTER 17       62.5 %
JOIN 16 AND 15 INTO CLUSTER 18       58.33 %
JOIN 10 AND 14 INTO CLUSTER 19       50 %
JOIN 7  AND 13 INTO CLUSTER 20       45.83 %
JOIN 19 AND 6  INTO CLUSTER 21       45.83 %
JOIN 8  AND 17 INTO CLUSTER 22       41.67 %
JOIN 18 AND 20 INTO CLUSTER 23       41.67 %
JOIN 2  AND 22 INTO CLUSTER 24       41.67 %
JOIN 21 AND 24 INTO CLUSTER 25       37.5 %
JOIN 23 AND 1  INTO CLUSTER 26       33.33 %
JOIN 25 AND 26 INTO CLUSTER 27       29.17 %
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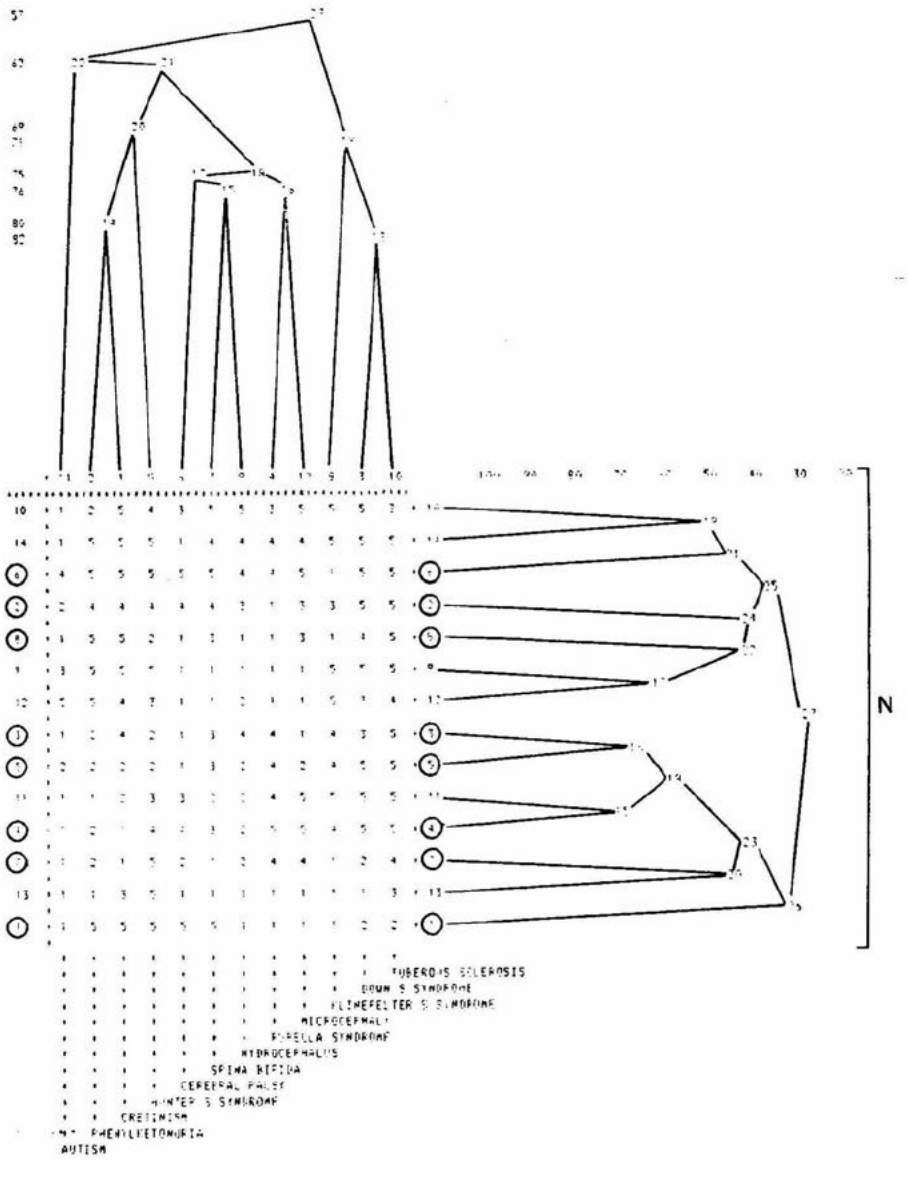

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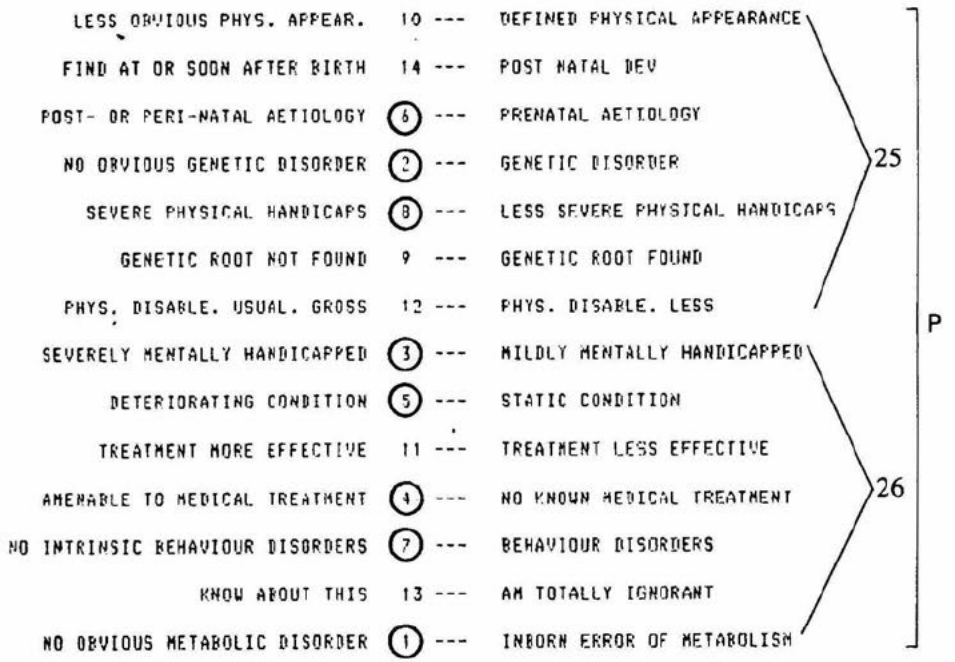


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TO DRAW THE ELEMENT TREE:                MATCH


JOIN 3  AND 10 INTO CLUSTER 13           82.14 %
JOIN 2  AND 1  INTO CLUSTER 14           80.36 %
JOIN 7  AND 9  INTO CLUSTER 15           76.79 %
JOIN 4  AND 12 INTO CLUSTER 16           76.79 %
JOIN 6  AND 15 INTO CLUSTER 17           75 %
JOIN 17 AND 16 INTO CLUSTER 18           75 %
JOIN 8  AND 13 INTO CLUSTER 19           71.43 %
JOIN 14 AND 5  INTO CLUSTER 20           69.64 %
JOIN 20 AND 18 INTO CLUSTER 21           62.5 %
JOIN 11 AND 21 INTO CLUSTER 22           62.5 %
JOIN 22 AND 19 INTO CLUSTER 23           57.14 %


THIS IS LYNN'S GRID
PURPOSE:  TO CONVERSE WITH THE EXPERT
DO YOU WANT YOUR GRID PUT ON FILE ?YES
YOUR FILE NAME IS  ZLYNN
(C)1978, MILDRED L.G. SHAW


TIME:  10.66 SECS.

READY
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