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TITLE: FIVE-LAYER INTELLECTUAL CUBE ✓
BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention is related to a five-layer intellectual cube, it is a square cube comprising six sides which each has twentyfive movable smaller blocks arranged horizontally and vertically and is provided with various colors or patterns, these smaller blocks can be rotated to change their orientations, so that each side of the
10 square cube can be varied in combination by colors or patterns, and this can arouse brains of people to get an intellectual enhancing effect, and can increase complexity of the intellectual square cube.

2. Description of the Prior Art

15 Human's brains and intellect continuously grow together with age, however, brains are subjected to dullness in case they are lack of training, therefore, there are a lot of intellectual toys or games in the markets for players to arouse their brains during playing, so that the
20 brains can be strengthened in company with continuous thinking.

Among the intellectual toys or games, in the early time, the widely prevailed three-layer intellectual cube (or so called magic cube) is a square cube having six
25 sides each composed of nine (3 x 3) movable smaller surfaces and has three layers both in vertical and in hori-

zontal directions, normally the six sides of the square
cube are applied each with a different color, i.e., the
nine smaller movable surfaces in each side are in one
color, when any layer is rotated to change their posi-
5 tions, the smaller movable surfaces in every side in this
layer are moved respectively to another side of different
color, therefore these sides have miscellaneous colors,
i.e., the six sides all change; when in playing, the way
of playing is to mix up the colors of the six sides of
10 the square cube, then to rotate all the layers to move
every group of smaller movable surfaces having the same
color to get in their proper side, until all the six si-
des of the square cube recover their own singular colors.

The above stated conventional three-layer intellectu-
15 al cube has its proper area and depth of thinking due to
the playing method of its game, and therefore provides an
important way of organization, thought and judgement, yet
it is not overly complicated, thereby it has been prevail-
-ed widely. However, the conventional three-layer intel-
20 lectual cube has been prevailed for a very long time and
has been well known, but it does not so prevail any more,
people playing it get fewer gradually.

SUMMARY OF THE INVENTION

In view that the intellectual cube can help arousing
25 of brains, it can stimulate imagination and judgement,
and help growth of brains, the inventor of the present

invention develops, after study and improving, a five-layer intellectual cube of which each side is more variable in combination, so that the game thereof can be enlarged in the area of thinking during playing, and thus benefit of arousing brains can be obtained.

In particular, the five-layer intellectual cube of the present invention is a square cube and has six sides which each is divided vertically and horizontally into twentyfive smaller movable surfaces; by changeability of orientation by rotation of these smaller movable surfaces, every side will have various possibility of combination of colors and patterns, this can arouse brains of people to get an intellectual enhancing effect. The structure includes a central axle block, 6 first blocks, 24 second blocks, 12 third blocks, 24 fourth blocks, 24 fifth blocks and 8 sixth blocks, wherein:

The central axle block is placed at the center of the five-layer intellectual cube, six axle rods are perpendicularly provided respectively on the six sides of the five-layer intellectual cube.

The first blocks are generally in "T" shapes, the tops thereof facing outwardly are provided each with a smaller movable surface, a rotation axle provided on the bottom of each of them is pivotally mounted in one of the tailing ends of the six axle rods and can be rotated thereon, the first blocks are thereby exactly located at

the center positions of the six sides respectively.

The second blocks are provided on the tops thereof each with a smaller movable surface, and are positioned respectively on the four sides of the first blocks, the inner sides thereof are provided each with a second engaging block.

The third blocks each has a top and a lateral surface perpendicular to each other, these surfaces each forms a smaller movable surface, the third blocks are positioned at the outer edges of the tops of the second blocks, the two smaller movable surfaces on each third block are located exactly at a corner where two sides of the five-layer intellectual cube orthogonally interconnect to each other, the inner sides thereof are provided each with a third engaging block.

The fourth blocks are provided on the tops thereof each with a smaller movable surface, the inner sides thereof are provided each with a fourth engaging block, these smaller movable surfaces are positioned at the four corners of the first blocks, that is, the two inner edges of each of these smaller movable surfaces neighbor with the edges of the two second blocks which are on the same side of the intellectual cube as that of the smaller movable surfaces of the fourth blocks and which are perpendicular to each other, the fourth blocks and the second blocks surround the 6 first blocks respectively.

The fifth blocks each has a top and a lateral surface perpendicular to each other, these surfaces each forms a smaller movable surface, the fifth blocks are positioned at the two lateral sides of the third blocks, these two smaller movable surfaces are also located exactly at a corner where two sides of the five-layer intellectual cube orthogonally interconnect to each other, the lower inner portions thereof are provided each with a fifth engaging block.

The sixth blocks each has three smaller movable surfaces perpendicular to one another, and are positioned on the eight corners respectively of the intellectual cube, the inner sides thereof are provided each with a sixth engaging block.

By mutual restraining and limitation of the above stated neighboring blocks, the blocks and the surfacial smaller movable surfaces thereof can make rotational displacement to change their positions, the six sides of the five-layer intellectual cube can have a variety of combinations by colors or patterns on these smaller movable surfaces, thereby complexity of the intellectual square cube can be increased, and an intellectual enhancing effect can be obtained.

The present invention will be apparent in its structure after reading the detailed description of the prefer

-red embodiments thereof in reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

5 Fig. 1 is a perspective view showing the appearance of the present invention;

 Fig. 2 (A), (B), (C) and (D) are schematic views showing the present invention in use;

10 Fig. 3 is a perspective view of a central axle block of the present invention;

 Fig. 4 is a schematic view showing assembling of the first blocks with the central axle block of the present invention;

15 Fig. 5 is a perspective view showing the situation after assembling of the first blocks with the central axle block of the present invention;

 Fig. 6 is a sectional view taken from the sectional line a-a in Fig. 5, it shows the position of the central axle block and the first blocks;

20 Fig. 7 (A) and (B) are perspective views showing the different angular positions of two second blocks;

 Fig. 8 is a perspective view showing the positions of a plurality of second blocks after assembling in the five-layer intellectual cube of the present invention;

25 Fig. 9 is a sectional view taken from the sectional line b-b in Fig. 8;

Fig. 10 is a perspective view showing the positions of the third blocks of the present invention;

Fig. 11 is a perspective view showing the positions of the third blocks after they are assembled in the five
5 -layer intellectual cube of the present invention;

Fig. 12 is a sectional view taken from the sectional line c-c in Fig. 11;

Fig. 13 is a perspective view showing the positions of the fourth blocks of the present invention;

Fig. 14 is a perspective view showing the positions of the fourth blocks after they are assembled in the five
10 -layer intellectual cube of the present invention;

Fig. 15 is a sectional view taken from the sectional line d-d in Fig. 14;

Fig. 16 is a perspective view showing the positions of the fifth blocks of the present invention;

Fig. 17 is a perspective view showing the positions of the fifth blocks after they are assembled in the five
-layer intellectual cube of the present invention;

Fig. 18 is a sectional view taken from the sectional line e-e in Fig. 17;

Fig. 19 is a sectional view taken from the sectional line f-f in Fig. 17;

Fig. 20 is a perspective view showing the positions of the sixth blocks of the present invention;

Fig. 21 is a perspective view showing the positions

of the sixth blocks after they are assembled in the five-layer intellectual cube of the present invention;

Fig. 22 is a sectional view taken from the sectional line g-g in Fig. 21;

5 Fig. 23 is an analytic perspective schematic view showing the first step in assembling of the present invention;

Fig. 24 is an analytic perspective view showing the second step in assembling of the present invention;

10 Fig. 25 is a schematic view showing the second step in assembling of the present invention;

Fig. 26 is an analytic perspective view showing the third step in assembling of the present invention;

15 Fig. 27 is a schematic view showing the third step in assembling of the present invention;

Fig. 28 is an analytic perspective view showing the fourth step in assembling of the present invention;

Fig. 29 is a schematic view showing the fourth step in assembling of the present invention;

20 Fig. 30 is an analytic perspective view showing the fifth step in assembling of the present invention;

Fig. 31 is a schematic view showing the fifth step in assembling of the present invention;

25 Fig. 32 is an analytic perspective view showing the sixth step in assembling of the present invention;

Fig. 33 is a schematic view showing the sixth step

in assembling of the present invention;

Fig. 34 is an analytic perspective view showing the seventh step in assembling of the present invention;

Fig. 35 is a schematic view showing the seventh step
5 in assembling of the present invention;

Fig. 36 is a perspective view showing the appearance of the present invention after assembling;

Fig. 37 is a perspective view showing the appearance of another embodiment of the present invention after assembling;
10

Fig. 38 is a perspective view of an embodiment of a second block of the present invention;

Fig. 39 is a perspective view of an embodiment of a third block of the present invention;

Fig. 40 is a perspective view of an embodiment of a
15 fourth block of the present invention;

Fig. 41 is a perspective view of an embodiment of a fifth block of the present invention;

Fig. 42 is a perspective view of an embodiment of a
20 sixth block of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, the five-layer intellectual square cube X of the present invention has six sides Y of which each is divided vertically and horizontally into
25 twentyfive (5 x 5) smaller movable surfaces.

As shown in Fig. 2 (A), (B), (C) and (D), each layer

of the five-layer intellectual square cube X can be rotated and displaced relatively, and the movable side Z of this layer can be moved to another side Y, so that the six sides Y can be various in combination by providing different colors and patterns. Thereby an intellectual enhancing effect can be obtained.

As are shown in Figs. 3 - 22, the five-layer intellectual square cube X of the present invention includes a central axle block 100, six first blocks 10, twentyfour second blocks 20, twelve third blocks 30, twentyfour fourth blocks 40, twentyfour fifth blocks 50 and eight sixth blocks 60. Wherein, the structure assembled with the aforesaid members will be described in detail in reference to the accompanying:

In the structure of the central axle block 100 as shown in Fig. 3, the central axle block 100 is located at the center of the five-layer intellectual square cube X, and six axle rods 101 are provided thereon and respectively perpendicular to the six sides of the five-layer intellectual square cube X.

Referring to the assembled structure of the first blocks 10 and the central axle block 100 as shown in Fig. 4 to 6, the first blocks 10 are generally in "T" shapes, the tops thereof face outwardly and form rotatable plates 11, a rotation axle 12 is provided on the bottom of each of them, the bottom surfaces of the rotatable plates

11 are all arciform, the rotation axles 12 can be pivot-
ally inserted respectively into the six axle rods 101 of
the central axle block 100. When in practising, a throu-
gh hole 13 is drilled from the center of each rotatable
5 plate 11 to the bottom end of the rotation axle 12 there
-of, and a sleeve 14 is provided in the through hole 13,
when the bottom end of the sleeve 14 is aligned with an
axle rod 101 of the central axle block 100, one of the
first blocks 10 is limited as to its position to the axle
10 rod 101 and is rotatable about the axle rod 101. Lastly,
a lid 16 is placed on the top of the rotatable plate 11
of which the top surface is a neat plane, so that the top
surfaces of the first blocks 10 each forms a smaller mo-
vable surface Z1 which is exactly positioned at the cen-
15 ter of the side Y of the six sides Y.

Referring to the structure of the second blocks 20
shown in Fig. 7 to 9, the tops thereof are each in an "L"
shape, the rear sides of the tops abut respectively the
four edges of the rotatable plates 11 of the first blocks
20 10, the front edges of the tops of the second blocks 20
protrude and are provided each with an arciform bottom
surface, the top surfaces thereof each forms a smaller
movable surface Z2 and are located respectively at all
the four edges of the smaller movable surfaces Z1 of the
25 rotatable plates 11. The second blocks 20 are provided on
the lower rear side thereof each with a second engaging

block 21 as shown in Fig. 7 (A), (B), the back of the second engaging block 21 protrudes rearwardly to extend to the lower portion of one side of a rotatable plate 11, the protruding portion has an arciform top ledge which is in conformity in shape with and abuts against the arciform bottom surface of the rotatable plate 11, so that the corresponding second block 20 will not drop, and the width of the second engaging block 21 is smaller than that of the upper portion of the second block 20, so that the two lateral sides of the second block 20 protrude laterally, and the bottoms of the protruding portions are arciform surfaces.

Referring to Fig. 10 to 12 showing the structure of the third blocks 30 and their positions on the intellectual square cube X, the third blocks 30 are disposed each between two second blocks 20 which are provided respectively on two neighboring sides Y, a top and a lateral surface thereof are perpendicular to each other and each forms a smaller movable surface Z3, the intersection of the two smaller movable surfaces Z3 (the outer edge) is located exactly at a corner where the stated two sides Y orthogonally interconnect to each other, the inner side of the third block 30 abuts the outer side of the smaller movable surface Z2 of a second block 20, so that the two smaller movable surfaces Z3 abut respectively the smaller movable surfaces Z2 of two second blocks 20 which are pro

-vided on the above mentioned two neighboring sides Y.

The third block 30 is provided in the rear a third engaging block 31, the top of the third engaging block 31 is arciform for inserting to abut the bottoms of the protruding portions on the tops of the two aforesaid second blocks 20, and is limited by the protruding portions of the second blocks 20 against dropping; besides, the width of the bottom end of the third engaging block 31 is smaller than that of a smaller movable surface Z3 and hence a "T" shape is formed, the bottom surfaces of the lateral ends of the top of the third engaging block 31 are arciform and can be conformed with the bottom arciform surfaces of the lateral sides of the second block 20, the width of the bottom end of the third engaging block 31 is equal to that of the second engaging block 21.

As shown in the drawings, the central axle block 10 allows the six first blocks 10 to be assembled and located to direct to the six orientations respectively on the the five-layer intellectual square cube X, the four edges of each first block 10 abut each with a second block 20, a third block 30 abut two second blocks 20 which are provided on two neighboring sides Y, i.e., two first blocks 10 on two neighboring sides Y contain therebetween two second blocks 20 and a third block 30. Taking the first block 10 on the top of the drawings as an example, each edge of the first block 10 neighbors in turn with a se-

cond block 20 and a third block 30 which then abuts downwards another second blocks 20 on the neighboring side Y, the other edge of the another second blocks 20 in turn abuts another first block 10 on the neighboring side Y.

5 In other words, the first block 10 on the top of the draw-
-ings forms a center, there are four second blocks 20 and
four third blocks 30 arranged sequentially on the four
edges thereof, the four third blocks 30 then abut down-
wards other four second blocks 20 on four neighboring si-
10 des Y, the other edges of the four second blocks 20 in
turn abut other four first blocks 10 on the four neighbor-
-ing sides Y. Although the first blocks 10, the second
blocks 20 and the third blocks 30 are mutually limited
not to drop, however, each block can be moved sidewardly,
15 so that when taking the first block 10 on the top as a
center, the second blocks 20 and third blocks 30 there-
around and the other four first blocks 10 on the four
neighboring sides Y can be rotated thereabout to change
positions optionally. If another first block 10 on ano-
20 ther side Y is taken as a center, situation is the same,
in fact, each first block 10 is taken as a center, and
the modes of rotation of the five-layer intellectual cube
X of the present invention as shown in Fig. 2 (A), (B),
(C) and (D) thus are obtained.

25 Referring to Fig. 13 to 15 showing the structure of
the fourth blocks 40 and their positions on the intellec-

tual square cube X. The fourth blocks 40 are provided on the tops thereof each with a smaller movable surface Z4. All the smaller movable surfaces Z4 are positioned at the four corners respectively of all the first blocks 10, that is, the two inner edges of each of these smaller movable surfaces Z4 neighbor with the edges of the smaller movable surfaces Z2 of the two second blocks 20 which are on the same side Y of the intellectual cube as that of the smaller movable surfaces Z4 and which are perpendicular to each other, the fourth blocks 40 and the second blocks 20 surround the six first blocks, and can be moved together with the second blocks 20 neighboring therewith; further, the fourth blocks 40 each is generally in the shape of "Z", the bottom of each smaller movable surface Z4 therefore bends and is arciform. The inner sides of the fourth blocks 40 thereof are provided each with a fourth engaging block 41, the fourth block 40 protrudes toward the rotation axle 12 of a first block 10 (referring to Fig. 6) and the second engaging blocks 21 of the above stated two second blocks 20 which are perpendicular to each other. The top surface of the protruding portion of the fourth block 40 is arciform and abuts on the bottom arciform surfaces respectively of the smaller movable surfaces Z1, Z2 of the first block 10 and its corresponding second block 20, so that the fourth block 40 is limited not to drop.

Referring to Fig. 16 to 19 showing the structure of the fifth blocks 50 and their positions on the intellectual square cube X. The fifth blocks 50 are provided at the two lateral sides of the third blocks 30, the top on one side Y and the lateral surface thereof on another side Y are perpendicular to each other to form each a smaller movable surface Z5 just like the case on the third blocks 30, the intersection of the two smaller movable surfaces Z5 (the outer edge) is also located exactly at a corner where the two sides Y orthogonally interconnect to each other, the inner side of a fifth block 50 abuts an outer side of the smaller movable surface Z4 of a fourth block 40; by the fact that the two inner sides of the smaller movable surface Z4 of a fourth block 40 neighbor respectively with two smaller movable surfaces Z2 of two second blocks 20 which are perpendicular to each other, so that the two outer sides thereof are perpendicular to each other too, and abut respectively on the inner sides of two smaller movable surfaces Z5 of two fifth blocks 50, the facing directions of these two smaller movable surfaces Z5 of the two fifth blocks 50 are also perpendicular to each other; the lower portions of the fifth blocks 50 are provided each with two lateral ledges of which the tops are arciform and abut against the bottom arciform surfaces of the two smaller movable surfaces Z4 of two fourth blocks 40. The fifth blocks 50

are provided each with a fifth engaging block 51 on the lower inner portion thereof, the shape of the fifth engaging block 51 is conformed partially with that of the third engaging block 31 of a third blocks 30 and partially with that of the fourth engaging block 41 of a fourth block 40 neighboring therewith, and abuts against and limited by the bottom arciform surfaces of the pending portions of the third block 30 and the fourth block 40. The fifth blocks 50 thereby are restrained from dropping, but can be moved together with their neighboring fourth blocks 40 along the bottom arciform surfaces of the lateral sides of their neighboring second blocks 20 and of their neighboring third blocks 30, or can be moved together with their neighboring third blocks 30 along the bottom arciform surfaces of the front protruding edges of the tops of their neighboring second blocks 20.

Referring to Fig. 20 to 22 showing the structure of the sixth blocks 60 and their positions on the intellectual square cube X. The sixth blocks 60 are provided on the eight corners of the five-layer intellectual cube X, and each includes three outer surfaces as three smaller movable surfaces Z6 perpendicular to one another, the three smaller movable surfaces Z6 are connected with one another with their outer edges, and abut the smaller movable surfaces Z5 of the fifth blocks 50 with their inner edges. Each sixth block 60 is provided with a lower sixth

engaging block 61 which is provided with a neck 62 and an engaging portion 63, the engaging portion 63 is in the shape in conformity with that of one of two laterals of each of three of the fifth engaging blocks 51 of three
5 fifth blocks 50 neighboring therewith, the top of the engaging portion 63 is arciform and is restrained by a plurality of recesses provided just above the aforesaid lateral ledges of these fifth blocks 50, so that the sixth blocks 60 can be prevented from dropping, and can be moved together with any of these fifth blocks 50.
10

By mutual restraint and limitation of the neighboring blocks 10 - 60 and the movability of the smaller movable surfaces Z (Z1 - Z6), when all the smaller movable surfaces Z are applied with colors or patterns, and when some
15 blocks and their surfacial smaller movable surfaces Z are moved to change positions, the six sides Y of the five-layer intellectual cube X can have various combinations of colors or patterns, and this can get an intellectual enhancing effect, and can increase complexity of the intellectual cube X.
20

The above paragraphs stated the structure and the relative positions of the components of the intellectual cube X of the present invention, when the components are assembled, by mutual restraint and limitation of the neighboring components taking the six first blocks 10 as
25 their original limited members, when in assembling from

the innermost components toward the outermost components, the top first block 10 must be assembled lastly in order that in no case that assembling of the components can not be completed; in practising, assembling shall follow the steps shown in Fig. 1 and Fig. 23 to 35.

The first step is shown in Fig. 23, when in assembling, a rotatable plate 11 of a first block is faced down, a sleeve 14 and a screw 15 are inserted into a through hole 13 provided in the first block 10, then four second blocks 20 are placed to abut the four sides of the first block 10, and four fourth blocks 40 are placed so that each fourth block 40 is positioned between two second blocks 20, and therefore all the second blocks 20 and the fourth blocks 40 surround the six first blocks 10 as was stated in the preceding paragraphs.

The second step is shown in Fig. 24 and 25, when the above components are assembled, nine smaller movable surfaces Z are faced down, one more circle of the components which form other smaller movable surfaces Z, the bottom square side Y can be completed (referring to Fig. 26). The components and the relative positions thereof are arranged like this: four third blocks 30 are placed at the outer edges of the four second blocks 20 respectively, then a fifth block 50 is placed on both lateral sides of each third block 30, and lastly, a sixth block 60 is provided on one of the four corners of the bottom layer

to complete the layer.

As shown in Fig. 26 and 27, when the second step is completed, the bottom layer of the five-layer intellectual cube X is completed, a whole side Y facing downwards is thereby obtained, the assembling now is continued from the third step. In practising of the third step, the four third blocks 30 of the aforesaid first layer are added thereabove each with a second block 20, and the eight fifth blocks 50 in this layer are added thereabove each with a fourth block 40, these eight fourth blocks 40 are located respectively at both sides of the just assembled second blocks 20, and lastly, the four sixth blocks 60 in the first layer and located on the four corners are respectively added each with a fifth block 50, in this way, the second layer of the five-layer intellectual cube X is completed.

The fourth step is shown in Fig. 28 and 29, when the second layer is completed, a depression is formed at the center thereof, the screw 15 mentioned in the first step is located and exposed here at the center, the axle rod 101 directing downward from the central axle block 100 can be screwed tight by the screw 15, the first block 10 in the first step can then be covered with a lid 16. The axle rod 101 on the top of the central axle block 100 directs upwardly when it is screwed tight, and the four lateral axle rods 101 are located to be perpendicular to

the four lateral sides Y of the five-layer intellectual cube X respectively, then four third blocks 30 are placed at the four corners, i.e., on the four fifth blocks 50 in the second layer, and eight second blocks 20 are placed
5 at two mutual orthogonal sides of each of the four third blocks 30 and on the eight fourth blocks 40 in the second layer; and lastly, four lateral first blocks 10 are respectively mounted on the tailing ends of the four lateral axle rods 101 by means of a plurality of the aforesaid
10 sleeves 14, screws 15 and lids 16, so that the four lateral first blocks 10 are located respectively on the second blocks 20 in the second layer, in this way, the third layer of the five-layer intellectual cube X and assembly of the central axle block 100 are completed.

15 The fifth step is shown in Fig. 30 and 31, the components for assembling therein are identical to those in the third step, but in the contrary orientation, and include four second blocks 20, eight fourth blocks 40 and four fifth blocks 50. The order of assembling is like
20 this: the four fifth blocks 50 are in the first place provided at the four corners, i.e., on the four third blocks 30 in the third layer; then the eight fourth blocks 40 are placed respectively on two mutual orthogonal sides of each of the four fifth blocks 50; and lastly,
25 the four second blocks 20 are placed each between two of the fourth blocks 40 just assembled and on the four first

blocks 10 in the third layer, in this way, the fourth layer of the five-layer intellectual cube X is completed.

5 The sixth step is shown in Fig. 32 and 33, the components for assembling therein are identical to those in the second step, but in the contrary orientation, and include four third blocks 30, eight fifth blocks 50 and four sixth blocks 60. The order of assembling is like this: the four sixth blocks 60 are in the first place provided at the four corners, i.e., on the four fifth
10 blocks 50 in the fourth layer; then the eight fifth blocks 50 are placed respectively on two mutual orthogonal sides of each of the four sixth blocks 60 just assembled and on the eight fourth blocks 40 in the fourth layer; and lastly, the four third blocks 30 are placed each be-
15 tween two of the fifth blocks 50 just assembled and on the four second blocks 20, in this way, the sixth step is completed.

As shown in Fig. 34 and 35, when the sixth step is completed, the circumferential of the fifth layer or the
20 top layer of the five-layer intellectual cube X is completed, however, a depression is left at the central area of this layer, and the axle rod 101 on the top of the central axle block 100 directs upwardly and is located at the center of the depression, the four lateral sides Y
25 and the bottom side Y assembled in the first and the second steps (totally five sides) have been completed now.

In the seventh step, some more blocks are added to the depression to complete the top layer or the top side Y, and the whole assembly can be completed then. In this step, the components used are identical to those of the first step, but in the contrary orientation, and include
5 a first block 10, four second blocks 20 and four fourth blocks 40. The order of assembling is like this: the four second blocks 20 and the four fourth blocks 40 are placed at the periphery of the depression, then the first block
10 10 is mounted according to the above stated method and by means of a through hole 13, a sleeve 14, a screw 15 and a lid 16 on the axle rod 101 directing upwardly at the center of the depression, so that the first block 10 is restrained on the axle rod 101, and the rotatable plates 11
15 of the first block 10 can restrain the abovementioned four second blocks 20 and four fourth blocks 40, these four second blocks 20 and four fourth blocks 40 in turn can restrain the other outer components (the components assembled in the sixth step), in this way, the five-layer
20 intellectual cube X is completed.

As shown in Fig. 36 and 37, when assembling of all the components is completed, the five-layer intellectual cube X is rotatable for playing in the ways shown in Fig. 2, the six sides Y of the five-layer intellectual cube X
25 can have various combinations of colors or patterns to get an intellectual enhancing effect, this can be done by

applying colors on the smaller movable surfaces Z; moreover, in order to avoid destroy of the whole appearance by above stated lids 16 on the first blocks 10, stickers Z7 of various colors or patterns can be applied on all
5 the smaller movable surfaces Z, a finished article of the five-layer intellectual cube X can thus be completed.

When in practising of the present invention, in order not to make a too large difficulty for a learner of the game, the six sides Y are only applied with two or three
10 colors or patterns.

The names of the components composing the present invention and the shapes shown in the drawings are only for illustrating a preferred embodiment of the present invention, and not for giving any limitation to the scope of
15 the present invention. Those skilled in this art can understand how to do some modifications or changes to the components of the present invention.

For example, the second blocks 20 to the sixth blocks 60 in Fig. 38 to 42 are made by the technique of injection moulding of plastic, the blocks are all hollow, this
20 can prevent the plastisol from deformation and weight reducing during cooling, and is beneficial to mass production; and wherein, Fig. 38 shows that the top portion and the inner bottom portion of a second block 20 are excavated to be hollow, Fig. 39 shows that a third block 30 and
25 the third engaging block 31 thereon are hollow, Fig. 40

shows that a fourth block 40 and the fourth engaging block 41 thereon are hollow, Fig. 41 shows that a fifth block 50 and the fifth engaging block 51 thereon are hollow, and Fig. 42 shows that a sixth block 60 and the engaging portion 63 thereon are hollow. Further, when in manufacturing, all the engaging blocks or engaging portions are provided with arciform surfaces, so that movement of the blocks can be smooth.

The embodiments stated above are only examples for illustrating the present invention. It will be apparent to those skilled in this art that various modifications or changes can be made to the components of the present invention without departing from the spirit, scope and characteristic of this invention. Accordingly, all such modifications and changes also fall within the scope of the appended claims and are intended to form part of this invention.



CLAIMS

1. A five-layer intellectual cube, being a square
cube and having apparently six sides which each is divi-
ded vertically and horizontally into five smaller mova-
ble surfaces respectively, of which each side has 25 sma-
-ller movable surfaces with different colors or patterns,
by changeability of orientation by rotation of said sma-
-ller movable surfaces, said six sides can provide a varie-
-ty of combinations by colors or patterns; said cube is
comprised of a central axle block, six first blocks, twen-
-tyfour second blocks, twelve third blocks, twentyfour
fourth blocks, twentyfour fifth blocks and eight sixth
blocks, wherein:

said central axle block is located at the center
of said five-layer intellectual cube, six axle rods are
provided on said central axle block and perpendicular
each to one of said six sides;

said first blocks are generally in "T" shapes, the
tops thereof face outwardly and form rotatable plates, a
rotation axle is provided on the bottom of each of said
rotatable plates, the bottom surfaces of said rotatable
plates are all arciform, said rotation axles are pivotal-
-ly inserted respectively into said six axle rods of said
central axle block, each of said first blocks is rotata-
ble about one of said axle rods, the top surfaces of said
rotatable plates each forms a smaller movable surface whi



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-ch is exactly positioned at the center of one of said six sides;

the tops of said second blocks are each in an "L" shape, the rear sides of said tops abut respectively the four edges of said rotatable plates of said first blocks, the top surfaces of said second blocks each forms a smaller movable surface and are located respectively at said four edges of said smaller movable surfaces of all said rotatable plates, said second blocks are provided on the lower rear sides thereof each with a second engaging block, the back of said second engaging block protrudes rearwardly to extend to the lower portion of one side of one of said rotatable plates, the protruding portion has an arciform top ledge which is in conformity in shape with and abuts against the arciform bottom surface of said one rotatable plate;

said third blocks each has a top and a lateral surface perpendicular to each other and forming each a smaller movable surface, the intersection of said two smaller movable surfaces is located exactly at a corner where two neighboring sides of said five-layer intellectual cube orthogonally interconnect to each other, the inner side of each said third block abuts the outer side of said smaller movable surface of one of said second blocks, so that said top and lateral smaller movable surfaces of each said third block abut respectively said smaller mo-



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vable surfaces of two of said second blocks which are provided on said two neighboring sides respectively, each said third block is provided in the rear a third engaging block, the top of said third engaging block is inserted
5 to abut the bottoms of the protruding portions on the tops of said two second blocks, and is limited by said protruding portions of said second blocks against dropping;
said fourth blocks are provided on the tops thereof
10 of each with a smaller movable surface, all said smaller movable surfaces are positioned at the four corners respectively of all said first blocks, that is, the two inner edges of each of said smaller movable surfaces neighbor with the edges of two smaller movable surfaces of two
15 of said second blocks on the same side of said intellectual cube and are perpendicular to each other, said fourth blocks and said second blocks surround said six first blocks, the inner sides of said fourth blocks are provided each with a fourth engaging block and protrudes toward
20 said rotation axle of one of said first blocks and toward said second engaging blocks of two of said second blocks which are perpendicular to each other, the top surface of the protruding portion of each said fourth block abuts on the bottom surfaces respectively of said smaller
25 movable surfaces of said one of said first blocks and its corresponding second block, so that each said fourth block



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ck is limited not to drop;

said fifth blocks are provided at the two lateral sides of said third blocks, the top on one side and the lateral surface thereof on another side of said five-layer intellectual cube are perpendicular to each other to form each a smaller movable surface, the intersection of said two smaller movable surfaces is also located exactly at a corner where said two sides of said five-layer intellectual cube orthogonally interconnect to each other, the inner side of each of said fifth blocks abuts an outer side of said smaller movable surface of one of said fourth blocks, the two outer sides of said fifth blocks are perpendicular to each other too, said fifth blocks are provided each with a fifth engaging block on the lower inner portion thereof, the shape of said fifth engaging block is conformed partially with that of said third engaging block of one of said third blocks and partially with that of said fourth engaging block of one of said fourth blocks neighboring therewith, and abuts against and limited by said third block and said fourth block;

said sixth blocks are provided on the eight corners of said five-layer intellectual cube, and each includes three outer surfaces as three smaller movable surfaces perpendicular to one another, said three smaller movable surfaces are connected with one another with their outer edges, and abut said smaller movable surfa-



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ces of said fifth blocks with their inner edges, each
said sixth block is provided with a lower sixth engaging
block which is provided with a neck and an engaging por-
tion, said engaging portion is in the shape in conformity
5 with that of one of two laterals of each of three of said
fifth engaging blocks of three of said fifth block neigh-
boring therewith, and is restrained by a plurality of re-
cesses provided on said fifth blocks, so that said sixth
blocks are prevented from dropping;

10 by mutual restraint and limitation of all said
neighboring blocks and the movability of all said smaller
movable surfaces for changing positions thereof, all said
smaller movable surfaces can be applied with colors or
patterns, an intellectual enhancing effect can be gotten.

15 2. A five-layer intellectual cube as in claim 1,
wherein, all said blocks are made by the technique of
injection moulding of plastic in mass production, said
blocks are all hollow in order to prevent the plastisol
thereof from deformation and weight reducing during cool-
20 -ing.

25 3. A five-layer intellectual cube as in claim 1,
wherein, said rotatable plates of said first blocks are
excavated to form hollow interiors which thread through
through-holes on the bottoms of said rotation axles, and
a sleeve is inserted into each through-hole to align each
said sleeve with one of said axle rods on said central



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axle block, a screw is extended through each said sleeve to connect to said axle rod, in this way, said first blocks are limited on said axle rods and are rotatable about said axle rods.