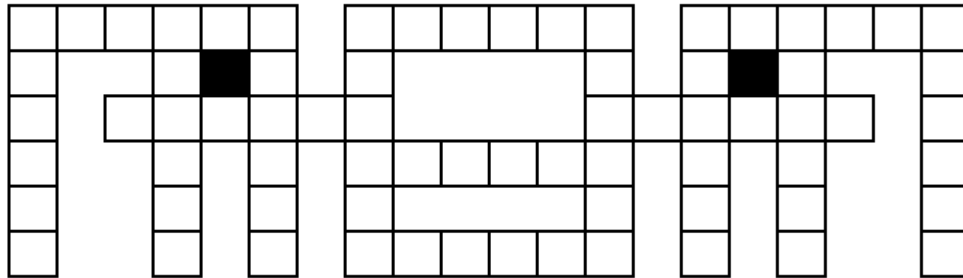## 1. Crisscross - 10 points

Fifteen of the following U.S. city names can be placed in the grid to complete the crisscross pattern across and down. Which name is left over when you're done?

ATHENS	CANTON	LAREDO	ODESSA
BANGOR	EL TORO	LOWELL	TACOMA
BILOXI	HELENA	NASHUA	TOLEDO
BOSTON	ITHACA	NEWARK	TUCSON

Answer: Enter the unused city name.

---

2. Cross Sums - 15 points

This is a standard Cross Sums puzzle: a crossword made with numbers instead of words. Enter a single digit (1 to 9) into each empty square so that the sum of the digits in each Across answer equals the value given to the left, and the sum of the digits in each Down answer equals the value given above. No digit is repeated within a single answer.
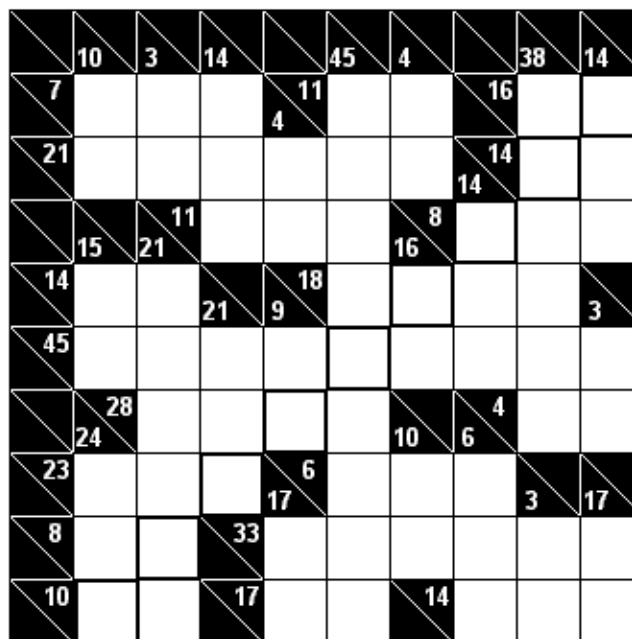
Answer: Enter the digits placed in the nine highlighted squares, from lower-left to upper-right.

---

3. No U-Turn Maze - 15 points

Begin at the cell labeled START. On each move go straight in the direction of that cell's arrow, proceeding as far you want, ignoring any cells that you jump over. There are two restrictions: do not stop on or jump over the black cell, and do not stop on a cell that would reverse your direction on the next move. For example, on the first move you can go either two or three cells upward. Any number more than three would run into the black cell; and moving only one space would require the next move to go in the opposite direction.

Find the fewest number of moves that take you from START back to START!
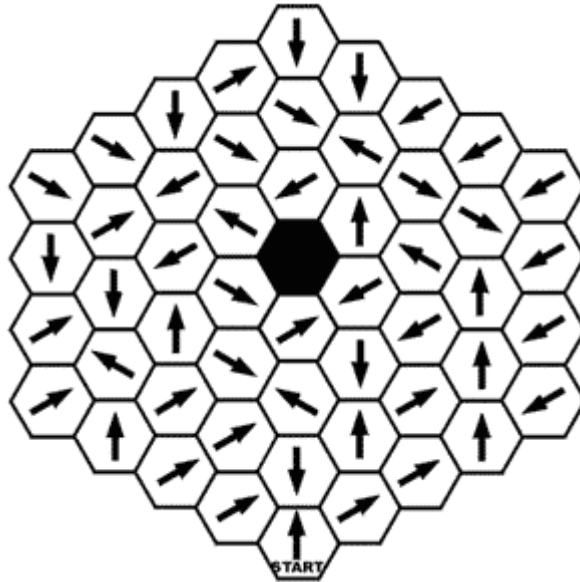
Answer: Enter the total number of moves, followed by the lengths of each move in order.

---

4. The Common Touch - 5 points each

In each of these puzzles, the seven famous names in the Yes group all share an unusual property, which none of the names in the No group have. For each puzzle, pick one of the seven names from the Answer List at the bottom that shares the property in the Yes group. (Hint: The answers have nothing to do with the people themselves--only the names. Only the last names, in capital letters, are relevant.)

4.1

Yes	No
Karl ABRAHAM	Dag HAMMARSKJOLD
Burt BACHARACH	Golda MEIR
James CALLAGHAN	Harry HOUDINI
Robert MCNAMARA	Julia ROBERTS
Donna SHALALA	William SAROYAN
Kakuei TANAKA	George ZHUKOV
Giuseppe ZANGARA	

4.2

Yes	No
Fred ALLEN	Marie CURIE
Federico FELLINI	Mahatma GANDHI
Jascha HEIFETZ	Czeslaw MILOSZ
Jomo KENYATTA	Barbra STREISAND
Marquis de LAFAYETTE	Alfred Lord TENNYSON
Charles TIFFANY	Luisa TETRAZZINI
Andrew WYETH	

	Yes	No
4.3	Konrad ADENAUER Fred ASTAIRE Aaron COPLAND Vaslav NIJINSKY Yoko ONO Itzhak RABIN Jacques THIBAULT	Louisa May ALCOTT Oksana BAIUL Magic JOHNSON John LENNON Eduard SHEVARDNADZE George WASHINGTON

Name List: Tom CRUISE, Gene KELLY, Jesse OWENS, Elvis PRESLEY, Antonio STARABBA, Woodrow WILSON, Franco ZEFFERELLI

Answer: For each problem, enter the name from the Name List that shares the property in the Yes group.

---

5. Paint by Numbers - 15 points

The numbers outside the grid tell you how many groups of black squares there are in the corresponding row or column and, in order, how many consecutive black squares there are in each group.
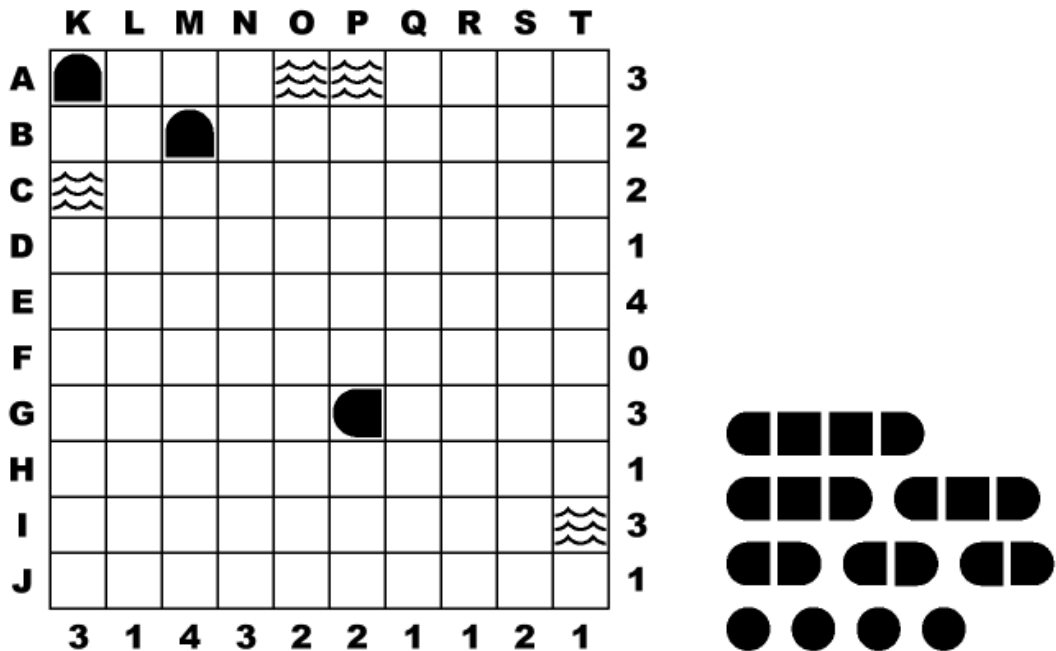
Example:

Answer: Indicate the colors used in the 15 highlighted squares, from lower-left to upper-right. Use 0 for white and 1 for black. In the example, this would be 10110.

6. Battleships - 15 points

Locate the position of the 10-ship fleet in the grid. The fleet is shown to the right of the grid: one 4-unit battleship, two 3-unit cruisers, three 2-unit destroyers, and four 1-unit submarines. Each segment of a ship occupies a single cell; ships are oriented either horizontally or vertically. Ships do not touch each other, even diagonally. The numbers on the bottom and right edges of the grid reveal the total number of ship segments that appear in the respective column or row. Cells with water (indicated by waves) cannot contain ships.

Answer: Enter the location of the four submarines (i.e., the single-segment ships) using the letters to the left and on top of the grid as coordinates. For example, the given water locations are AO, AP, CK, IT.

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7. Order in the Court - 5 points each

Place the digits 1 or 9 into each square so that the eight different 4-digit numbers reading across and down are in increasing numerical order, as indicated by the numbers outside the grid. In the example, the numbers outside the grid correspond to the numerical order of the numbers inside: 111, 119, 199, 911, 919, 991.

Example:

7.1

7.2

7.3
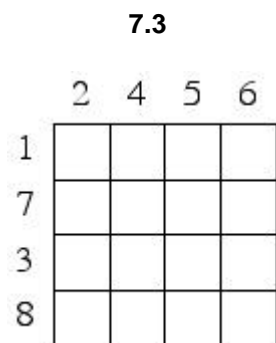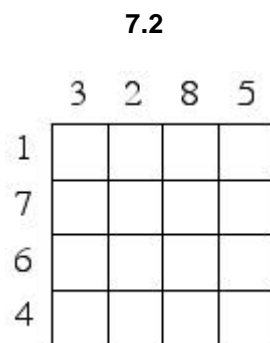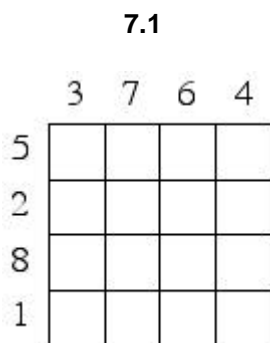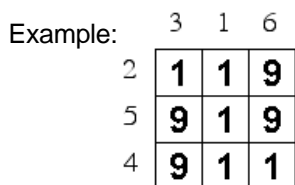
Answer: For each problem, enter the four 4-digit numbers reading across, starting with the first row, then the second, then the third, then the fourth.

---

8. Statue of Liberty - 10 points

One of the five images A-E is an exact duplicate of the first Statue of Liberty drawing, except that it has been rotated or reflected. The other four images are significantly different in some additional way. Which is the duplicate?

A
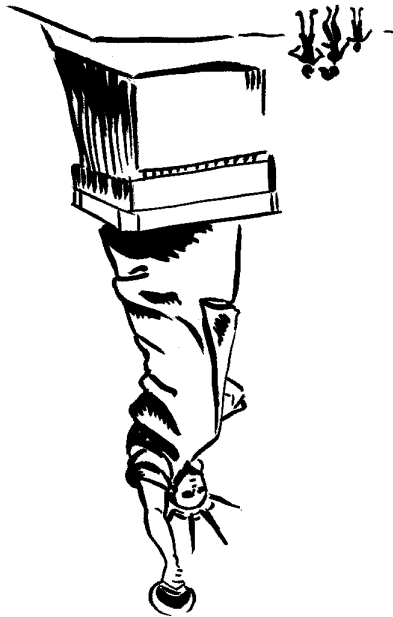
B

C

D

E

Answer: Enter the letter for the matching picture.

9. Missing Peace - 10 points

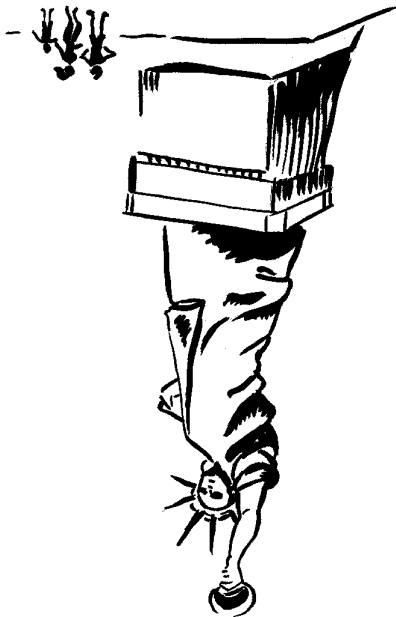The names of the 19 Nobel Peace Prize winners listed below can be found in the word search grid. Each name reads in a straight line horizontally, vertically, or diagonally. The 16 central letters in the grid must be filled in before the puzzle can be completed.

ARIAS
BRANDT
BRIAND
DUNANT
HULL
HUME
KING
MANDELA
MARSHALL
MONETA
MOTT
PAULING
PEARSON
PERES
RABIN
RENAULT
SADAT
SAKHAROV
WALESA

U	H	A	L	E	D	N	A	M	H
T	U	S	A	D	A	T	V	U	N
L	L	E	U	P	S	O	M	E	S
U	L	L					S	A	D
A	D	A					I	L	A
N	U	W					B	T	K
E	N	K					E	I	I
R	A	A	E	O	R	N	I	T	N
S	N	T	E	N	O	A	D	N	G
D	T	T	O	M	R	S	M	T	G

Answer: List the 16 missing letters in order from left to right and line by line--first the top line, then the second line, then the third, and finally the fourth.

---

10. Tile - 10 points

Divide the grid into four regions with exactly the same size and shape (rotations are allowed, but not reflections) so that each region contains exactly one letter. You must divide the grid only along the given lines.

Answer: Enter the letters corresponding to the six highlighted squares, from lower-left to upper-right.

11. Knight Moves - 10 points + 5 bonus for shortest solution

The diagram shows a restricted chess board with three black knights and three white knights. Your goal is to move the pieces so that the same squares are occupied but the colors are reversed.

Pieces may move only as a chess knight: an L-shape with two squares in one direction and one square in another (pieces may jump over "non-squares"). No more than one piece can be on a single square at a time. No other rules of chess apply to this puzzle.

One turn is a sequence of moves made by the same piece. Any solution containing fewer than 20 turns is worth 10 points. There is a bonus of additional 5 points for any solution using the minimum number of turns.

The first turn must use a black piece (at A or F).
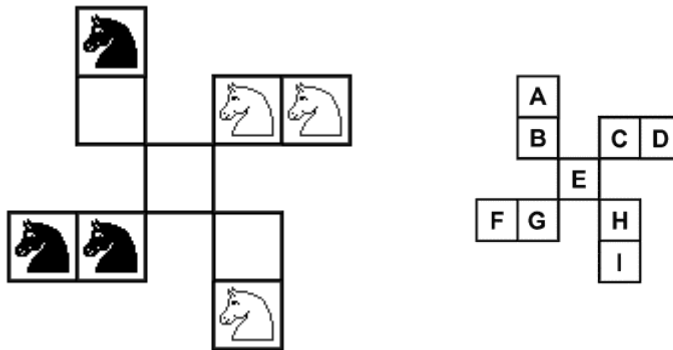
Answer: Enter the number of turns, followed by a description of each turn. For example, if the first turn were the white knight at D moving to H, and the second turn were the black knight at A moving to E and then to D, then the two-move description would simply be D-H, A-D.

12. Digit Fidget - 10 points each

Place the digits 1-9 into the grid so that each row and column adds up to the corresponding number given outside the grid. Each number is used exactly once.

Example:

12.1

12.2

Answer: For each problem, enter the digits in the top row from left to right, then the second row, the third row, and then the fourth row.

13. Equations - 10 points each

Enter a different digit from 1 to 9 into each of the boxes, so that each of the four equations reading across is true. All calculations are done from left to right and involve only positive integers.

13.1

$$\square + \square \times \square = \square + \square = \square + \square + \square = \square$$

13.2

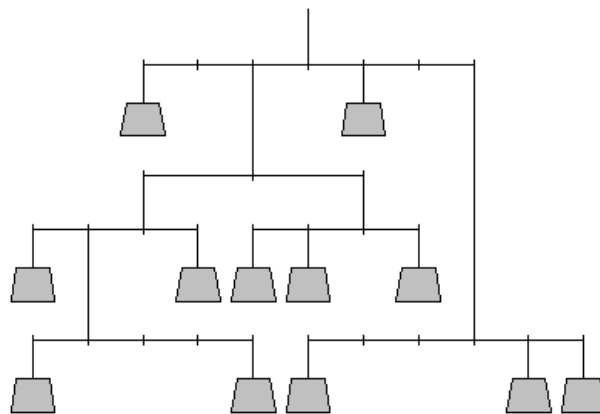$$\square + \square = \square + \square + \square = \square \times \square = \square + \square + \square + \square = \square$$

13.3

$$\square + \square = \square + \square + \square \times \square + \square = \square = \square + \square = \square$$

Answer: For each problem, enter the nine digits in order from left to right.

---

14. Weighs and Means - 20 points

Assign the values 1 to 12 to the weights in the diagram so that everything balances as shown. Each value will be used exactly once.


Answer: List the two weights used in the top row from left to right, followed by the five in the middle row, then the five in the bottom row.

---

15. Lunar Lockout™ - 10+15 points

Each letter in the grid represents a robot that travels horizontally or vertically, but only directly toward another robot -- as far as it can go without hitting it. One move is a continuous sequence of such traverses made by the same robot. The goal is to end up with robot X on the center space after the specified number of moves.
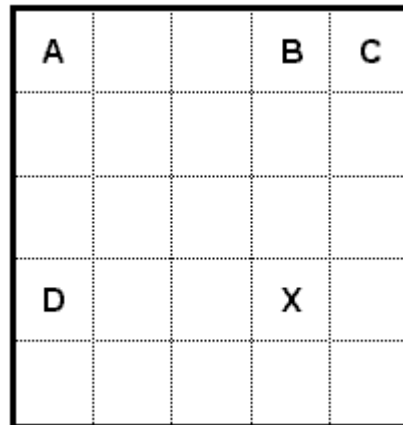
Example: The first move could be robot X moving south to D, then east to C, north to A, and finally west to B. (X's first move could also end at any of the robots along the way: at D, at C, or at A). Neither A, B, nor C can make the first move because there is no robot that any one of these can move toward.
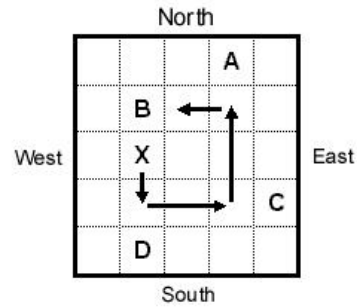
15.1 - 10 points
3 moves
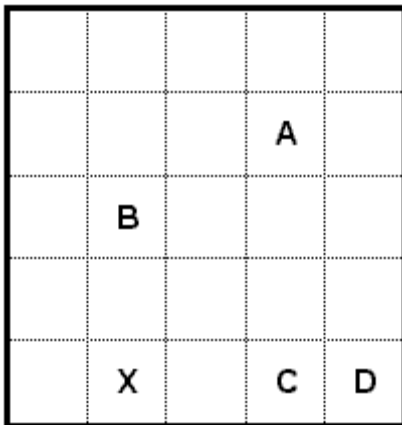
15.2 - 15 points
5 moves

Answer: Enter the moves that get X to the center space. Describe each move with the name of the robot and the directions traveled. In the example problem, the three-move solution is D-ne, A-s, X-e.

---

16. Tetrahedron Painting - 10 points

On each face of a tetrahedron, paint an arrow pointing to one of the three vertices (see diagrams). How many different ways are there to do this? Two paintings of the tetrahedron are the same if one can be physically oriented to appear identical to the other (rotations are allowed but NOT reflections).


Answer: Enter the number of ways to paint the tetrahedron.

---

17. Do or Die - 15 points each

Place six dice in the grid, each showing a different face. A face takes up a 3x3 square in the grid, and faces are not allowed to overlap. The numbers below and to the right of the grid indicate how many pips are in the corresponding row or column. The faces must be oriented as in the example, except that the 6-face can be oriented either vertically or horizontally.

Example:
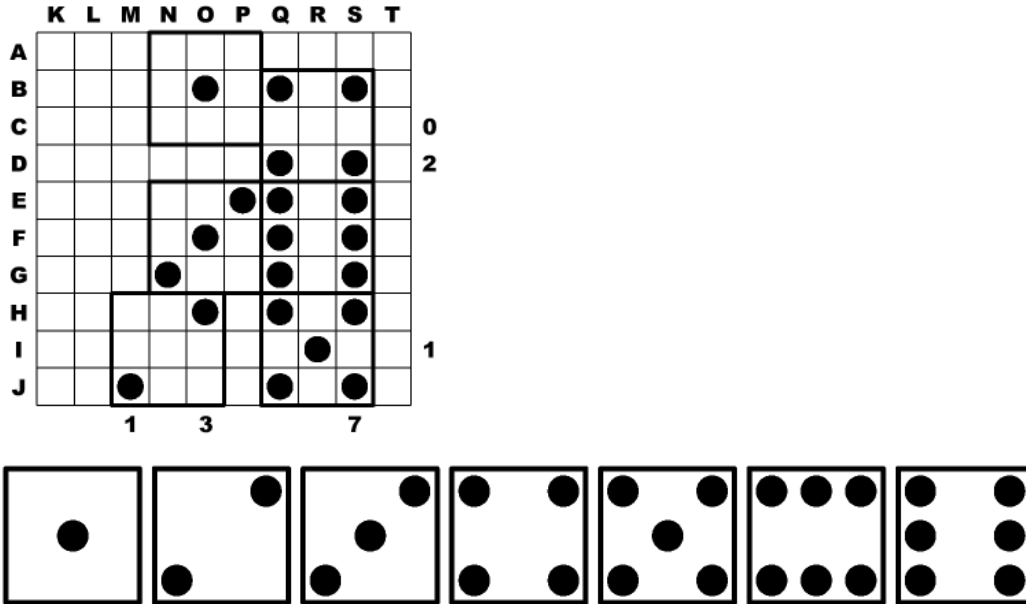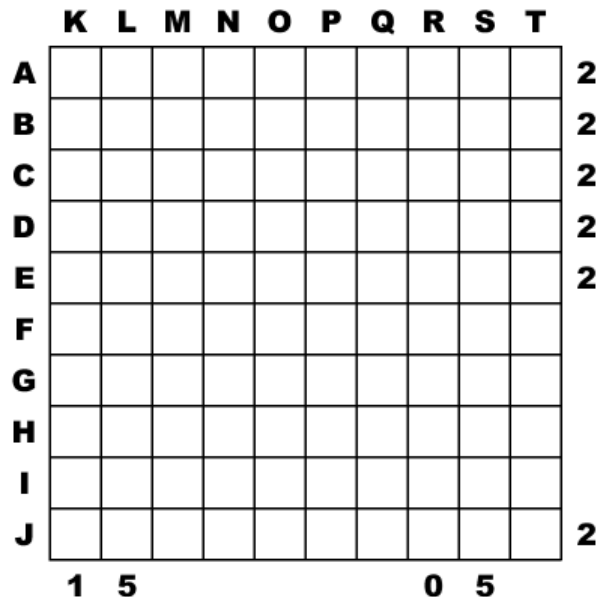

17.1
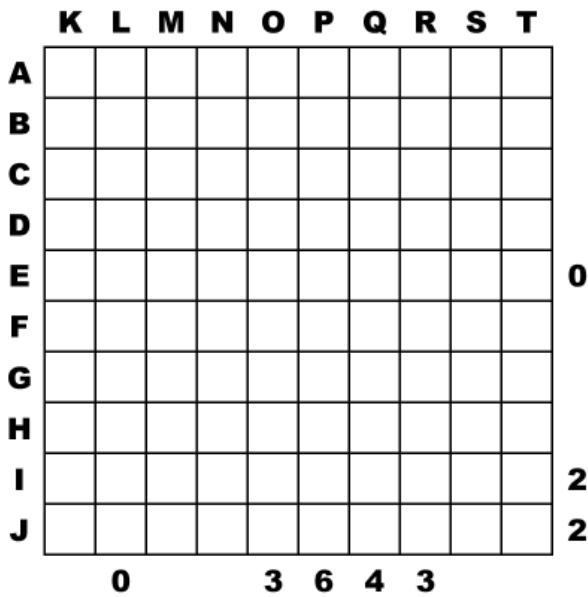
17.2

Answer: Enter the location of the center of each face in order from the 1-face to the 6-face, using the letters to the left and on top of the grid as coordinates. In the example, this would be BO, IN, FO, CR, IR, FR.

18. Eminent Domain - 15 points

One or more horizontal or vertical lines are drawn from each numbered square. Lines cannot cross black squares or other numbered squares. Each number indicates how many squares are connected by its lines; the numbered squares themselves are not counted. No lines overlap or intersect each other, and each empty square is covered by exactly one line.

Example:
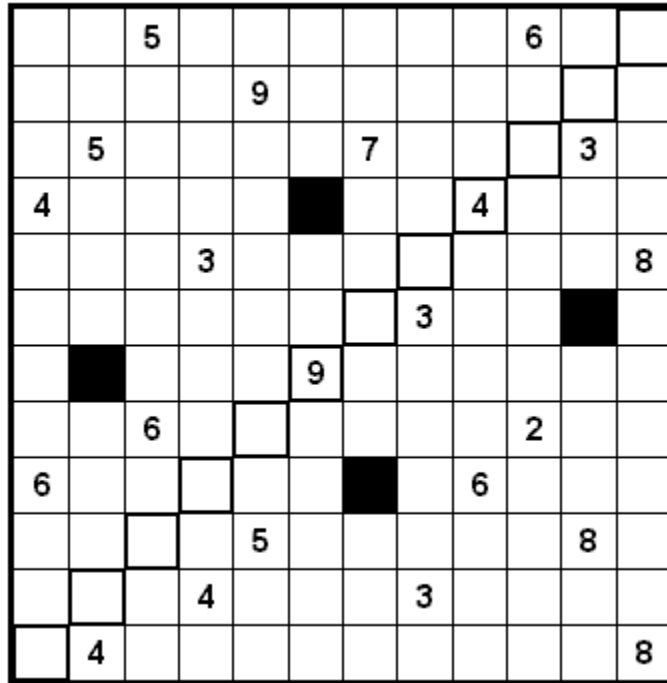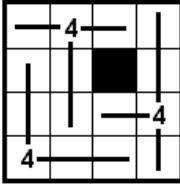
Answer: Enter the numbers corresponding to the twelve highlighted squares, from lower-left to upper-right.

19. Dem Bones - 20 points

A set of 21 dominoes, using all combinations of one through six pips, is in a 7 x 6 rectangular tray. The layout is shown with the pips replaced by numbers and the domino edges removed. Reconstruct the missing edges.

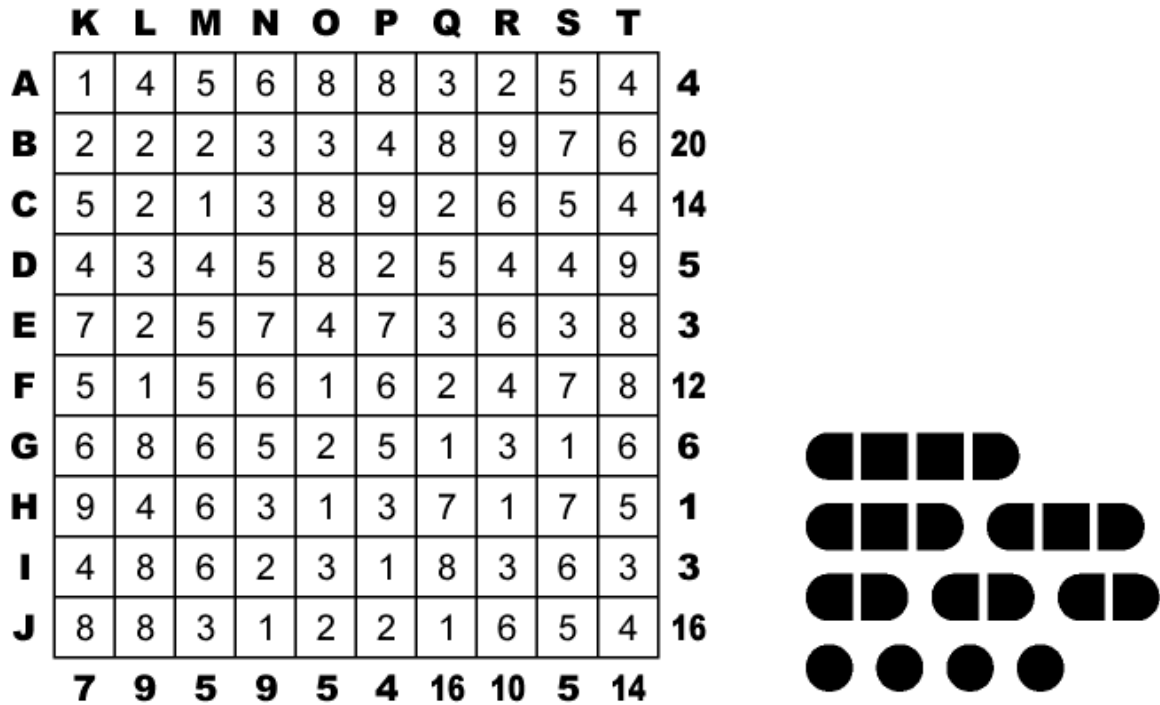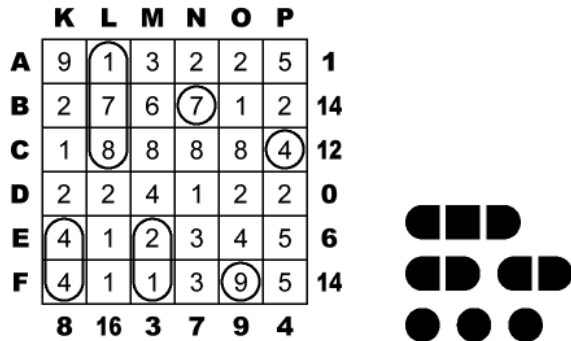| 2	4	6	4	5	2	5
4	1	2	1	3	2	5
4	1	6	3	3	2	6
5	6	6	1	4	3	6
3	1	5	1	1	2	3
5	6	2	3	5	4	4

Answer: Enter the dominoes that are oriented horizontally, in order reading from left to right, starting with the top row, then the second row, then the third, etc.

20. Battleships Variation - 15 points

Locate the position of the 10-ship fleet in the grid. The fleet is shown to the right of the grid: one 4-unit battleship, two 3-unit cruisers, three 2-unit destroyers, and four 1-unit submarines. Each segment of a ship occupies a single cell; ships are oriented either horizontally or vertically. Ships do not touch each other, even diagonally.

In this variation of Battleships, the values on the right and bottom edges of the grid reveal the sum of the numbers in each of the ship segments that appear in each respective row or column.

Example:

	K	L	M	N	O	P	
A	9	1	3	2	2	5	1
B	2	7	6	7	1	2	14
C	1	8	8	8	8	4	12
D	2	2	4	1	2	2	0
E	4	1	2	3	4	5	6
F	4	1	1	3	9	5	14
	8	16	3	7	9	4	

|	K	L	M	N	O	P	Q	R	S	T	
A	1	4	5	6	8	8	3	2	5	4	4
B	2	2	2	3	3	4	8	9	7	6	20
C	5	2	1	3	8	9	2	6	5	4	14
D	4	3	4	5	8	2	5	4	4	9	5
E	7	2	5	7	4	7	3	6	3	8	3
F	5	1	5	6	1	6	2	4	7	8	12
G	6	8	6	5	2	5	1	3	1	6	6
H	9	4	6	3	1	3	7	1	7	5	1
I	4	8	6	2	3	1	8	3	6	3	3
J	8	8	3	1	2	2	1	6	5	4	16
	7	9	5	9	5	4	16	10	5	14	

Answer: Enter the location of the four submarines (i.e., the single-segment ships) using the letters to the left and on top of the grid as coordinates. In the example, the three submarines are at BN, CP, and FO.

21. Hexasperation - 30 points

Find a looped path through the grid subject to the following constraints: the path must proceed from one cell to an adjacent cell, it must pass through no cell more than once, it must not go through any numbered cells, and must never make a sharp-angled turn (i.e., a turn at a 60° angle). Each number indicates how many of the adjacent cells are part of the path.

Example:
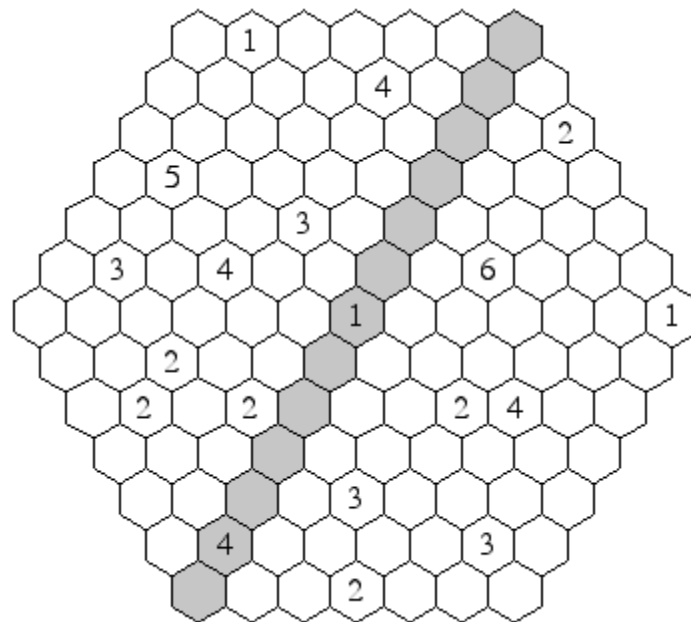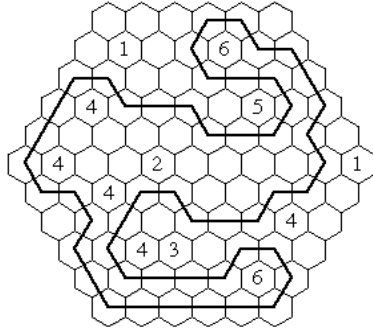
Answer: Indicate which of the highlighted cells from lower-left to upper-right are part of the path. Use a 1 to indicate that the path goes through a cell; use a 0 to indicate that the path does not go through a cell. List the thirteen digits in order from lower-left to upper-right. The answer for the example grid would be "11001010110".

## 22. Rolling Block Maze - 20 points + 10 bonus points for shortest solution

This is a multi-level rolling block maze with the following rules:
1. Each of the dark blocks (A, B, C) can roll in any of four directions, using one of its base edges as the axis of rotation. The light-colored walls are barriers, not blocks, and do not move.
2. A block cannot roll if it is obstructed by other blocks or barriers, if it would fall outside the edge of the maze, or if the new base would not fully supported from below.
3. The blocks can never change levels. Block A must always rest of the floor of the maze; block B must always rest on the first level; and block C must always rest on the second level.

Note the dimensions of the blocks and barriers: A (1x1x2), B (1x1x2), C (1x1x1); the gray barriers are all (1x1x1) cubes.

For example, block B cannot move first. Block A can only roll South. After that, B can roll East (partially supported by A), but not North, South or West. If, instead, block A first rolled South twice, then C could roll West (supported by A), but in no other direction.

The goal of the maze is to move block C on top of space X. Any solution of 75 or fewer moves is worth 20 points. A solution using the fewest number of moves is worth an additional 10 bonus points.
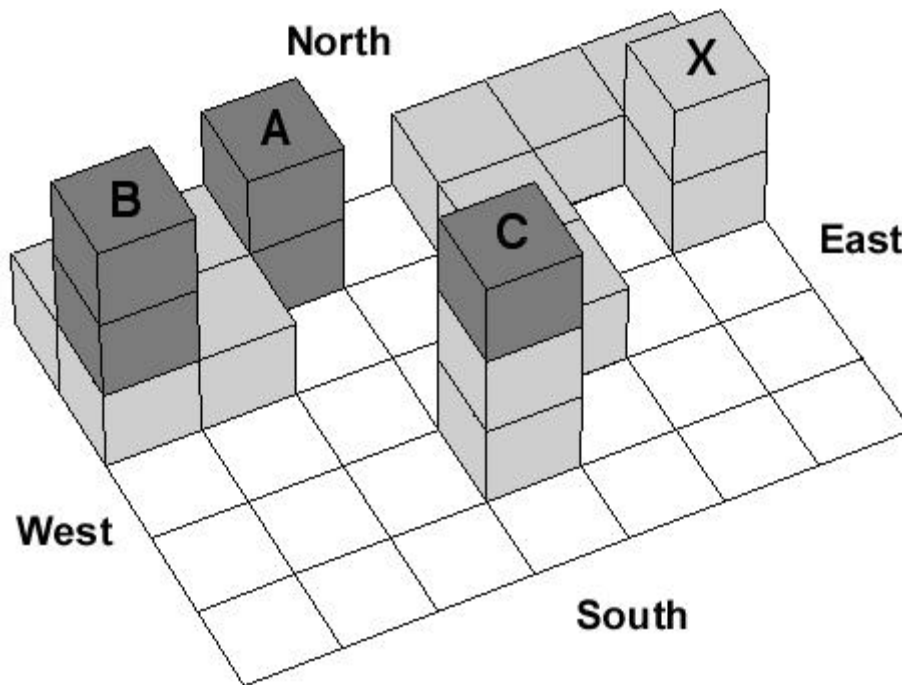
Answer: Enter the number of moves followed by a list of the moves, grouped by consecutive moves of the same block. In the last example above, the three moves could be described as: 3: A(ss), C(w).

END OF TEST