Games

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Problem 1. Two players take turns breaking up a rectangular chocolate bar 6 squares wide by 8 squares long. They may break the bar only along the divisions between the squares. If the bar breaks into several pieces, they keep breaking the pieces up until only the individual squares remain. The player who cannot make a break loses the game. Who will win?

Problem 2. Two players take turns putting pennies on a round table, without piling one penny on the top of another. The player who cannot place a penny looses.

Problem 3. Two players take turns placing bishops on the squares of a chessboard, so that they cannot capture each other. (The bishops may be placed on squares of any color.) The player who can not move loses.

Problem 4. On a chessboard a rook is placed on square $a1$. Players take turns moving the rook as many squares as they want, either horizontally to the right or vertically upward. The player who can place the rook on square $h8$ wins.

Problem 5. A king is placed on square $a1$ of a chessboard. Players take turns moving the king either upwards, to the right, or along a diagonal going upwards and to the right. the player who places the king on square $h8$ is the winner.

Problem 6. The number 60 is written on a blackboard. Players take turns subtracting from the number on the black board any of its divisors and replacing the original number with the result of the subtraction. The player, who writes the number 0 looses.

Problem 7. This game begins with the number 2. In one turn, a player can add to the current number any natural number smaller than it. The player who reaches 1000 wins.

Problem 8. There are 20 points on a circle. Players take turns connecting two out of these 20 points by segments so that the new segments do not intersect segments that are already drawn. The player who cannot draw a segment loses. Define a winning strategy. Create similar problems with different starting numbers of points.

Problem 9. Ten 1's and ten 2's are written on a blackboard. In one turn a player may only erase any two figures. If the two figures erased are identical, they are replaced with a 2, if they are different, they are replaced with a 1. The first player wins if a 1 is left at the end and the second player wins if a 2 is left.

Problem 10. There are three piles of stones. The first contains 50 stones, the second 60 stones, and the third 70. A turn consists in dividing each of the piles containing more than one stone into two smaller piles. The player who leaves piles of individual stones is the winner.

Problem 11. There are two piles of candy. One contains 20 pieces, and the other 21. Players take turns eating all the candy in one pile, and separating the remaining candy into two (not necessarily equal) non-empty piles. The player who cannot move loses

Problem 12. There are two piles of 11 matches each. In one turn, a player must take two matches from one pile and one match from the other. The player who cannot move loses.

Problem 13. There are two piles of matches:

(a) a pile of 101 matches and a pile of 201 matches;

(b) a pile of 100 matches and a pile of 201 matches.

Players take turns removing a number of matches from one pile which is equal to one of the divisors of the number of matches in the other pile. The player removing the last match wins.