Problem 1.

Let's paint the table like a chess-board. Then each white ~~squar~~ cell has only black squares for neighbors and each black square has only white squares for neighbors. The number of white squares is equal to the number of ~~(sm)~~ black squares. We can put in the white squares number 1 and in the black squares - number 2.

So the sum is:

~~(5000. 1+5000.2)~~ $5000.1+5000.2 = 5000+10000 = 15000.$

The sum 15000 is the smallest possible.

Answer: 15000.

Problem 2

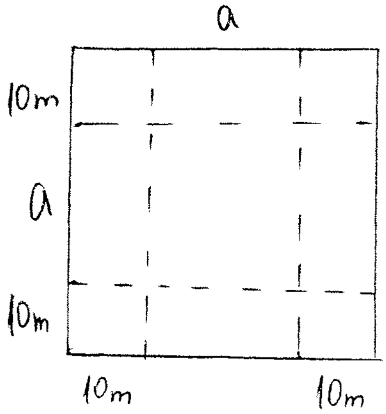
The example is:

$25 \to 75 \to 225 \to 25$

or

$75 \to 225 \to 25 \to 75$

Problem 3



Let us mark with:

a - the length of the square-pond

x - the number of days

On the x^{th} day $10 \cdot x$ m will be equal to the half of a.

So:

$$10x = \frac{a}{2}$$

$$x = \frac{a}{20}$$

x must be whole number, so we can see the different cases:

- $x = 1 \Rightarrow a = 20$

  The ice sector $\overbrace{\text{}}^{\text{after the first day}}$ is $4 \cdot (a-20) \cdot 10 + 4 \cdot 10 \cdot 10 = 400$

  But 400 is 100% of $400 = 20^2$.

- $x = 2 \Rightarrow a = 40$

  The ice sector after the first day is:

  $4 \cdot (40-20) \cdot 10 + 400 = \cancel{2400}\ \cancel{600}\ 1200$

  ~~But 1200 is~~ $\cancel{\frac{600}{1600} \cdot 100 =}$ But 1200 is $\frac{1200}{1600} \cdot 100 = 75\%$ of $1600 = 40^2$.

- $x = 3 \Rightarrow a = 60$

  The ice sector after the first day is:

  $4 \cdot (60-20) \cdot 10 + 400 = 2000$

  But 2000 is $\frac{2000}{3600} \cdot 100 = 55\frac{5}{9}\%$ of $3600 = 60^2$.

Problem 3 - continue

- $x=4 \Rightarrow a=80$

The ice sector after the first day is:

$4\cdot(80-20)\cdot 10+400=2800$

But 2800 is $\frac{2800}{6400}\cdot 100=43{,}75\%$ of $6400=80^2$.

- $x=5 \Rightarrow a=100$

The ice sector after the first day is:

$4\cdot(100-20)\cdot 10+400=3600$

But 3600 is $\frac{3600}{10000}\cdot 100=36\%$ of $10000=100^2$.

- $x=6 \Rightarrow a=120$

The ice sector after the first day is:

$4\cdot(120-20)\cdot 10+400=4400$

But 4400 is $\frac{4400}{14400}\cdot 100=30\frac{5}{9}\%$ of $14400=120^2$.

- All another values of x give ~~smallest~~ smaller percents than $30\frac{5}{9}\%$. So it is impossible to do that.

Problem 4

The rectangle has a size of $11 \cdot 12 = 132$ square units.

We have that:

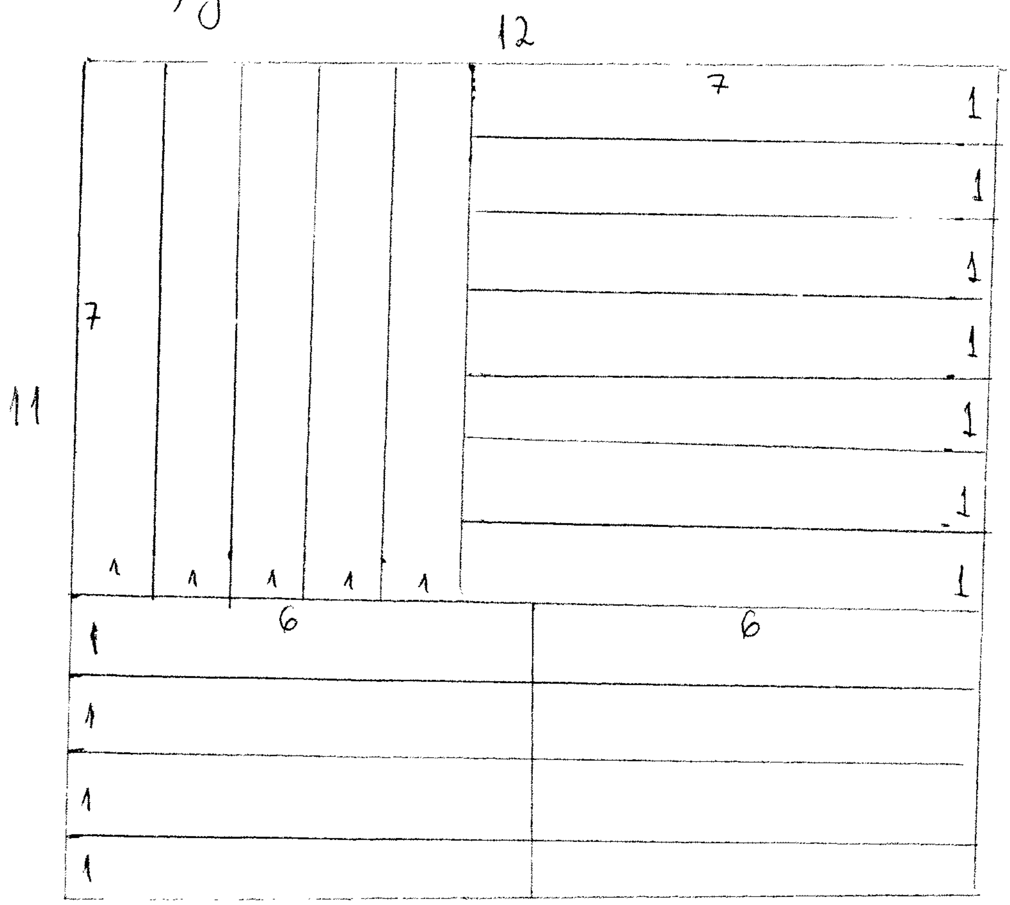
$132 = x \cdot 6 + y \cdot 7$, where x - is the number of the strips 1×6
y - is the number of the strips 1×7

For x and y we have that cases:

- $x = 1$; $y = 18$

This case is impossible, because ~~anyway~~ in all ways to put the strip 1×6, we can't put the 18 strips 1×7 to fill the whole rectangle 11×12.

- $x = 8$; $y = 12$



Here is an example. In all another cases the number of strips is bigger. So the smallest number of strips is 20.

Answer: 20

Problem 5

If there are no bags in bags:
We need $\frac{100(100+1)}{2}^{*} = 5050$ candies.

*
$\frac{100(100+1)}{2} = 1+2+3+\ldots+100$

If there are 50 pairs of 2 bags, where one of them is in the other.
The smallest sum is $2+4+6+\ldots+98+100 = \frac{50.102}{2} = 2550$ candies, ~~But~~ but we have only 2018. (In this case the bag with 2 candies includes the bag with ~~one~~ 1 candy, the bag with 4 candies - the bag with 3 candies and so on).
So we need a bag that contains a bag with another bag inside.