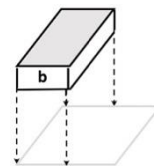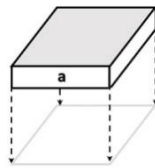- SECOND QUESTION: Maximum Score: 0.3 puntos.

A game consists of stacking two types of pieces described in the figures: (a) square and (b) rectangular, so as to form a tower with a square base and no holes. The pieces are placed one on top of the other, one by one, on the face with the largest surface area, completing floors, as shown in the figure.

A new floor cannot be started if the previous floor has not been completed.

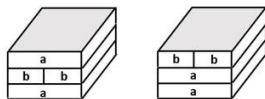Two impermissible constructions are shown in the figure.

Design a **minimal DFA** to serve as a model to generate correct constructions, with a number of floors $n \geq 1$
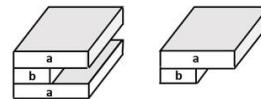
Drawing of independent pieces:
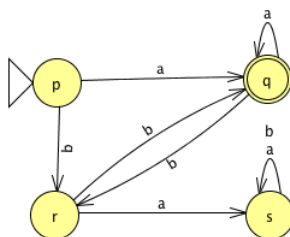

Description of the stacks:

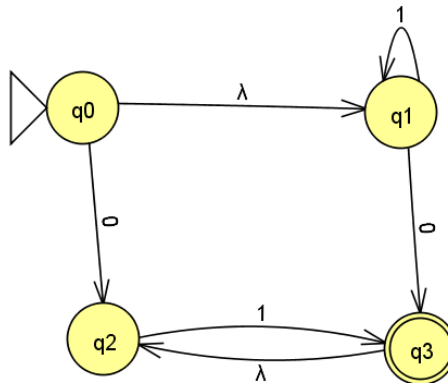| Correctly positioned pieces	Incorrectly positioned pieces

Solution:

- THIRD QUESTION: Maximum Score: 0.3 puntos
  Given the following NDFA in the figure below, calculate the minimal equivalent DFA. Besides, indicate the language it recognizes and argument about why it is the same for both automata.
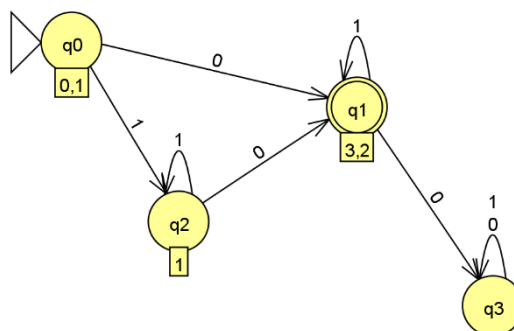

SOLUTION

1) T* calculation:

	0	1	λ	$\lambda*$	$\lambda*0\,\lambda*$	$\lambda*1\,\lambda*$
-->q0	q2		q1	{q0, q1}	{q2, q3}	{q1}
q1	q3	q1		{q1}	{q2, q3}	{q1}
q2		q3		{q2}	{Ø}	{q2, q3}
*q3			q2	{q2, q3}	{Ø}	{q2, q3}

2) AFD= ({0,1}, {Q0, Q1, Q2, Q3}, f, Q0, {Q1}), where f is:

	0	1
-->Q0 = {q0, q1}	Q1	Q2
*Q1 = {q2, q3}	Q3	Q1
Q2 = {q1}	Q1	Q2
Q3 = {Ø}	Q3	Q3

3) Minimal DFA:

	0	1
-->C1 = {Q0, Q2}	C2	C1
*C2 = {Q3}	C3	C2
C3 = {Ø}	C3	C3
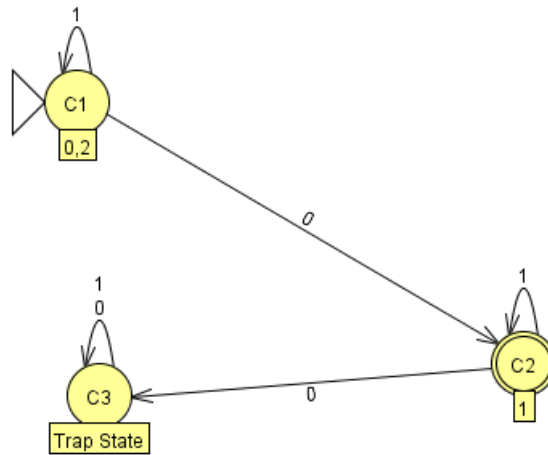
The language is: L = $\{1^n 0 1^m / m,n \geq 0\}$