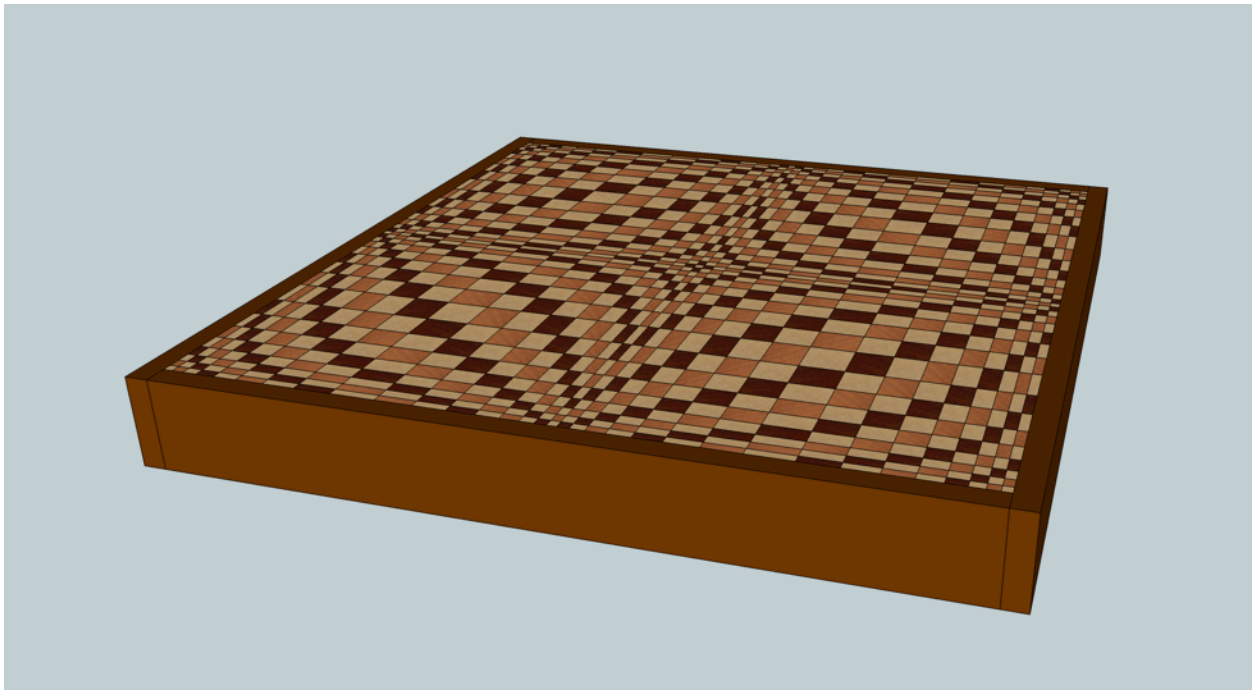
# A "WAVE"
# 3D END GRAIN CUTTING BOARD

**mtmwood**
**2014**

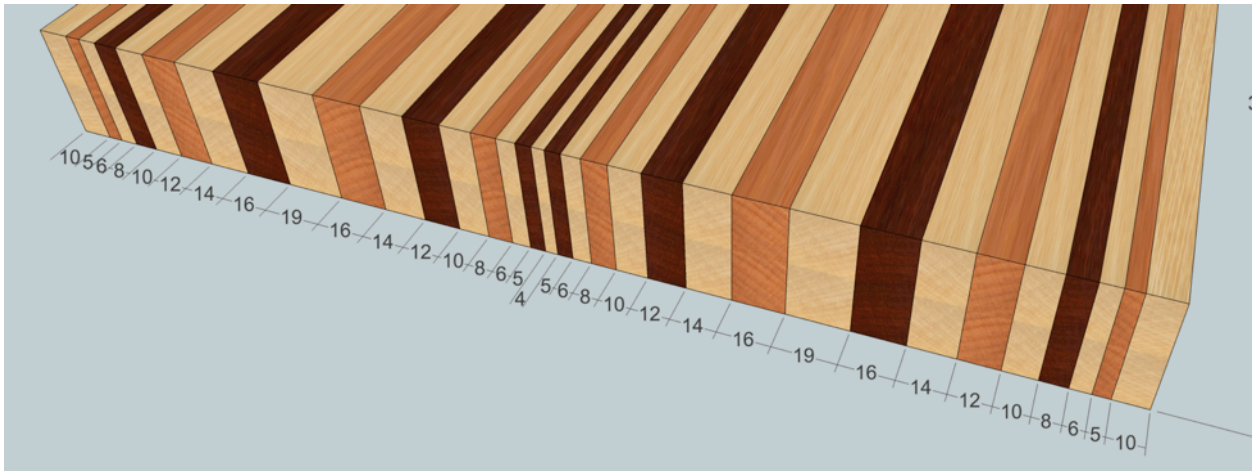
A «Wave» pattern is based on old well-known optical illusion.



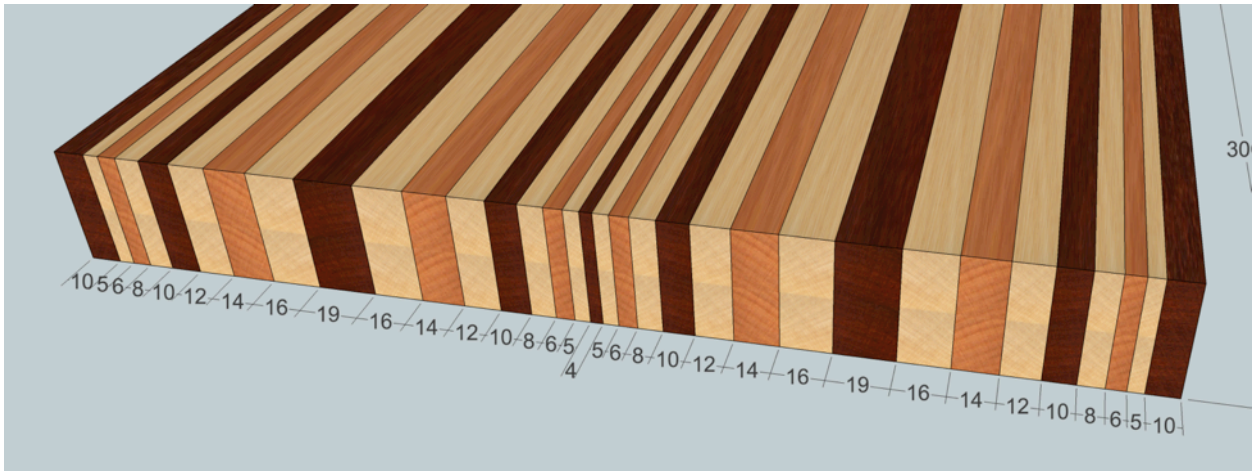
I used hard maple, movingui and padauk for main part of the board and sapele for the frame. You may use other contrasting wood species. You need the types of wood: light wood (maple, hornbeam, birch), dark wood (padauk, walnut, sapele, purpleheart) and middle tone wood (movingui, cherry, oak).

We want to get the checkered pattern (but not a chess board pattern) board. The “Wave” pattern is complex enough and consists of four types of boards.

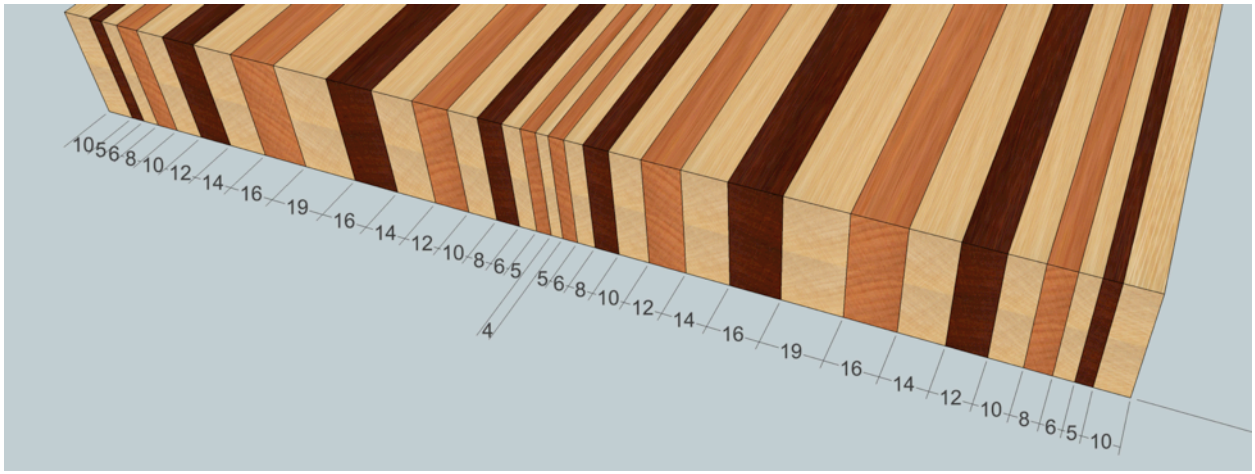
1st board:



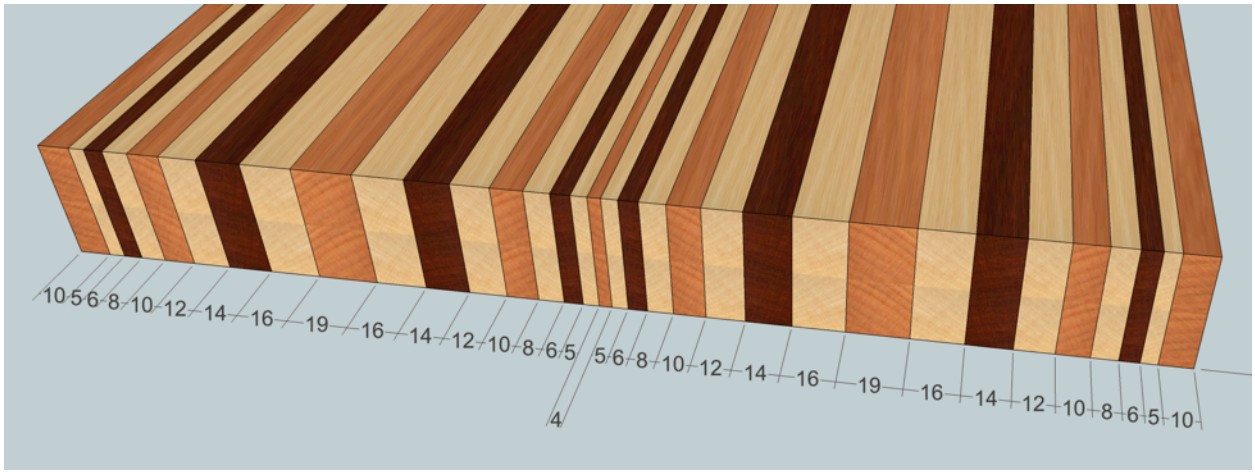
2nd board:



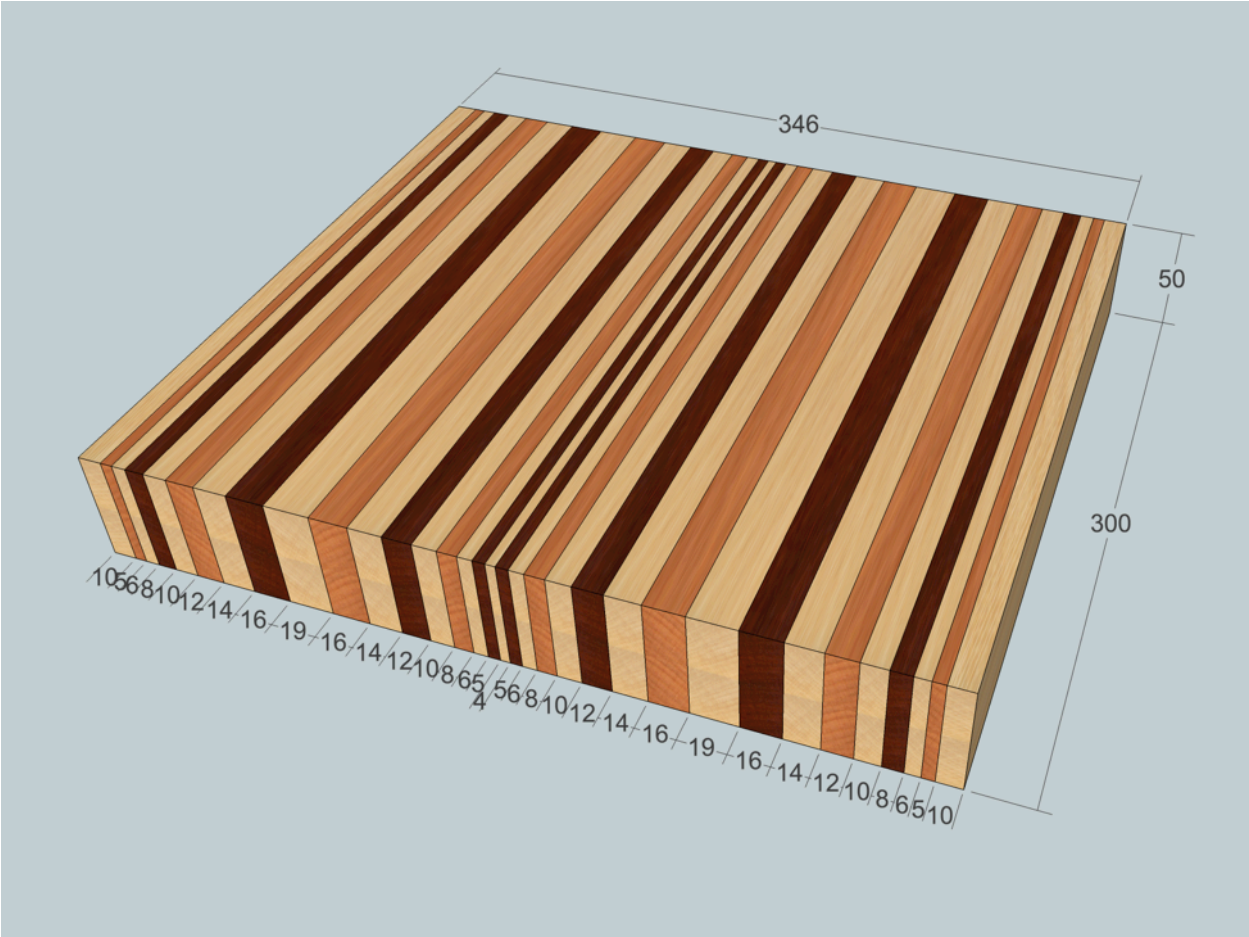

3rd board:




4th board:



First of all it is necessary to make four boards. The length of each board must be no less than 300 mm, the thickness – 45-50 mm.



To make these boards you need equal thickness of all used lumber. I had 2” padauk, 2” movingui and only 1” maple. So I did the following.

1. Processed 2” lumber on jointer and planer and got 48.9 mm thickness.

2. Cut the 48.9 mm maple slats

3. Finally I rotated maple slats by 90 degrees and got equal thickness of all three woods.

Now start making the boards. You should cut your lumber on narrow strips.

The 1st board consist of the following strips:
Maple:

- 4 mm – 1 pc;
- 6 mm – 4 pcs;
- 10 mm - 6 pcs;
- 14 mm - 4 pcs;
- 19 mm – 2 pcs.

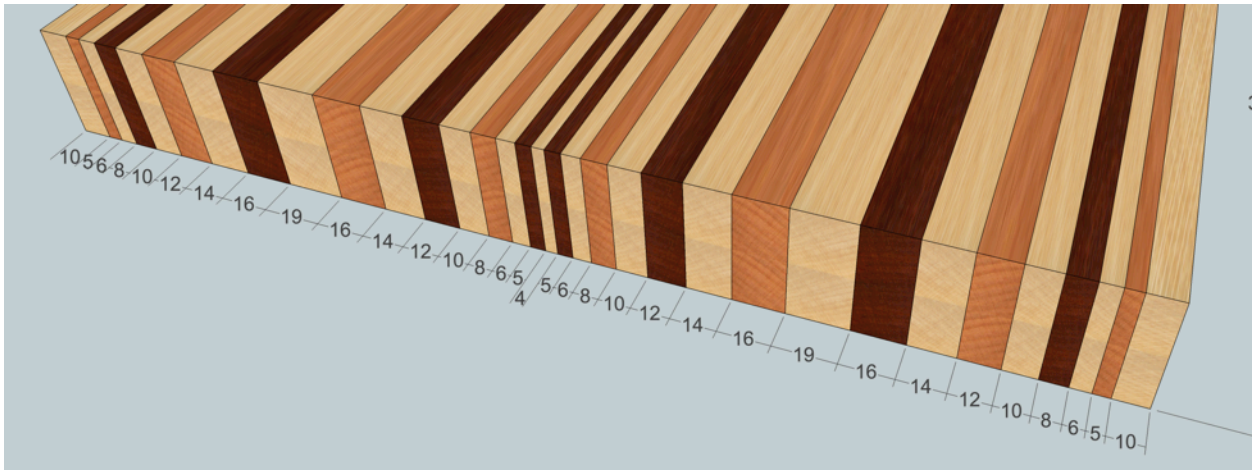
Padauk:

- 5 mm - 2 pcs;
- 8 mm – 2 pcs;
- 12 mm - 2 pcs;
- 16 mm – 2 pcs.

Movingui:

- 5 mm - 2 pcs;
- 8 mm – 2 pcs;
- 12 mm - 2 pcs;
- 16 mm – 2 pcs.

Total: 33 pcs.



The 2nd board:
Maple:

- 5 mm - 4 pcs;
- 8 mm – 4 pcs;
- 12 mm - 4 pcs;
- 16 mm – 4 pcs.

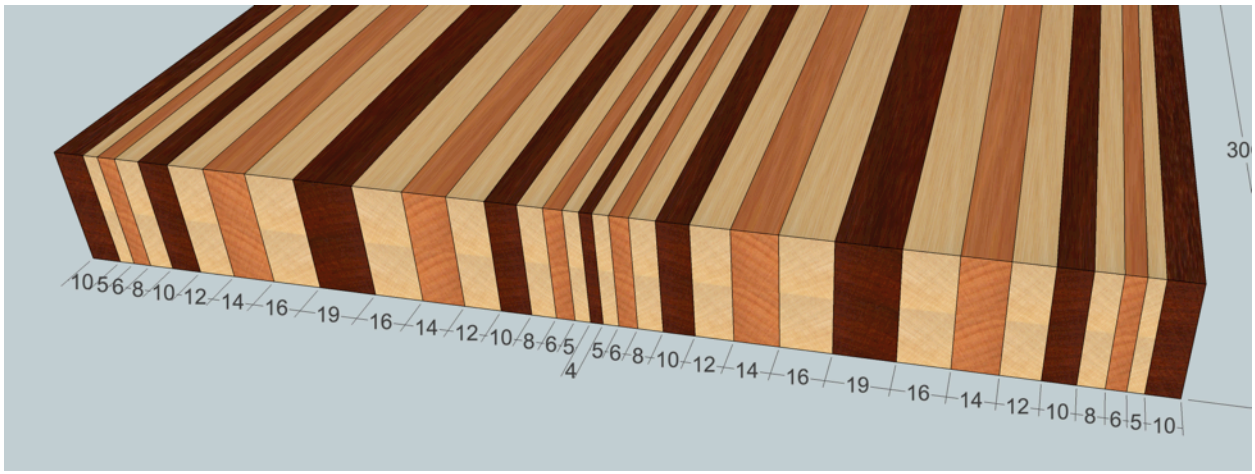
Padauk:

- 4 mm – 1 pc;
- 10 mm - 6 pcs;
- 19 mm – 2 pcs.

Movingui:

- 6 mm - 4 pcs;
- 14 mm – 4 pcs.

Total: 33 pcs.



The 3rd board:
Maple:

- 4 mm – 1 pc;
- 6 mm – 4 pcs;
- 10 mm - 6 pcs;
- 14 mm - 4 pcs;
- 19 mm – 2 pcs.

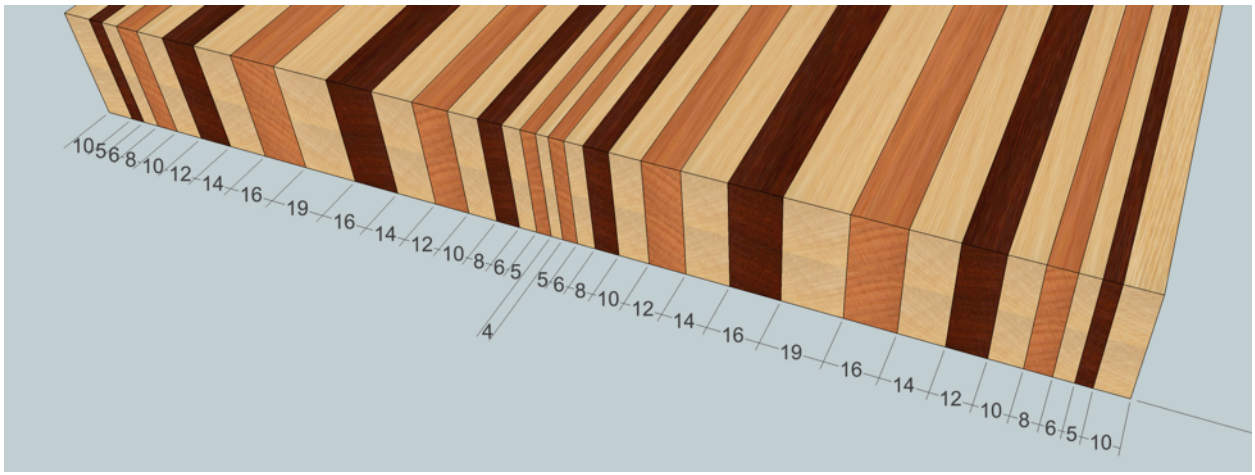
Padauk:

- 5 mm - 2 pcs;
- 8 mm – 2 pcs;
- 12 mm - 2 pcs;
- 16 mm – 2 pcs.

Movingui:

- 5 mm - 2 pcs;
- 8 mm – 2 pcs;
- 12 mm - 2 pcs;
- 16 mm – 2 pcs.

Total: 33 pcs.



The 4th board:
Maple:

- 5 mm - 4 pcs;
- 8 mm – 4 pcs;
- 12 mm - 4 pcs;
- 16 mm – 4 pcs.

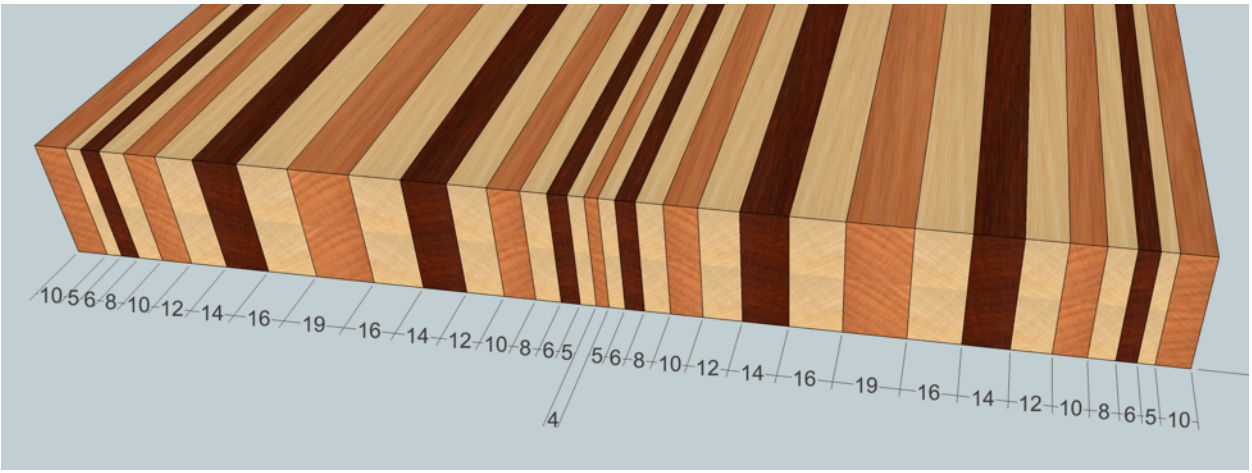
Padauk:

- 6 mm - 4 pcs;
- 14 mm – 4 pcs;

Movingui:

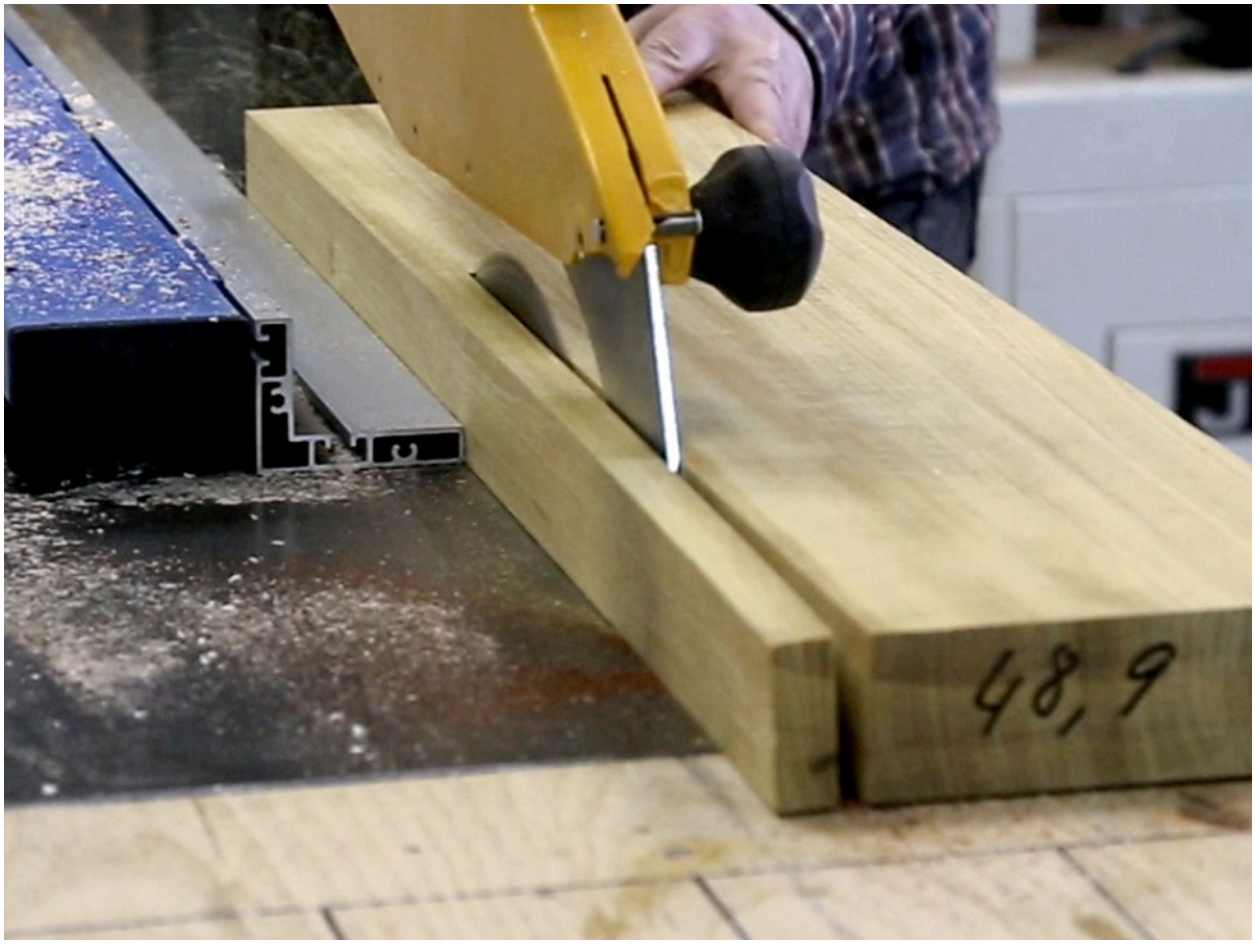
- 4 mm – 1 pc;
- 10 mm - 6 pcs;
- 19 mm – 2 pcs.

Total: 33 pcs.

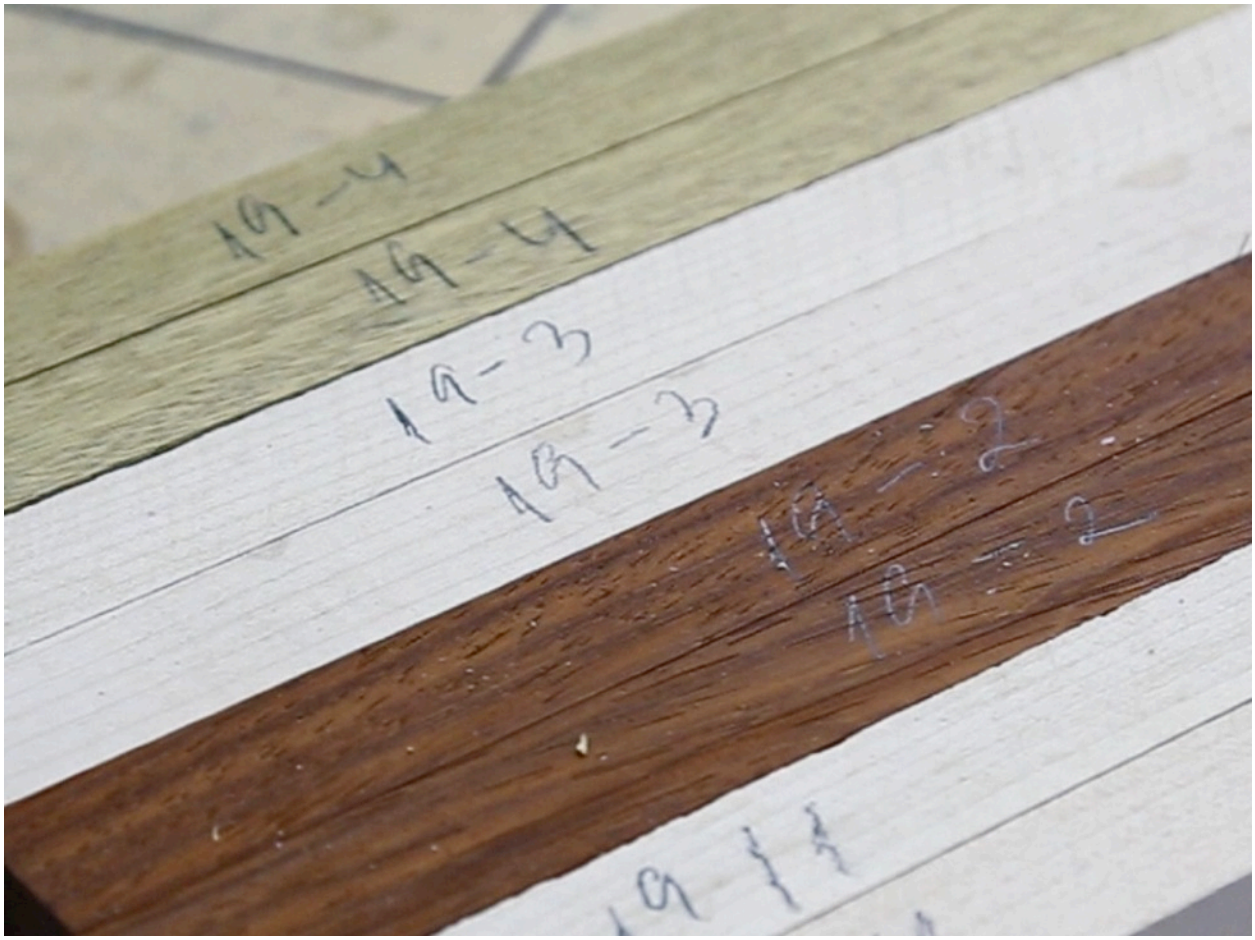



NB! Note, that the strips at the edges are 10 mm width, but in the finished cutting board they will be 4 mm. We will cut 6 mm later.

Cut all strip 1-2 mm thicker to make the exact thickness on the planer.



Mark all strips. For example, “19-4” means 19 mm strip of 4th board.



Then process the strips by the planer.
NB! It extremely important to process all strips the same thickness from the different boards at one time at one level of the planer. All four boards will be jointed together in one cutting board, so even the small differences in thickness will break the pattern of the cutting board.
For example, set the level of the planer at 19 mm and plane all eight strips from four boards at one time.

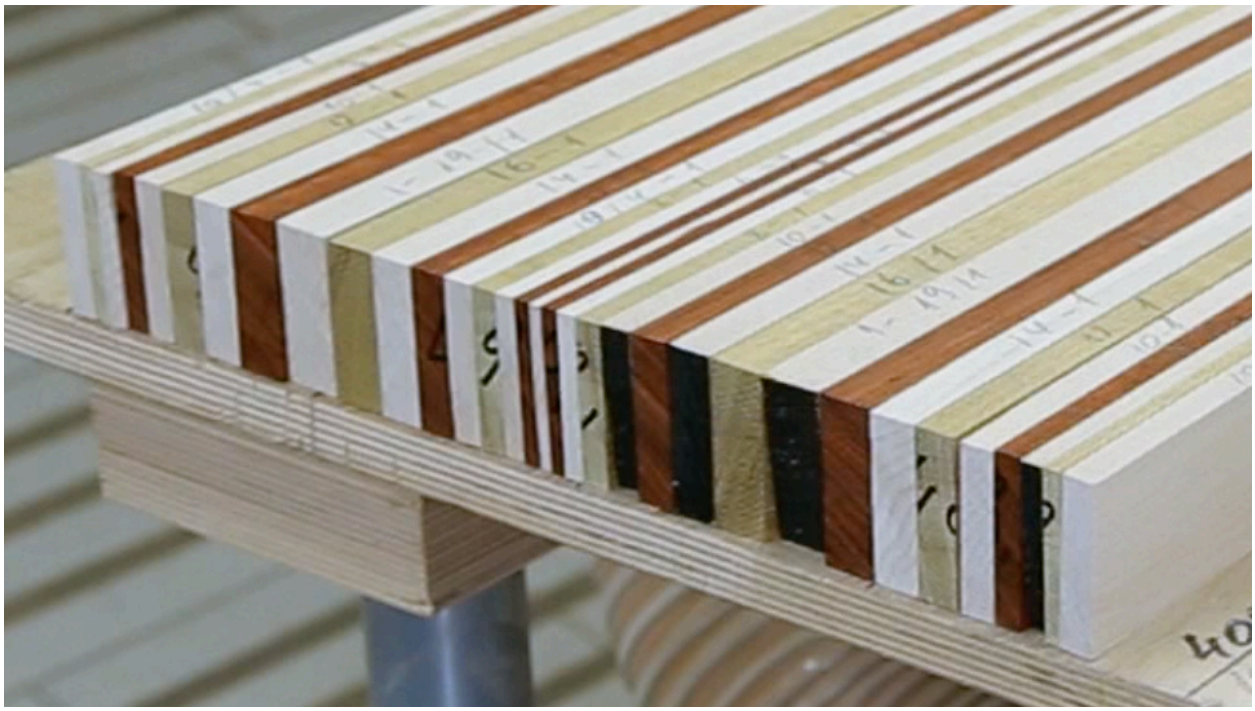
Actual thickness may be slightly more or less than 19 mm, but the thickness of all eight strips must be the same!

You will get four boards.

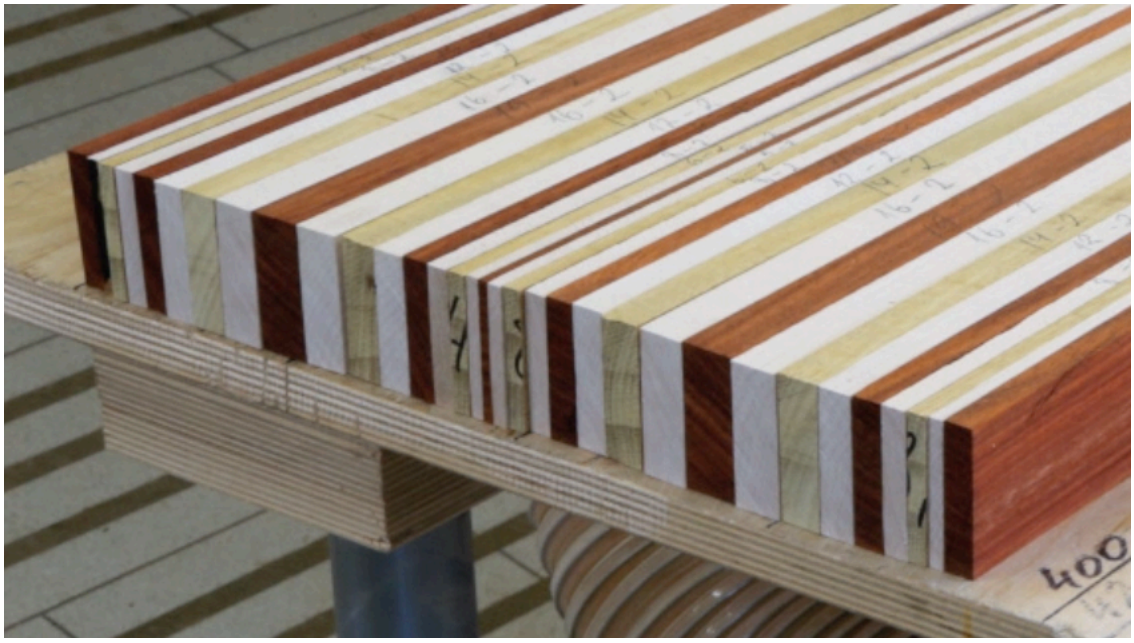
Make one more board for the frame. We used sapele wood. The thickness of the ready board should be 10 mm.

Place the strips in the necessary order as shown at the drawings above.
The 1st board:
Before:

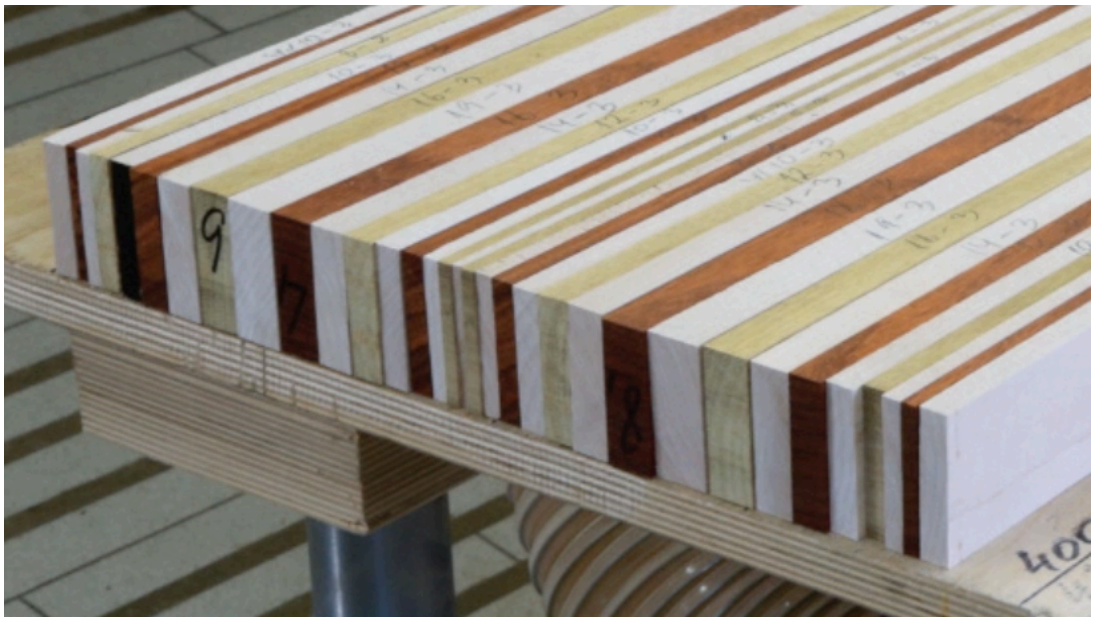
After:



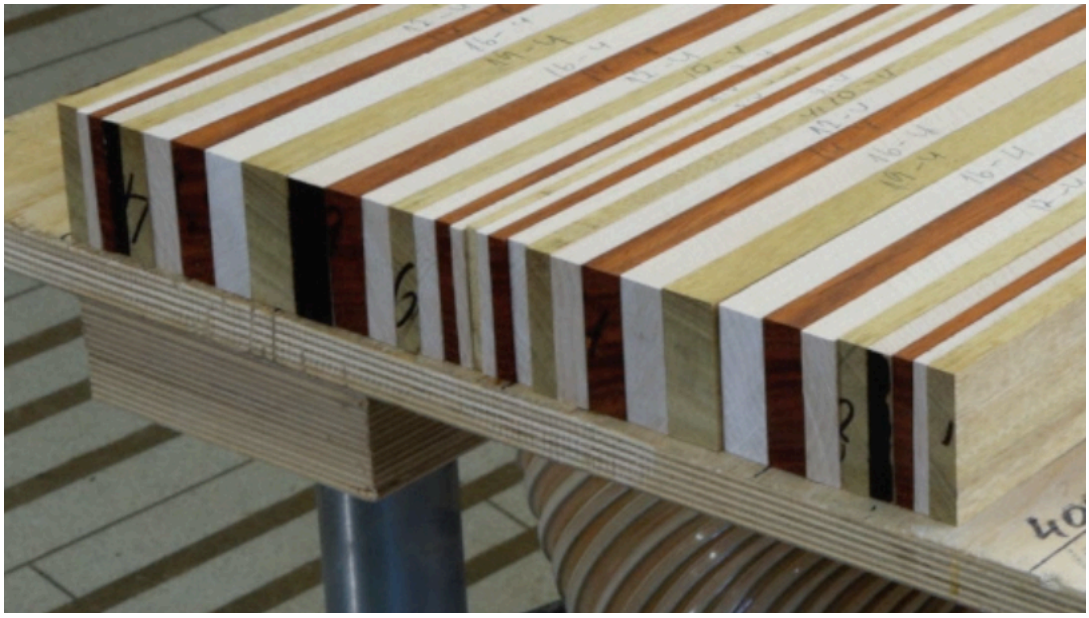
The 2nd board:



The 3rd board:



The 4th board:



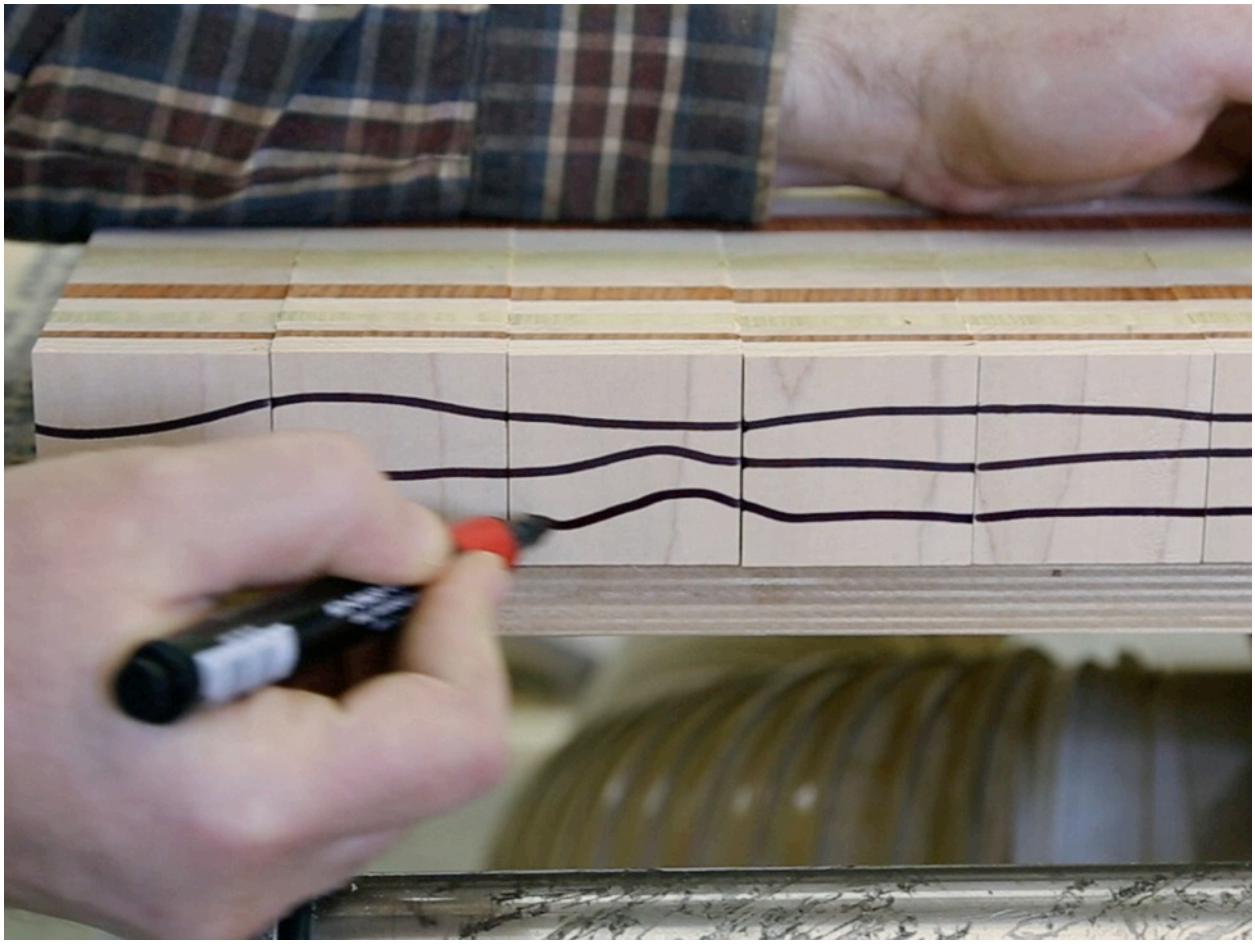
Glue the boards.

Wait a night.

Plane the boards. The thickness of boards may differ.

Set the table saw cutting width 43-44 mm. The thickness of finished cutting board should be 40 mm. Cut the strips and rotate each strip 90 degrees.

Mark the strips of all four boards. For example, mark the 3rd board strips by three lines.



Then cut narrow strips.
NB: Make the strip thickness 1-2 mm larger. Drum sander will remove additional thickness later.

Mark all strips by number of the board and the thickness of the strip.

You should get the following strips.

1st board strips, mm:
4 (3 pcs.), 10 (4 pcs.), 19 (2 pcs.);

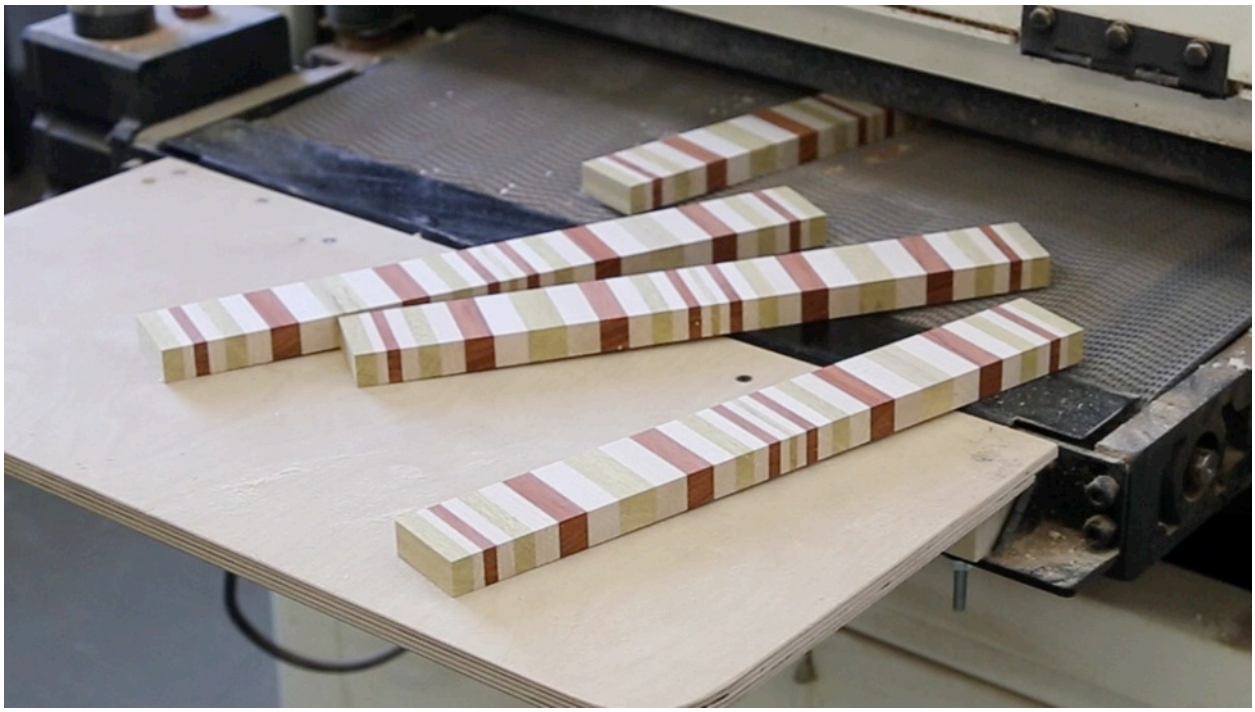
2nd board strips, mm:
5 (2 pcs.), 8 (2 pcs.), 12 (2 pcs.), 16 (2 pcs.);

3rd board strips, mm:
6 (4 pcs.), 14 (4 pcs.);

4th board strips, mm:
5 (2 pcs.), 8 (2 pcs.), 12 (2 pcs.), 16 (2 pcs.);

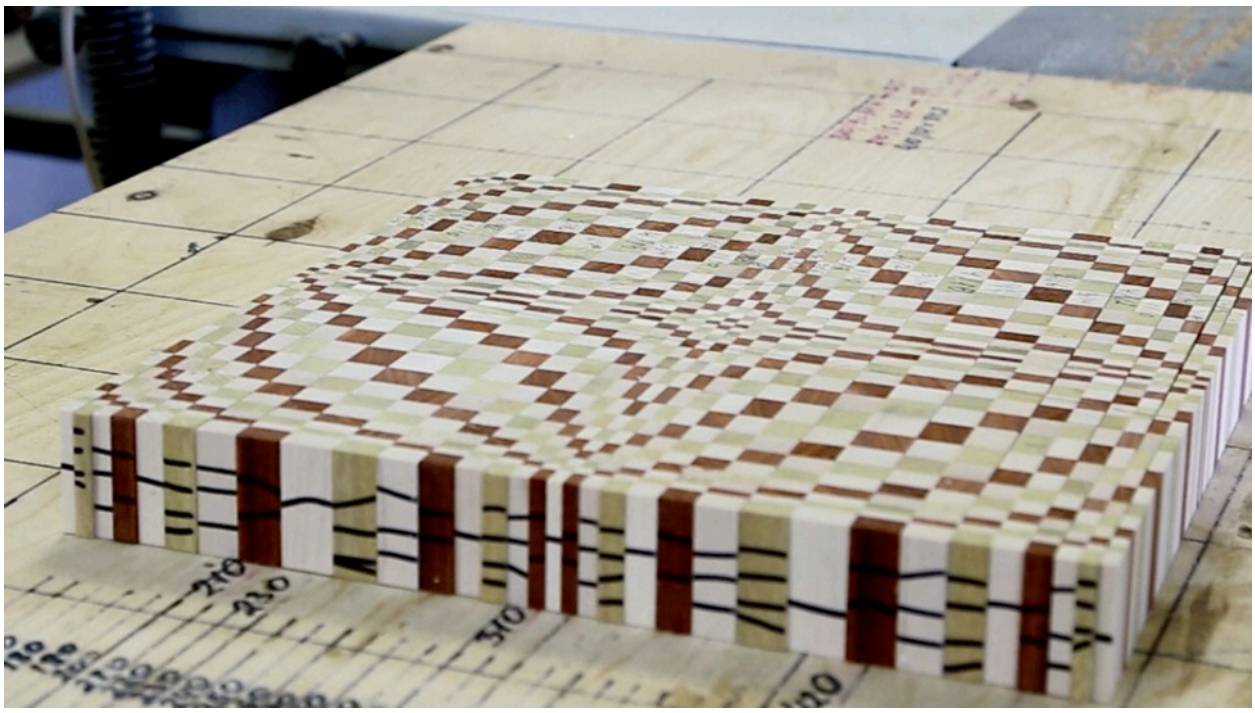
Total: 33 pcs.

Use the drum sander to sand the strips. The strips of the same thickness from different boards sand at one time.



Collect the cutting board. Start from the edge.
The correct sequence of the strips is the following:

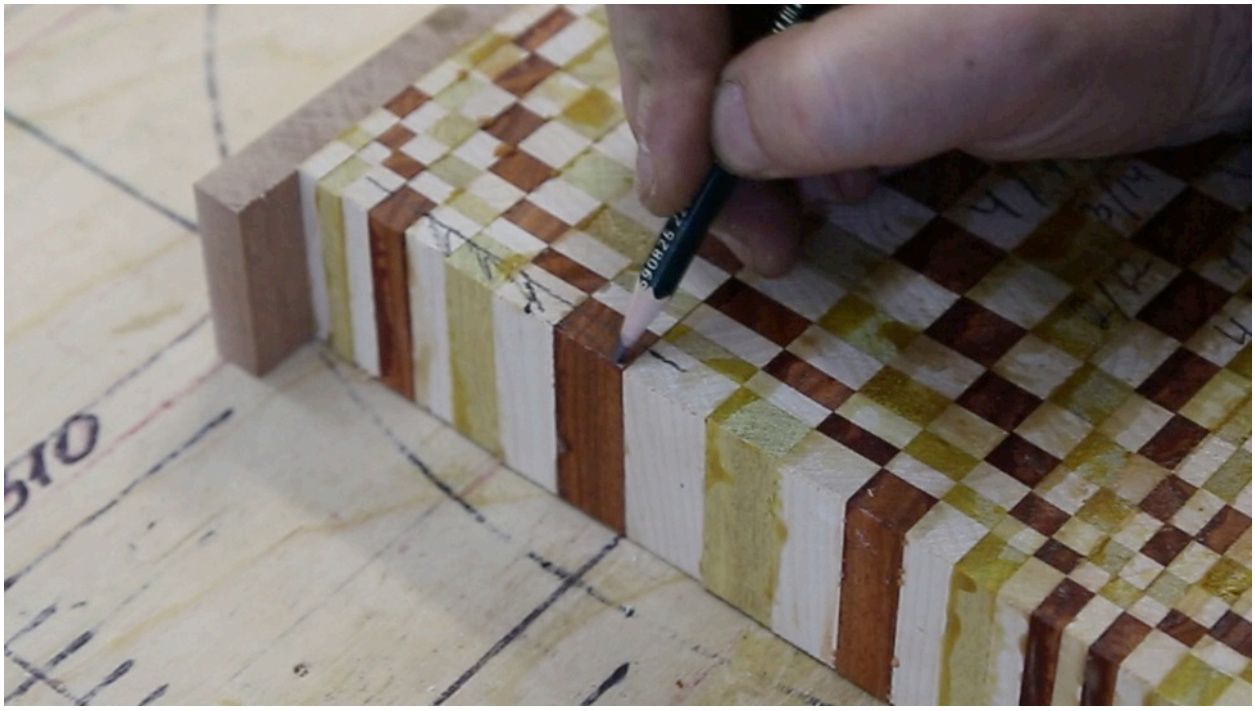
1st board – 4 mm;
4th board – 5 mm;
3rd board – 6 mm;
2nd board – 8 mm
1st board – 10 mm;
4th board – 12 mm;
3rd board – 14 mm;
2nd board – 16 mm
1st board – 19 mm;
4th board – 16 mm;
3rd board – 14 mm;
2nd board – 12 mm
1st board – 10 mm;
4th board – 8 mm;
3rd board – 6 mm;
2nd board – 5 mm
1st board – 4 mm;
2nd board – 5 mm
3rd board – 6 mm;
4th board – 8 mm;
1st board – 10 mm;
2nd board – 12 mm
3rd board – 14 mm;
4th board – 16 mm;
1st board – 19 mm;
2nd board – 16 mm
3rd board – 14 mm;
4th board – 12 mm;
1st board – 10 mm;
2nd board – 8 mm
3rd board – 6 mm;
4th board – 5 mm;
1st board – 4 mm;
Total: 33 pcs.



Glue the cutting board. Add two sapele strips at the edges. Use Titebond III glue. You have only 15 minutes to glue thirty-five strips.

Wait a night.

The rows at the edges should be 3 mm.



Cut the excess at the table saw.

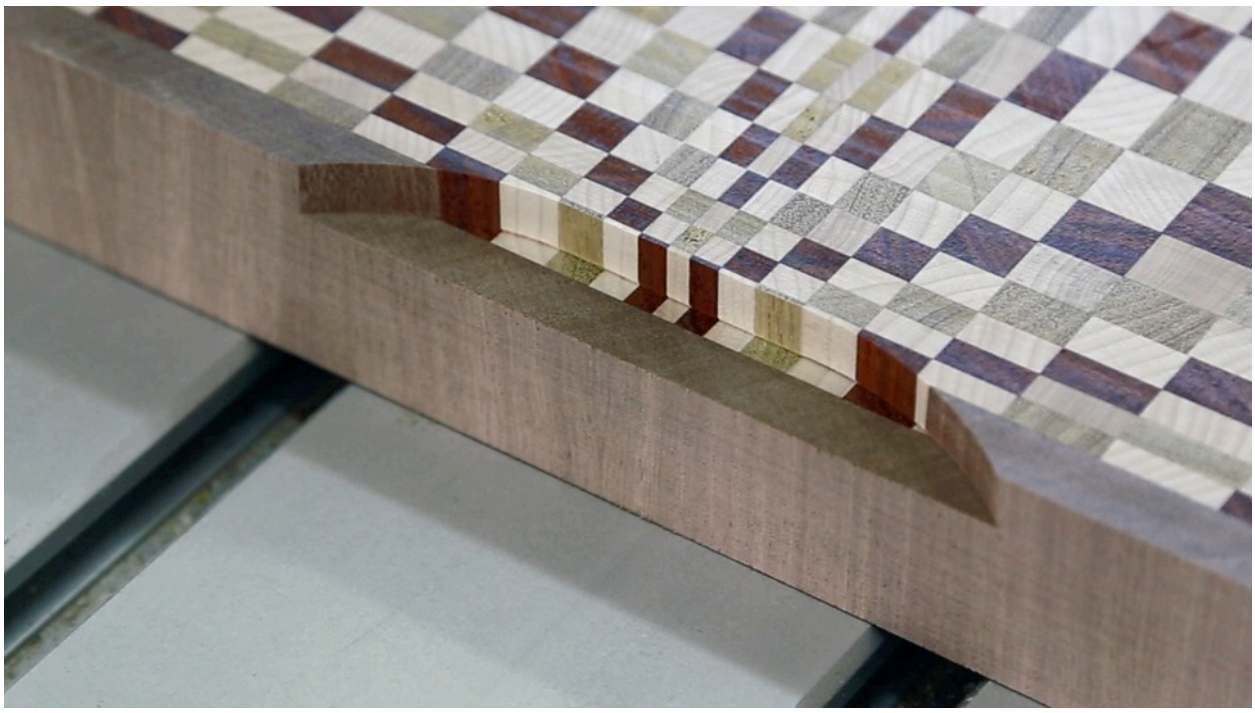
Glue the remaining sapele strips. Use sacrificial rails. These rails will protect the cutting board edges while planning. Front rail is necessary to ensure a smoother entry the board into the planer. Back rail is needed in order to prevent tearing out the fibers at the exit the board from the planer.

Wait 24 hours.

Plane the board. The planer experiences high overloads while planning the end grain surfaces. Therefore it is necessary to remove only 0.3-0.5 mm of material in one pass. Also it is necessary to reduce this value twice during the last pass.

Saw off the sacrificial rails.

Make finger grips by shaper or router.



It's useful to use the drum sander for levelling. But if you do not have such a machine, you may go directly to the orbital sander.

First use 150 sandpaper. Start with 100 sandpaper, if you skip the drum sander operation. And finish sanding by 220-240 sandpaper.

Finally process the board by mineral oil. You should firmly close the pores of the wood and prevent the ingress of moisture into the fibers. You should treat the board by food grade mineral oil to prolong service life, to protect against bacteria and to make beautiful appearance of a board. Mineral oil is tasteless and odourless. Sunflower, olive, and other food grade oils cannot be used for treatment, because after a while they become bitter and will transmit this taste to foodstuff.
You can also treat the cutting board by mixture of mineral oil and beeswax (4:1 ratio)

Enjoy your cutting board!