CadnanoSQ interface (1/4)

Editing tools we will use

edit (v) — Allows you to drag ends of 3' and 5' ends

break (b) — Breaks an existing strand into two pieces

erase (e) — Deletes the entirety of a strand on a single helix

auto staple — Populates all existing scaffold strand (blue) with staples. Also adds crossovers where possible.
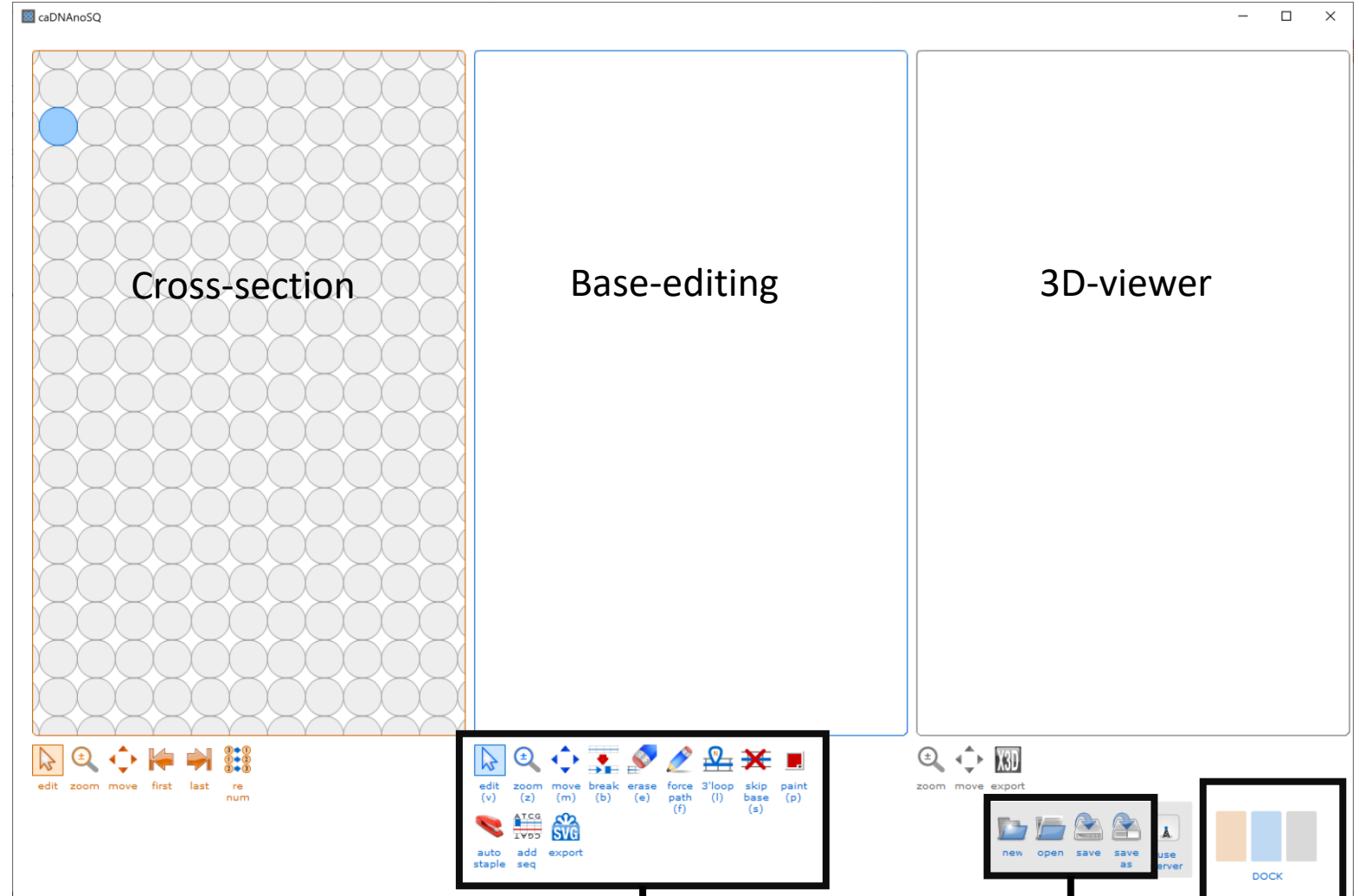
force path (f) — Creates a connection with no length, between two bases (5' to 3'). Allows for things to be spaced out in Cadnano.

move (m) — Moves you around the "Base-editing" window. Can also do this with the arrow keys.

**Beware! In this older version of Cadnano there is no undo feature** ☹

caDNAnoSQ

Cross-section

Base-editing

3D-viewer

edit (v)   zoom (z)   move (m)   break (b)   erase (e)   force path (f)   3'loop (l)   skip base (s)   paint (p)

auto staple   add seq   export

zoom   move   export

new   open   save   save as   use server

DOCK

Editing Tools

Save options

Toggle active regions

Changing working area

Adding cross-overs

To add more bases: with the **Edit (v)** tool selected, move the orange bar (click and drag) all the way to the right of the "Base-editing"
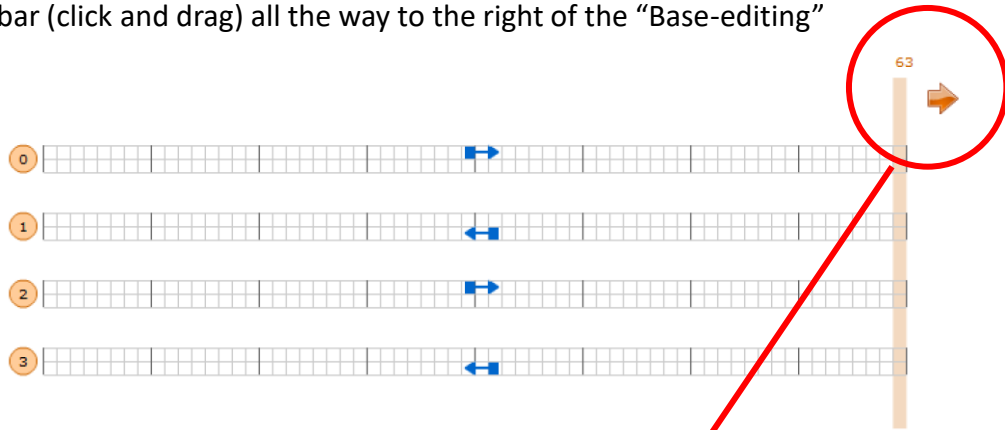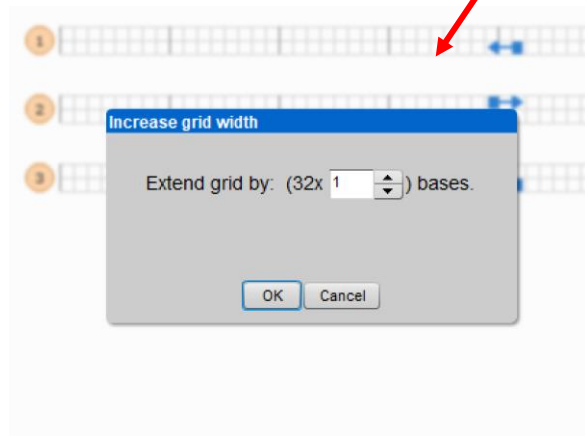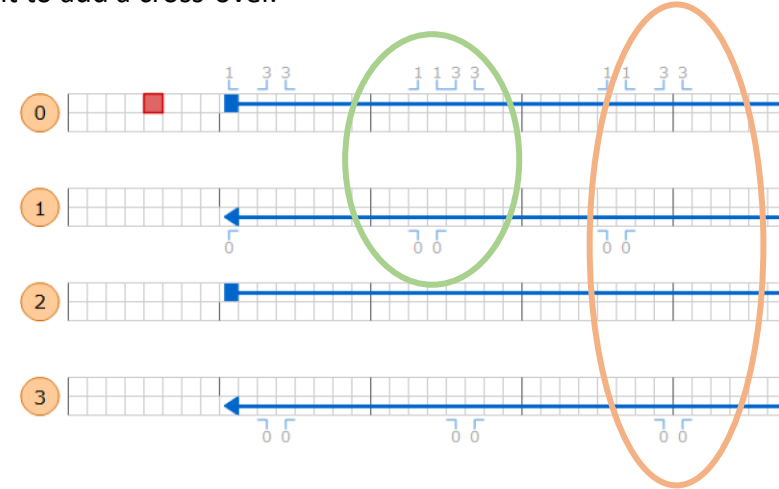
With the **Edit (v)** tool selected, click on a strand around the area you want to add a cross-over.


Choose number of bases (the open boxes) to add.

The small numbers with the right angles show where cross-overs can be placed. The number tells you which helix the cross over will connect to. Click on the number to add the crossover.

Increase grid width

Extend grid by: (32x 1 ⇕) bases.

OK   Cancel
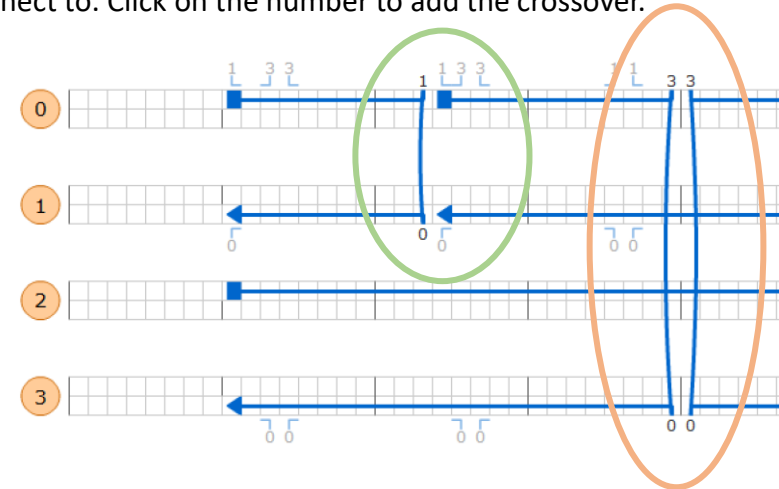
Closing a break

With the **Edit (v)** tool selected, hold *Shift* and click on either the 3' or 5' end around the break to join the strands together.
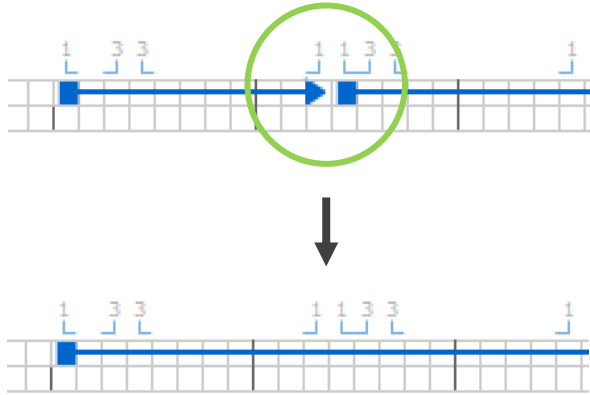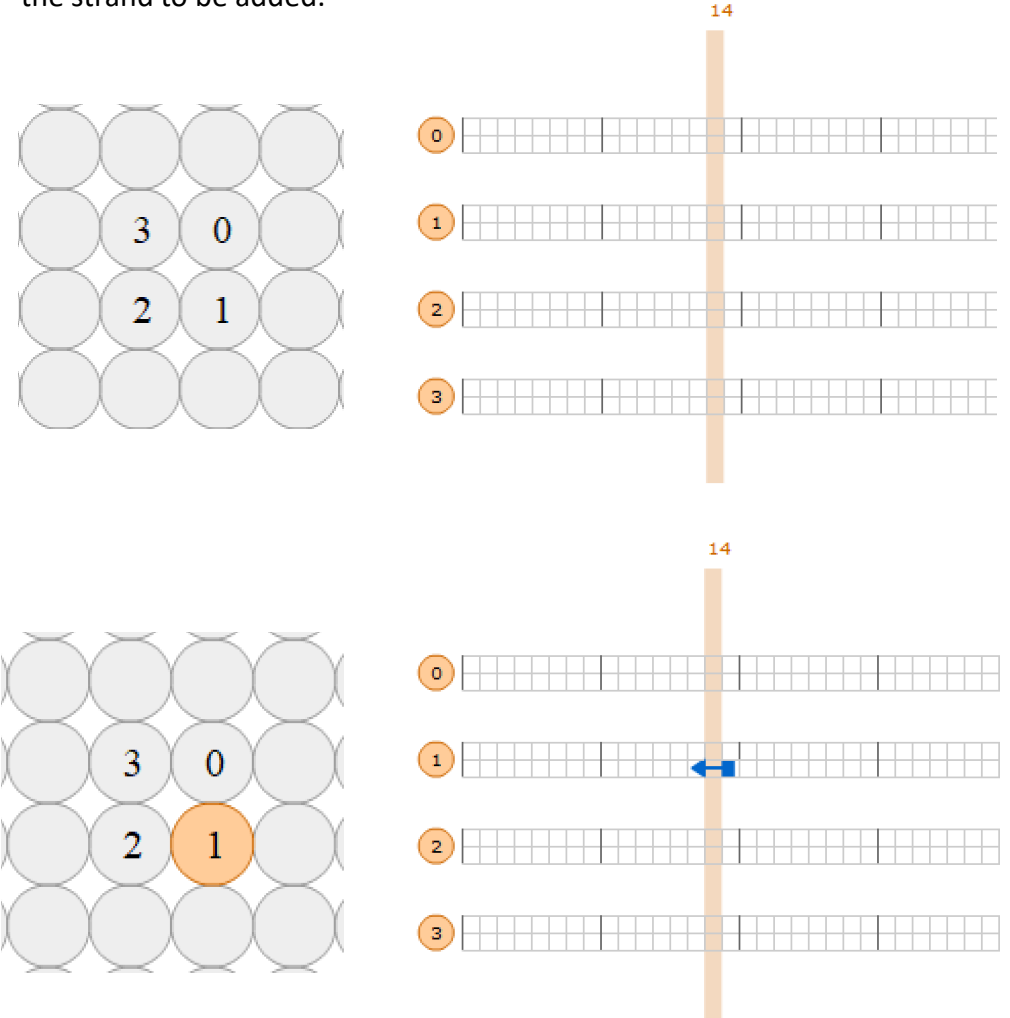

Removing a cross-over

Just double click on the crossover.

Adding a new strand on a helix

Sometimes you want to add strand on an existing helix. With the **Edit(v)** tool selected. Move the orange bar to the location that you want the new strand to appear. In the "Cross Section" window, click on the helix number you want the strand to be added.
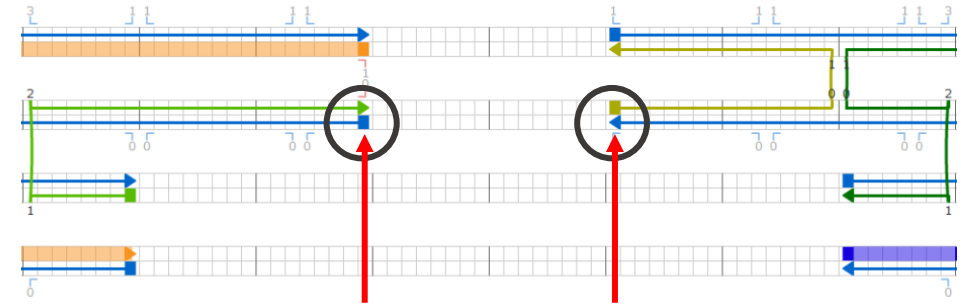
Connecting separate bricks in a structure

Sometimes you want to have your design have disjoint regions in the Cadnano design, like when making a hinge. But the scaffold still needs to route all sections of the structure to be in a single loop. We use the **Force path (f)** tool to add connections across gaps in the design.

1. With the **Force path (f)** tool selected, click on the 3' end (triangle) and then click on the 5' end you want to connect to.

2. Click **Confirm**

Then here   Click here

Force Crossover

Force a crossover from
1[200] to 1[183]?

Confirm   Cancel
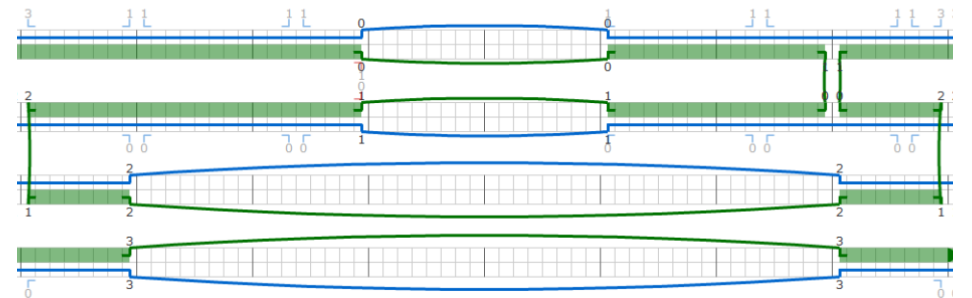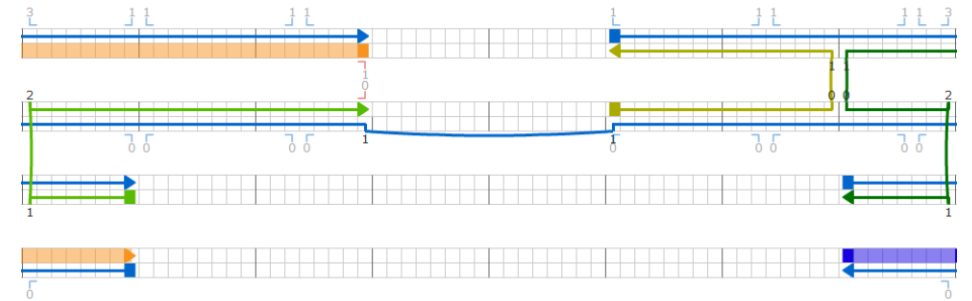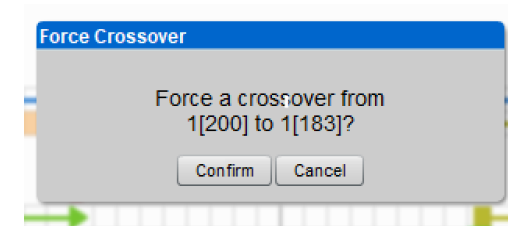
Cadnano2 interface (1/3)

Select — Lets you select bases and move around cross-overs and 3'/5' ends.

Pencil — Allows you to add bases/strands to the design.

Break — Breaks an existing strand into two pieces

In **cadnano2** you can toggle what parts of the strands you can select, for today leave them in this configuration. If things start acting strange, check that they are toggled to the right state.

You can move around either region with the arrows keys and can zoom in/out with the scroll wheel.

Rejoice! This version has undo! Press Command+Z to undo your last actions.

Save options

Creates Sq cross-section
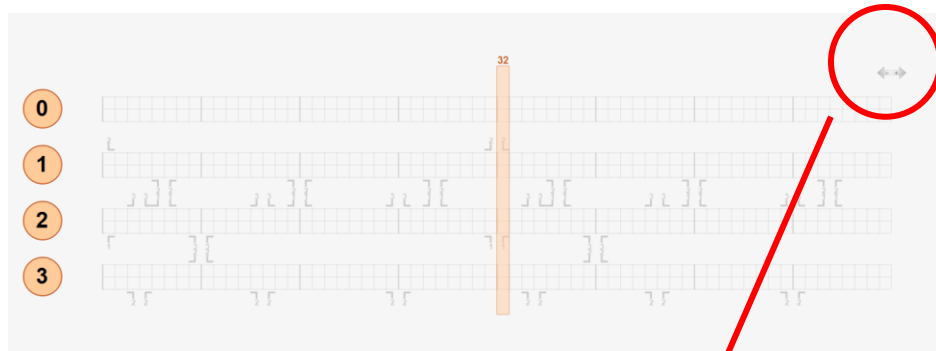
AutoStaple tool

Editing Tools
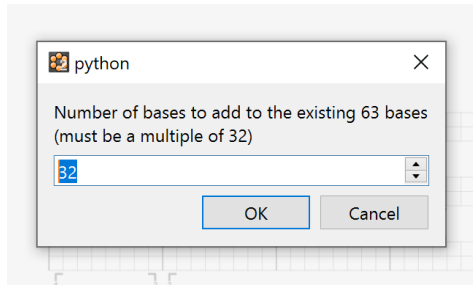
Defines selection type

Cross-section

Base-editing

Cadnano2 interface (2/3)

Changing working area

To add more bases: at the right side of the "base-editing" region, there will be small arrows. Click on the arrow.

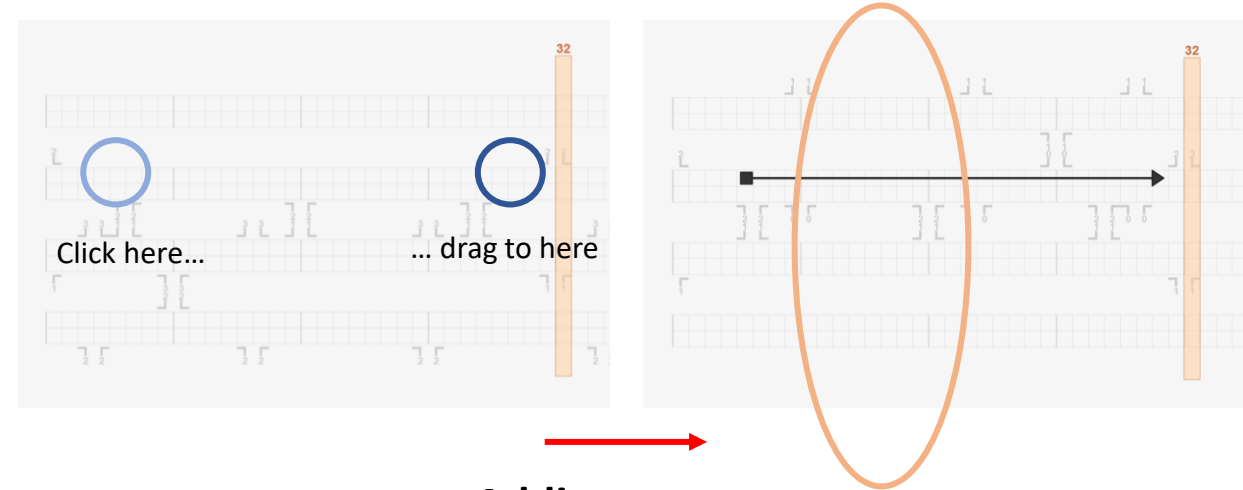
Choose number of bases (the open boxes) to add.

Adding a new strand on a helix

Sometimes you want to add strand on an existing helix. Using the **Pencil** tool, click and drag along any helix to draw on a new strand.

Click here...   ... drag to here

Adding cross-overs

With the **Select** tool, click on the strand you want to add a cross-over. The small numbers with the right angles show where cross-overs can be placed. The number tells you which helix the cross over will connect to. Click on the number to add the crossover.
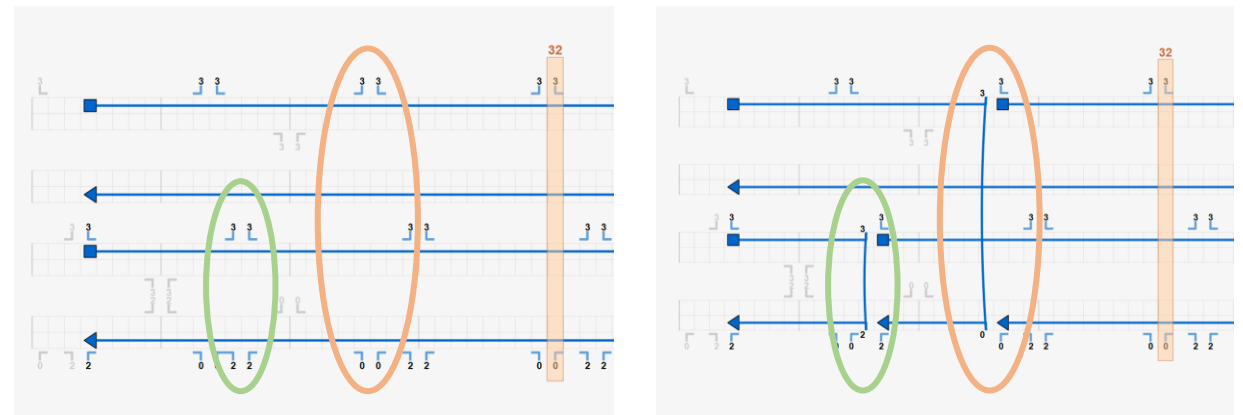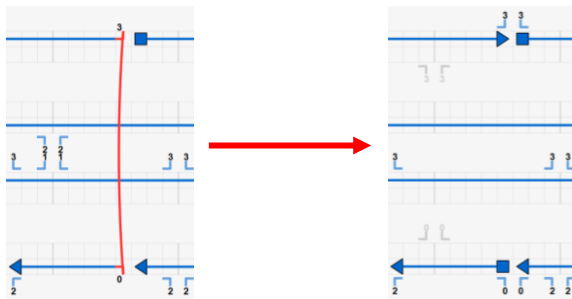
Closing a break

With the **Select (v)** tool selected, hold *Shift* and click on either the 3' or 5' end around the break to join the strands together.
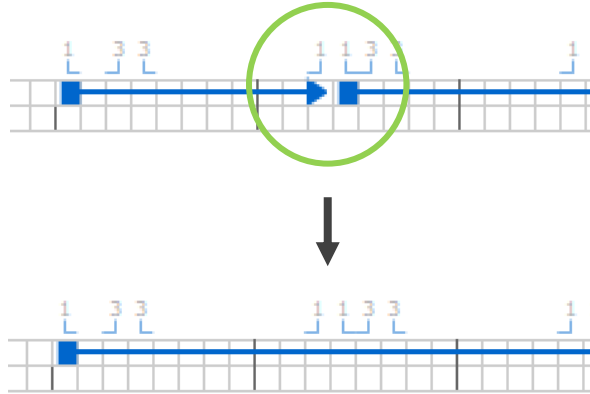

Removing a cross-over

Using the **Select** tool, click on the cross-over, it will turn red. Press the Delete or Backspace key to remove the selected cross-over.

Connecting separate bricks in a structure

Sometimes you want to have your design have disjoint regions in the Cadnano design, like when making a hinge. But the scaffold still needs to route all sections of the structure to be in a single loop. We use the **Pencil** tool to add connections across gaps in the design. Click on a loose 3' end (arrow) and then on any 5' end (square).

Click here   Then here

Repeat as desired
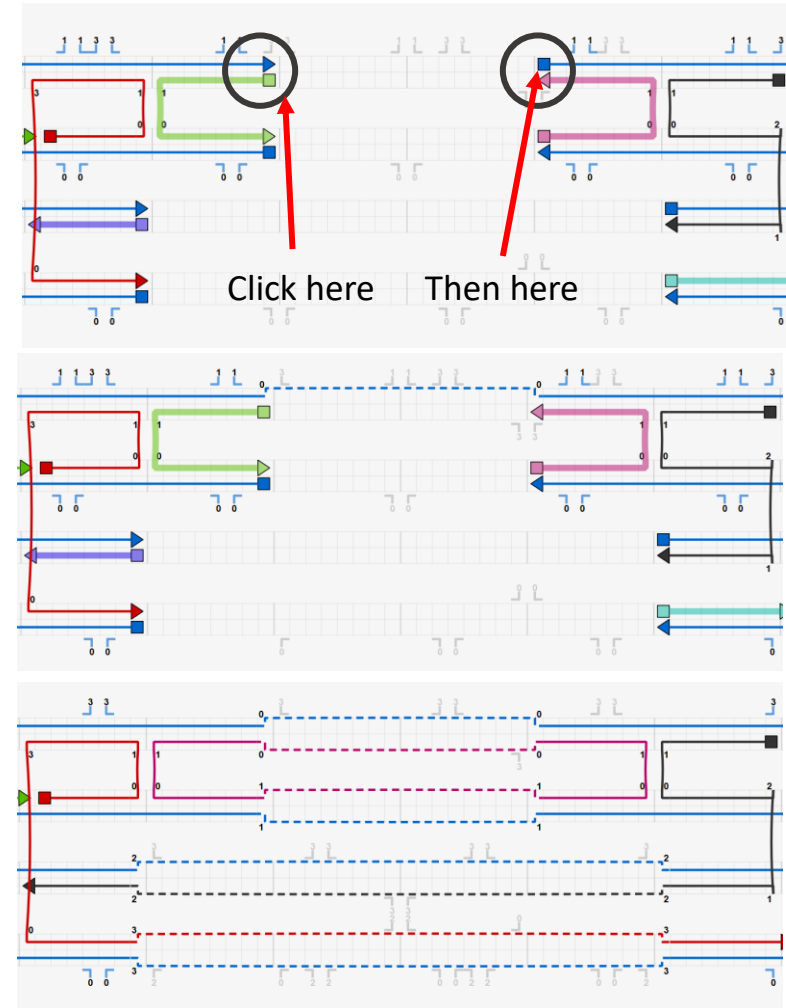
Steps to making a structure

1. Choose a cross-section of helices for the object.

2. Create loops of scaffold for pairs of helices.

3. Connect the scaffold helices together to make a single loop

4. Click the **Auto-staple** tool to populate the structure with staples.

5. Break staples!

Staple breaking rules for today

1. No loops. All staples must have a break in them.

2. Keep the length between 24-48 bases long. This is 3 to 6 "blocks". A block is a region of 8 bases, demarcated by the darker lines in the software.

3. Staples should have one "long" domain. A "long" is a staple region that binds two or more continuous blocks of scaffold on a single helix.

4. No "long – short – long" motifs. A "short" is a staple region that only binds a single block of scaffold on a single helix.

5. No staple segments smaller than 8 bases (one block).

Useful numbers

1bp = 0.34nm

2.6 nm