Draft *digital drawing*

Introduction

Draft is an app (specifically a PWA: progressive web app) for A4-size two-dimensional scale drawings - a designer/engineer/architect's drawing board - simple CAD.

As a PWA it can be run via a URL, like any web app, on any device with a browser, though it is more usable on a laptop or tablet than on a small phone screen. Unlike a simple web app, though, it can install on a device and run like other apps, without the need for an internet connection.*

The app uses scalable vector graphics - SVG - for technical drawing at scales from full-size to 1:100 and will output drawings as SVG files which can be printed as accurate scale drawings on an everyday inkjet printer or shared as PDF files.

Drawings use a small set of elements - lines, rectangles, circles, etc. - and a small set of styles - pen widths and shades, line types, fill shades, text size and shade, and opacity.

Being intended for technical drawing, there are no fancy features like textures or gradients but the app majors on accuracy. Traditionally, colour is not much used in drafting, so the app uses black, white and shades of grey, allowing reproduction on monochrome laser printers or copiers. At the same time, I follow the dictum that you should never use two syllables when one will do, so rectangles are boxes and rotation is spin. To suit most applications, units are millimeters and degrees. Apologies to the people of the three countries in the world that still use imperial units, but hey, millimeters are not hard!

Because the app can be used on various devices - a laptop, with a mouse or the trackpad, a tablet with a stylus or a fingertip, even on a smartphone, many common techniques such as hover, double-click, right-click, two-finger gestures (you know what I mean!) or keyboard input may not be available. So you will be using simple universal methods which I will call *tap* and *drag* plus occasional real/virtual keyboard input for sizes or text.

When personal computing and I were younger I bought one of the first BBC Micro computers, learned basic and assembler and wrote a simple drawing program which I sold to enthusiasts, hobbyists and schools and colleges. I called it Digital Drawing. **Draft** is its much more capable grandchild.

If you have problems using **Draft**, find something that doesn't work properly, or have ideas for improvements please email me at elvin.ibbotson@gmail.com. Enjoy!

elvin ibbotson 2021

*to install Draft on your device, choose the 'Install…' option from your browser's menu.

Screen layout

The drawing fills the screen. Drawings are A4 size (210 x 297 mm) but can be landscape or portrait format according to the screen orientation (usually landscape on a laptop or portrait on a phone). A tablet makes either format easy. When you start the app or begin a new drawing it will be sized to fit the whole drawing to the screen, but you can zoom and pan to navigate into and around the drawing.

At the top-left corner of the screen is the *style* button which acts as a visual guide to the current drawing style choices or to the style of a selected element. Style choices include the pen width and shade, line style, fill shade (if any) and opacity. Tapping on the *style* button opens the *style dialog* which allows the various style options to be changed. The checkered background indicates the degree of opacity of the fill shade. This button and the drawing itself are always visible.

Below the *style* button are the *navigation tools*. The first of these is the *document* tool which allows you to start a new drawing, save one, load one, output for printing, load a background reference drawing, etc.

The next four tools are for navigating the drawing: *zoom in* and *zoom out* which double or halve the magnification, *zoom all* which fits the drawing to the screen, and *pan* to move around the drawing. The zoom tools just take a click. The *pan* tool puts the app into *pan mode* allowing you to drag the drawing around until you tap to cancel it.

Below the navigation tools are the *drawing tools*. The first of these is for drawing *lines* - either single lines or a series of linked lines. Finishing a series of linked lines at the start point produces a closed polygonal *shape*, the *box* tool for drawing rectangles and the *oval* tool for drawing circles or ellipses. When drawing lines you will find it easy to make them horizontal or vertical, while when drawing boxes or *ovals* - using the next tool - it is easy to make them exactly square or circular. The *arc* tool is for drawing circular arcs, then there is the *text* tool for labels or titles and a tool for adding *dimensions*. The last of the drawing tools is for adding *combis* - combinations of lines, boxes, ovals, arcs and text to make elements you can draw once then use again and again. Later you will see how to make combis within the app or by using any text editor together with some simple SVG.

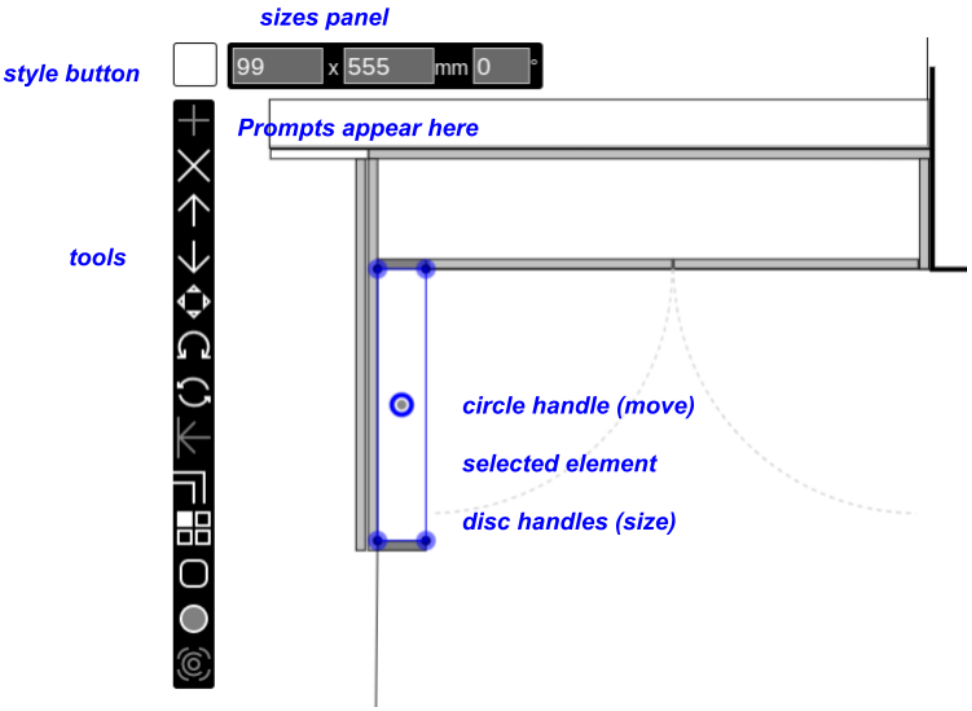
Once you have drawn something you can tap on it to *select* it. If a single element is selected the *style* button may change to suit the element and the *sizes* panel will appear next to it at the top of the screen, giving the size and orientation (*spin*) of whatever you are drawing or have selected. Depending on context, the information shown may be width and height or length and direction. You can type values here to edit elements, changing sizes or spin angle.

When you select elements you will also notice the drawing tools being replaced by the *edit tools*. These allow you to make changes affecting one or more selected elements. The tools available will depend on the current context - how many elements you have selected and what type, for example. Tools appear in grey when they are disabled.

From the top, the *add* tool has a limited application - adding segments or sides to *lines* or *shapes*. Below it, the *remove* tool can be used to delete segments or sides from lines and shapes or to remove complete elements. The two buttons below move elements *up* or *down* layers. There is no true layering in this simple app, but elements are drawn in the order they were added so later elements can be drawn over earlier ones. These buttons are used to alter the drawing order and can bring elements out from behind others or push them further back.

The next tool is to *move* selected elements (or just selected segments or sides of lines or shapes) by exact distances horizontally or vertically, while the one below it is to *spin* (rotate) elements. Next is the *flip* tool. This is used to flip selected elements over, mirroring them horizontally or vertically. Elements can be flipped in-situ or mirrored about an *anchor* (see below). The *align* tool lines up multiple selected elements by their left, right, top or bottom edges or along centre-lines. The next two tools are for duplicating individual elements. The *double* tool makes a parallel copy, offset by an exact distance to the left or right (for lines and shapes) or inside or outside (boxes, ovals and arcs). The *repeat* tool allows a specified number of copies of an element to be made at exact intervals horizontally, vertically, or in a grid.

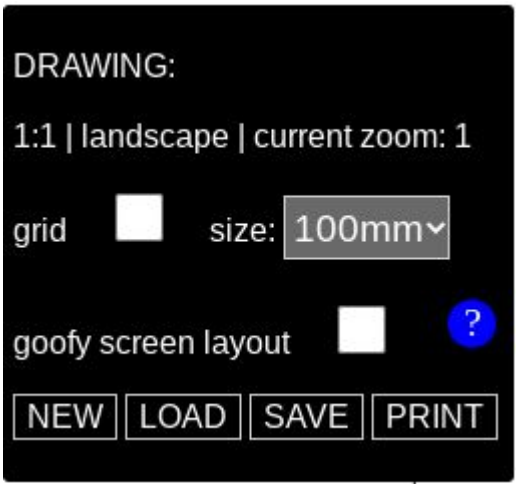
Boxes have square corners when they are drawn, but you can use the *fillet* tool to round the corners by a specified radius to make what are sometimes called ‘squircles’. Next the *anchor* tool lets you add a temporary anchor point which you can use for exact positioning of elements you are moving, as a centre of rotation when using the spin tool or an axis for mirroring using the *spin* tool, or to specify an anchor point for placing combis which you can create using the *combine* tool. This lets you save selected elements for use as *combis*.



Documents

Tapping the *document* button pops up the document dialog which shows information about the current drawing and allows you to change settings.

If you have given the drawing a *name* it appears at the top above the drawing *scale* and *format* (landscape or portrait) and the current *zoom* level.

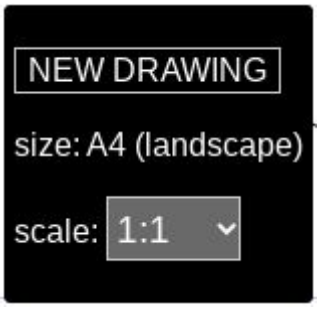


You can choose whether to have a *snap grid*. With snap grid active drawing will be constrained to multiples of the grid size which can be selected from options appropriate to the drawing scale. You can switch grid snap on or off or change the grid size at any time.

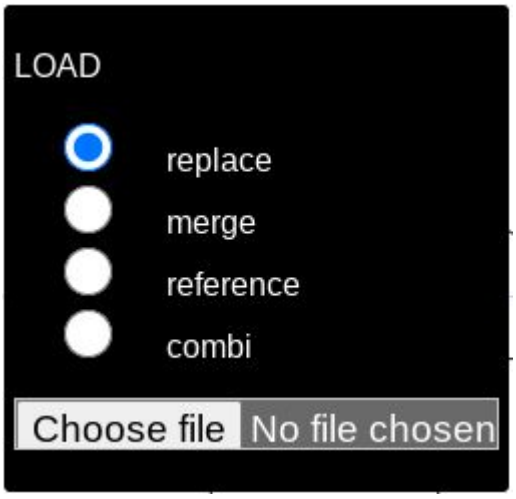
By default the *tools*, *style button, sizes* panel and *dialogs* will be arranged at the top-left of the screen, but you can opt for a *goofy* layout (snowboarders will know) which puts them on the right. The blue query button opens this guide.

Across the bottom are four buttons for document handling: NEW, LOAD, SAVE and PRINT.

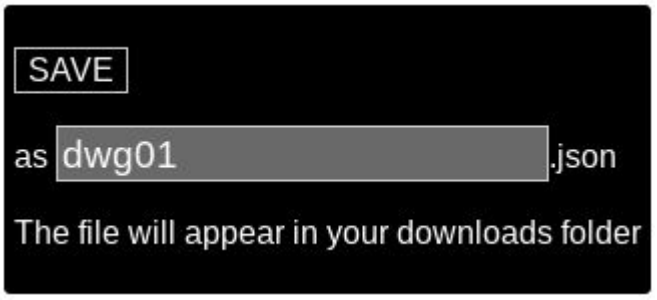
NEW brings up the *new drawing* dialog. **Draft** always works with A4-size drawings and the landscape/portrait format will be set by the orientation of the screen, so if you are using a tablet you can choose. The drawing scale can be anywhere from full-size (1:1) to 1/100 scale. The options are: 1:1, 1:2, 1:5, 1:10, 1:20, 1:50 and 1:100. Starting a new drawing will of course replace the current drawing, so be sure to save it first (see below). Tap the NEW DRAWING button to start the drawing.



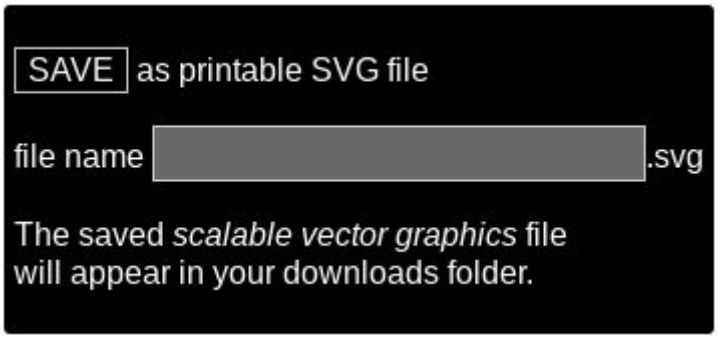
LOAD brings in a drawing you have already saved. You can choose whether it will *replace* the current drawing or *merge* with it. There will be more, later about ways you can use the merge option to structure drawings. A third option is to load a *reference* drawing. This will be drawn in blue outlines as a background. You will be able to see it and *snap* to it but you cannot edit it and it will not appear in a saved or printed drawing. A fourth *load* option is to load a *combi*. This lets you choose a combi you have already created (much more later) and bring it into your drawing's library so you can use it as often as you like in the drawing. You choose drawings or combis to load by tapping the *Choose file* button.



SAVE simply saves the current drawing to a named file for use later. Just enter a name and tap SAVE. Normally the file will appear in your usual downloads folder but you may be able to choose a destination. Note for the technically-minded. The file is saved in JSON format (JavaScript Object Notation) as are combis.



PRINT is very similar to SAVE but saves the drawing in SVG (Scalable Vector Graphics) format which can be viewed in other apps, shared with others, or printed directly to an inkjet or laser printer or to a PDF file. This option is called PRINT but actually just saves a file for printing later, so you do it by tapping the SAVE button. The whole idea of **Draft** is to produce scale drawings, so with a little attention to the settings when you send the file to print you will Be able to produce prints exactly to scale.



Drawing and navigation

This is where most of your time will be spent, navigating around your drawing as you add lines, boxes, text, dimensions,... The initial view will show the whole drawing (zoom level 1) but the upper left will be partially obscured by toolboxes, dialogs, etc. To get a closer look, tap the *zoom in* button to go to zoom level 2. Tap *zoom out* to get a broader view or *zoom all* to return to the initial view. The *pan* tool lets you drag the drawing to see elements hidden by the screen clutter or to see other parts of the drawing when zoomed in. Just tap a blank area of the drawing or another tool to exit panning mode.

Lines and shapes are drawn using the first tool. To draw a line drag from the start to the end. This may involve left button-drag-release if you are using a mouse or touch-drag-lift if you are using a touch screen with a stylus or just your finger. The line length and direction appear in the *sizes* panel. **Draft** uses the compass convention for direction: 0° is upwards - north - and degrees are clounted clockwise. Lengths are in millimeters. You can adjust a line segment by entering a length or direction before drawing the next segment. A second drag operation will draw another line segment linked to the previous one. To finish, tap on the last end-point. Shapes are drawn in the same way but must have at least three sides and are finished by dragging back to the start-point. You will notice that lines are ‘magnetically’ drawn to the orthogonal so it is easy to draw them exactly horizontally or vertically.

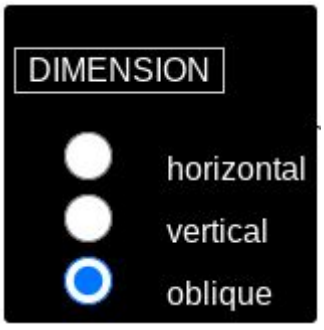
Boxes and ovals are created with the next two tools and both are very easy. To draw a *box* just drag from corner to (diagonally opposite) corner. The width and height are shown but it is easy to change them later. *Ovals* are similar but don’t have corners! Just as lines like to

be horizontal or vertical, Boxes like to be square and ovals like to be circles - just drag at around 45°.

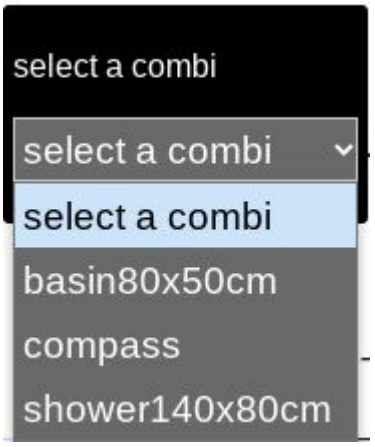
Arcs require a little more care. Full-blown CAD systems offer several options for drawing arcs - centre/radius/start & finish, three-point, tangential,... **Draft** has just one, probably the most useful. Arcs will often be drawn at the end of lines, so you start not at the centre of the arc but at its start-point. Drag from the start-point to the centre. To draw an arc at the end of a horizontal line you might drag straight up or down. When you lift at the centre you will see a blue radius from the centre to the start with small arrows indicating the two possibilities for the arc's sweep direction - clockwise or counter-clockwise. Drag from one side of the start-point in the direction of sweep and lift at the end-point to complete the arc.

Text is much easier! Just tap where you want it to start, type the text into the text box that appears and press Enter. This is a drafting app, not a word processor, so text is intended for labels, titles and the like and just single-line text is available. It is drawn from its bottom-left corner.

Dimensions allow you to link dimensions to drawing elements. Most elements have *nodes* such as ends of lines or arcs, corners and centre-points, and dimensions link to these nodes. When you tap the dimension tool you are prompted to 'tap start node'. Then to 'tap end node'. If the two nodes align either vertically or horizontally (such as when dimensioning a box) this alignment is used for the dimension but if they are not aligned the *dimension dialog* appears for you to choose whether the dimension should indicate the horizontal, vertical or oblique separation - choose and tap DIMENSION. When you have tapped both nodes a blue dimension line is drawn between them and you are asked to 'drag to position'. The dimension then appears with the distance annotated. The dimension is linked to the nodes so if the drawing element moves the dimension moves with it. And dimensions are not limited to a single element but can span two. Then if one is moved the dimension is adjusted to suit.



Combis combine more than one drawing element into more complex drawing objects (the chemical analogy would be 'molecules') which can be used multiple times in a drawing and saved for use in other drawings. You can create libraries of combis. An engineer might have combis for various structural steel profiles or fasteners while an architect might have collections of bathroom fittings or doors. Loading combis was described earlier but once this is done tapping the *combi* button pops up the *combi dialog* for you to choose which combi to add. You then 'tap to place' the combi in the drawing. Combis are created with *anchor points* and it is the anchor point which is positioned where you tap. Once placed you can spin or flip a combi, move it to a new position or even repeat it. These editing functions are described below.



Snap to it

You will have noticed the blue lines, boxes, ovals, etc. which appear as you draw. You will also have seen how drawing is ‘magnetically’ attracted to the horizontal, vertical, square or circular. This is *orthogonal snap*. You will also find that blue horizontal and vertical lines appear as you drag. These *datum lines* relate to nodes of drawing elements. You can use them to easily align elements horizontally or vertically. Two sets of horizontal and vertical datum lines appear as you drag close to nodes. By dragging close to two nodes you can align to two separate points. In the **Document** section, above, *grid snap* was mentioned. This allows you to constrain drawing to an invisible grid. You switch this on or off and set the grid size in the *document dialog*. The final form of ‘magnetic’ snap is snapping to nodes. *Node snap* makes it easy to locate the start of a line or arc, corner of a box or centre of a circle exactly on any node of any previously drawn element. This feature also allows you to snap to nodes of elements in the blue *reference* layer. You can base a new drawing on features in an earlier drawing by loading it as a reference drawing.

Natural selection

To edit or remove an element, or simply to get more information about it, you need to select it. To select a single element just click on it. The selected element will be given one or more blue *handles* - a *ring handle* can be used to move the element and is the centre of rotation if you *spin* it. *Disc handles* can be used to change the element’s size (more about this later). You will also see black dots showing where the element’s nodes are.

You can drag an element around using its blue ring handle (at the start of a set of lines or the centre of a box, for example) and use any of the blue disc handles to change its size or shape, but you may want to use one of these handles to move the element. Well, you can: just tap a disc handle, rather than dragging it, and it changes to a blue ring which you can use to drag the whole element. The blue ring also acts as the anchor if you resize an element.

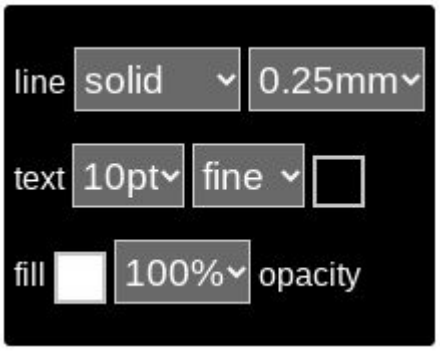
To select more than one element you can click on more elements individually or use the *selection box*. This is not the box of assorted chocolates my grandparents bought me every Christmas but just a blue box you drag around the elements you want. An element needs to be entirely within the *selection box* to be included. The selected elements are highlighted by transparent blue panels.

To clear the selection just click on a blank area of the drawing and any blue *handles* or panels will disappear. You can always move selected elements by dragging or using the *move* tool (more later) and you can *remove* them. Other changes depend on whether you have one or several elements selected. You can change the styling of a single element, for example, but not of a group selection, while multiple selected elements can be aligned but this is meaningless for just one.

When we discuss editing lines and shapes you will see that the *selection box* can be used to select a subset of segments or sides for finer-grained editing.

Styling

The *style* button at the top corner of the screen shows the style of a selected element or, if several elements are selected, or none, the current default styles. You can tap the button to either change the styling of the selected element or to set the style to be used for future elements. This is done using the *styles dialog*.



Here you can set the styling of…
lines and outlines: solid, dashed or dotted lines in four widths from 0.25 to 2mm (based on DIN standard drawing pens) and three shades from light gray to black, the **fill** used to shade closed shapes - white, two grays or black from fully opaque to completely transparent with two degrees of opacity between; and the size, style and shade of **text**, using five sizes (7 to 20pt) in plain, bold or italic and the same shades used for lines.

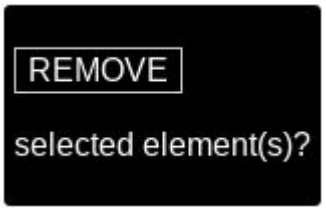
The shades used for lines, text and fill are set using the *shade menu*. Fill shades range from white to black (or none if opacity is minimised) but the lines and text cannot be white or else they would not be visible. Instead a special option lets you push elements back into the *reference layer*. They will no longer be part of the drawing but will appear in blue (with no fill) and be visible but no longer editable. The reference layer acts as a guide for drawing and you can *snap* elements to it. Choosing the blue line colour removes the selected element from the drawing and puts it in the reference layer.

Editing

The most immediate ways of editing selected elements are by *drag-moving* and *drag-sizing* elements using the blue ring and disc handles (or the blue rectangles for multiple selections) and by entering exact sizes in the *size panel*. When drag-resizing boxes or ovals you can adjust the width or height or both keeping the same aspect ratio, while for ovals there is a bias towards circles. As well as sizes you can set a *spin* rotation. If you resize an element using the size panel the *disc handle* acts as an anchor.

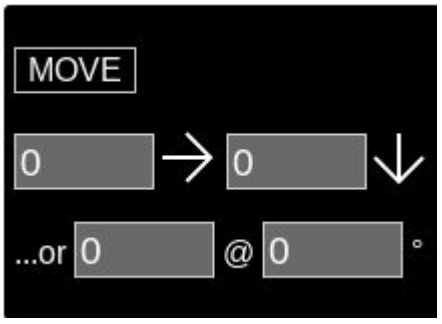
When one or more elements are selected the *edit tools* appear. Usually some of them will be shown grey as they are not usable with the current selection. Some can only be used with single selected elements while others only apply to multiple selections.

The top two tools are *add* and *remove*. The *add* tool is only used when editing *lines* or *shapes* to add segments or sides and will be described later. *Remove* can also be used to edit lines and shapes but will otherwise remove any selected elements (after you confirm that you really want to do so).

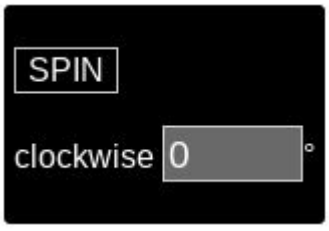


The next two tools are to bring elements *forward* or push them *back* in the drawing order. Elements are layered in the order they are drawn. Later elements may overlap and obscure earlier ones. *Forward* moves elements up towards the top layer and *back* moves them down - earlier in the drawing order.

Now for the real edit tools… The first is *move*.
Most elements can be moved by simply dragging them - using the round blue *move handle* if just one is selected or dragging any of the blue boxes for multiple selections. But this tool allows exact movements to be specified. You can enter horizontal and/or vertical movements or a distance and a direction. Then tap MOVE. To move left or upwards or to specify an angle left of north (0°) use negative numbers.



Next is the *spin* tool. This pops up the *spin dialog* where you can enter a number of degrees to spin the selection. Spin is clockwise so enter a negative value to spin counter-clockwise. A single element will be rotated about its (round blue) anchor point. Multiple selections spin around their mid-point. The exception is when you have placed an *anchor* when elements are rotated around this anchor. This will be described below.

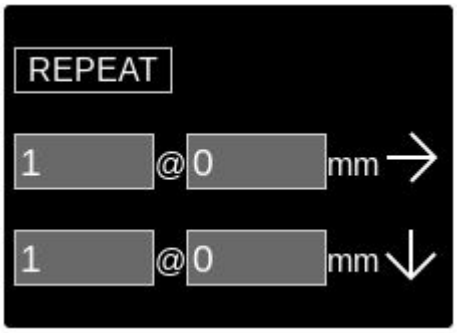


The *flip* tool lets you mirror elements either horizontally or vertically. Just tap the appropriate icon in the *flip dialog*. Normally, a single element will flip in place and multiple selected elements will be mirrored around their mid-point, but if you have an *anchor* (more below) you will have the option to produce a copy (or copies of multiple elements) mirrored about the anchor. This feature is useful for symmetrical arrangements.

If you have more than one element selected you can use the *align* tool to line them up. Choose the alignment from the *align dialog*: lined up vertically by the left-most or right-most extremes or the mid-point, or horizontally by the middle or top or bottom extremes

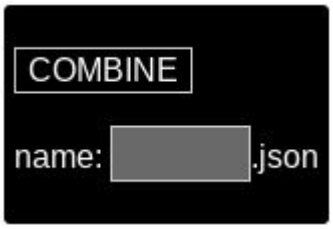
Lines, shapes, boxes and ovals can be duplicated using the *double* tool which opens a dialog where you can specify an offset distance for the copy. For lines and shapes the offset will be to the right (viewed from the start point) while for boxes, ovals and arcs the copies will be outside (bigger) unless a negative offset is specified when the duplicate will be to the left or inside the original (provided it will fit). Tap DOUBLE to draw the duplicate. This tool is perhaps most useful for lines - showing walls as double lines on an architectural plan, for example.

Another way to create copies of elements is using the *repeat* tool. In the dialog you can enter the number of repeats and their spacing horizontally and/or vertically. Specifying 3 across and 2 down will give 6 elements arranged in a grid, including the original at the top-left. A repeat of 1 horizontally and 5 vertically will give the original plus 4 copies in a column. Use negative spacings to repeat to the left or upwards.



The *fillet* tool has a very specific application. It is used to give boxes round corners. Simply enter the radius and tap FILLET. Obviously the radius should be no greater than half the smaller dimension of the box.

Earlier the *anchor* tool was mentioned. This lets you place an anchor on any node in the drawing, such as a box corner, circle centre or line end. This anchor (a blue ring) can then be used to locate a group of selected element by drag-moving them or to provide an axis for mirroring elements using the *flip* tool or a centre of rotation when the *spin* tool is used. A particular application of the anchor is to specify a location point when combining elements into a combi…



First select the elements to be combined then add an *anchor* on a node to be used to locate the combi. You can then tap the *combine* tool and enter a name for the combi. Tapping COMBINE will save the new *combi* to your downloads folder and you can use *load combi* and the *combi* tool to Enjoy!place copies in your drawings. These operations are mentioned above and described in detail later in this guide.

Second thoughts?

Before moving on to the different types of element, a word about backtracking.
If you add an element then decide you don't want it you can just *remove* it, and before an element is removed you must confirm you really want to discard it, If you change your mind after moving or resizing an element, though, it can be difficult, so an *undo* button appears in place of the style button. Tapping this will reinstate the previous position, size, orientation, alignment or corner radius. Tapping anywhere else will bring the style button back.

Lines and shapes

You will probably use the *line* tool more than any other as lines are very versatile. Accordingly there are more options for editing them. When you select a line object with multiple segments you will see a blue ring handle at the start point and square disc handles at each subsequent node. You can move the whole line object by dragging the ring handle at the start point, and you can drag any node to a new position. You can tap a disc handle to change it to a ring handle which can then be used to drag the whole element. You can also add nodes, forming new line segments or you can delete nodes or the whole element.

If you tap the *add* tool you are prompted to tap on a node. The new node will be added halfway between this node and the next. If you tap the last node a new segment will be added to the end of the set of lines. Tapping *remove* also brings a 'tap a node' prompt. In this case tapping a disc handle will remove that node while tapping the ring handle will remove the whole element (after checking you really want to).

Further possibilities involve the *selection box*. With a line selected you can drag the selection box to enclose a subset of its nodes. You can then use the *move* tool to shift these nodes a fixed distance horizontally, vertically or both.

Lines never have any fill shade when created but you can give them a fill shade using the *styles* button. Shapes are basically joined-up lines, so all these ways of editing apply to them as much as to lines.

Boxes and ovals

You can drag boxes around using the centre ring handles (or any of the corner handles if you tap on one to change it from a disc to a ring). To resize a box or oval use one of the corner (disc) handles. You can change the width, height or both together, keeping the same aspect ratio. If you want to change the proportions you will need to enter a new width or height in the size panel. If a box or oval has spin it will be projected back to the orthogonal when you select it. This makes adjustments easier. It's spin will be reinstated when you are done.

Arcs

You can drag arc elements around to reposition them and you can resize them. When you press on a blue disc handle a blue ring appears representing the arc's radius. Dragging the handle towards or away from the centre of the arc changes the radius. Dragging around the ring changes the angle from the centre. Be careful doing this, though: arcs are not simple and it is possible to accidentally turn them 'inside out'.

Text

When you select a text element it gets a blue ring handle. You can use this to drag-move the text and you can *spin* the text around this anchor point. But as well as the blue handle the *text edit* box will appear and you can edit the content of the text. While being able to spin text to a vertical or sloping orientation is often useful, you can also use the *flip* too to mirror it - less obviously useful, but possible nevertheless.

Dimensions

A selected dimension element gets a blue ring handle which can be used to adjust the offset of the dimension line from the element nodes it is linked to. In this case only vertical movement is used. You will see the effects as you drag the handle. You can remove a dimension and it will be removed automatically if you remove an element it is linked to.

Using combis

Earlier you read how to load and place *combis* and how to save groups of elements as combis you could use in other drawings. If you do a lot of drawings, combis can save a lot of time and it is worth taking the trouble to develop a library of useful combis. So what are they good for?

Whatever type of drawing you do, combis can be very useful for graphical items that can appear in many drawings - things like title panels, graphical scale bars, north points. An architect might have collections of bathroom or kitchen fittings, doors and windows, while an interior designer might have a library of office furniture. A structural engineer may have libraries of structural steel sections, mechanical engineers will use collections of fasteners, and an electrical engineer will draw upon libraries of electrical symbols.

Like all drawing elements, combis are sized in mm - real-world units - and will only be useful in drawings of appropriate scales. A desk will look fine in a 1:50 or 1:100 scale office layout but would fill a one-fifth-scale plan. This applies equally to graphical elements: you may noth think of a north-point as having a physical size but you will need different versions at different scales. A north-point on a 1/100-scale plan might be 2m across!

When you create a combi you give it a name and it will normally be saved in your downloads folder. It is a good idea to move it to a combi folder or even to have several for different combi libraries. You may also want to include the scale in the name (eg. ‘scaleBar20’) or use different folders for various drawing scales.

Another way of creating combis, for those with a knowledge of SVG (scalable vector graphics) is to write them by hand in a text editor. This can be quicker than defining them in **Draft** and SVG is actually quite simple. There are plenty of tutorials online but, to give a flavour, this is a simple combi:

{"name":"shower140x80cm","svg":"<rect x='0' y='0' width='1400' height='800' stroke='black' stroke-width='2.5' fill='white' /><rect x='50' y='50' width='1300' height='700' rx='50' stroke='gray' stroke-width='2.5' fill='white' /><circle cx='700' cy='200' r='60' stroke='black' stroke-width='2.5' fill='white' />"}

This combi is in a file called ‘shower140x80cm.json’ as it takes the form of a JavaScript Object Notation (json - pronounced ‘Jason’) file with just two properties: the combi name and the svg code. As the name suggests, it depicts a shower tray 140cm wide and 80cm deep. It is drawn using three elements: a 1400x800mm box, a 1300x700mm round-cornered box in grey and a circular waste. It doesn’t take long to learn enough JSON and SVG coding to be able to write combis like this.

Structured drawings

When you are used to producing simple drawings using Draft you might want to use some of the options available for creating more complex sets of drawings using the *reference layer* and *merge* features. I’m an architect so I will use architectural plans as an example.

A typical set of plans for a small project such as a two-storey house might include floor plans for each storey, a substructure plan for the foundations, a roof plan, a heating-and-ventilation layout and an electrical plan. You might start by drawing the layout of the walls on the ground floor, saving it as ‘Floor0’ and putting the saved file in a new folder for the project.

Now, the upper floor will have a lot in common with the ground floor, so when you have started your new drawing, load the ‘Floor0’ plan into the reference layer. You will see the ground floor in blue outline and you can draw the upper floor walls by snapping to the reference layer where they coincide. Another approach, if there are only small differences between the two floors, would be to save the lower floor then save it again as ‘Floor1’ after making whatever changes are necessary where it differs from the ground floor.

With both floors drawn and doors and windows in place (possibly using combis from a ‘doors&windows’ library) they can be used as reference layers for drawing a foundation plan and a roof plan and for heating-and-ventilation and electrical plans. These might be filed as ‘Substructure’, ‘Roof’, ‘H&V-0’ or ‘Electrics-1’. Keeping them all as separate drawings may be simpler and easier to maintain than putting all the information in one drawing. The electrician or heating engineer will need to see how the installations fit in with the layout of the house, so use the *load/merge* option to combine layers: load the ‘Floor0’ plan showing the ground-floor layout then load/merge ‘Electrics-0’ before saving the combination as ‘Floor0electrics’.