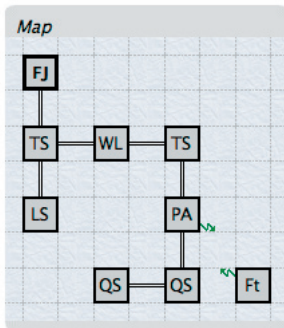


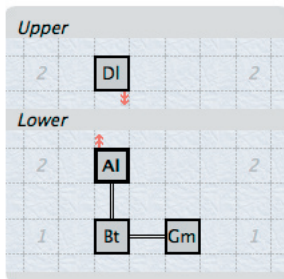
Inform's new World Index

The December 2010 build of Inform makes the first substantial change to the World Index panel in four years. Some of the changes jump out at you, but others are subtler, and we thought regular users might appreciate a few notes on what's different. We've noticed that some people use the World Index all the time (and use the keyboard shortcut, ⌘-9, to jump to it), but that others hardly ever go there — well, perhaps this relaunch will make it worth a second look.

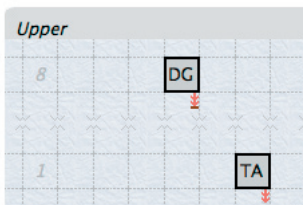
1. How the map is displayed



(a) The map has always been rendered on a cubical grid, like a series of floor plans for a building, starting with the top floor and working down to the basement. In past builds the grid itself was invisible, and rooms plotted against high white, but with large maps this made it hard to align distant rooms by eye. So the grid is now visible as dotted lines, and a faint blue-white paper texture underlies even that, making it clearer where the map's boundaries lie.



(b) It's also important to be able to align, by eye, an upper with a lower level — in particular, to be able to see which room is exactly above which other. The problem isn't the "easting", the coordinate along the east-west axis, because upper and lower maps are positioned so that they have the same axis. It's the "northing". In this build, faint italic numbers on the "graph paper" background mark off the north-south axes on each level map, making it much easier to match them up.



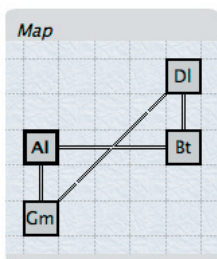
(c) It often happens that upper levels in very large maps contain just a few rooms — turrets or spires poking up from a mostly lower landscape. This can result in wasted vertical screen space, with the uppermost level map consisting of large strips of blankness. Blank rows are now omitted from these maps; the "graph paper" grid-lines are marked as being broken when this happens, using the same convention statisticians use when they draw broken axes on graphs which have a false origin.

(d) The origin room (in which play begins) is emphasised with a bold border as well as a boldface abbreviation.

(e) These abbreviations are better chosen. Inform used to do this by taking a room's name and reducing it to one or two capital letters from its initials. Thus "Fontana Dam" would be "FD", "North of Rockfish Gap" would be "NO", "Shelter" would be "S" and "Monson" would be "M". The new method skips common connective words like "of", and uses consonants inside one-word names to add a lower-case letter to otherwise single-letter abbreviations. Thus we now have "FD", "NR", "Sh" and "Mn". (Inform falls back on using vowels if no consonants are available; thus "Zoo" is abbreviated "Zo".)

This makes it much easier to follow large maps, where the tendency to repeat abbreviations is much reduced. For example, Zone 1 of the London Underground includes stations called "Bank", "Bayswater", "Brixton" and "Barbican": rather than labelling these B, B, B and B, Inform now labels them Bn, By, Br and Br.

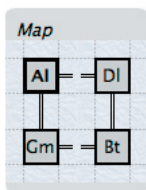
(f) For better visual clarity, the "I am a hyperlink" underlining on these abbreviations has been removed, but they remain links to the details of the rooms in question. Rooms and connections continue to have "tool tips" appearing if the mouse hovers long enough over them.



(g) The display is now better able to show crossovers of awkward long connections, where they occur. For example:

Alpha is west of Beta. Gamma is south of Alpha.
Delta is north of Beta. Gamma is southwest of Delta.

can only be plotted if the E-W and SW-NE connections are about twice the length of the two N-S connections, and they cross over at a 45-degree angle. In previous builds Inform would have had trouble drawing this.



(h) If Inform is absolutely forced to place rooms next to each other, even though the map connections they have don't match up, it now draws these with a break in them to indicate this. For example:

Alpha is west of Beta. Gamma is south of Alpha.
Delta is north of Beta. Gamma is west of Delta.
Index map with Alpha mapped west of Delta.

(The last line is needed to prevent Inform finding a better layout.) This comes out as a quadrangle of rooms, but in fact those connections are mysteriously making a sort of figure-eight, and the breaks drawn at least draw attention to the mystery.

(i) When non-standard directions have been mapped as standard ones, a key at the bottom of the map is now displayed: for example,

Mapping starboard as east; port as west; fore as north; aft as south

(j) The “inside” and “outside” directions are curiosities. Often they really denote a telescoping of the scale of the geometry: for instance, an IF author might write

Inside from the Grassy Meadow is the Ruined Sheepfold.

Here the Meadow is imagined as a large area and the Sheepfold a small one, though both are rooms. In mapping terms, if the Sheepfold is a single room (or has perhaps a couple of connecting rooms otherwise cut off from the rest of the map) then Inform used to draw the Sheepfold as a separate map to the side of the main one. It now insets this map, where possible, to keep it close to the Grassy Meadow. (For preference, an inside connection is offset right and down; an outside connection, left and up. This corresponds with the convention used by the zigzag arrows.)

(k) When there are independent blocks of map, not connecting at all, these are now mapped in size order from left to right. The most common case where there are a large number of these blocks is when a pool of, say, 20 rooms exists for dynamic placement into a changing map at run-time; when Inform sees a large number of such singleton rooms, it tries to group them by region, placing rooms near to each other if they are created near to each other in the source text, and then (if it can't do any better) arranges them in a nearly-square rectangle, for the sake of tidiness. Here's a really extreme case:



(l) A slightly easier-on-the-eye set of colours has been chosen for the region colouring, but with the aim of keeping as much contrast as possible when there are only three or four different regions (as quite often happens).

(m) The World Index map now respects the colours indicated by index mapping hints like this one:

Index map with room-colour of Zoo set to “Navy” and room-name-colour of Zoo set to “White”.

(The only settings recognised by the World Index map are “room-colour” and “room-name-colour”, and only for named individual rooms and for regions.)

(n) Size limits on the EPS map (30 levels, 100 rubrics) have been lifted.

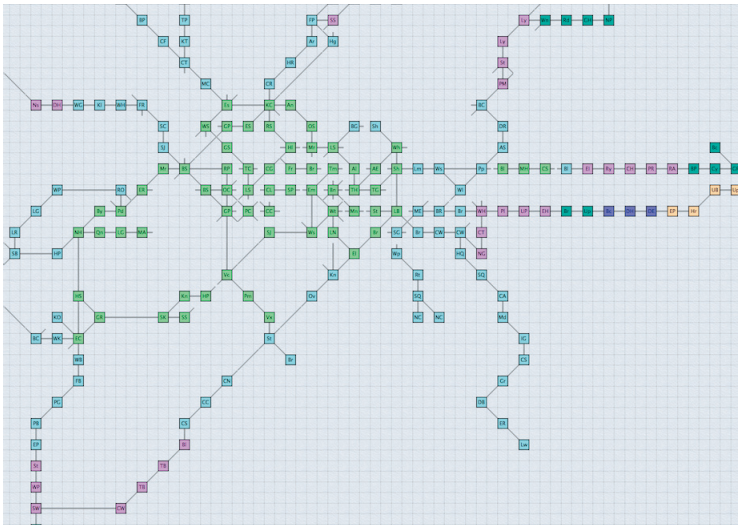
2. How the map is calculated

In calculating the map, Inform has to solve an unusual computing problem: it takes a set of rough compass bearings between nearby landmarks, but without knowing distances (“Alpha is west of Beta”), and tries to establish positions for them in space. In many cases no exact solution exists. Some IF works use a single room to represent a wide expanse of space, not a single point, making its “location” fuzzily defined. (An extreme case would be a single room called “Forest”, representing the entire surroundings of the map.) Other works of IF simply aren’t simulating space at all, though in practice little portions of them usually still are.

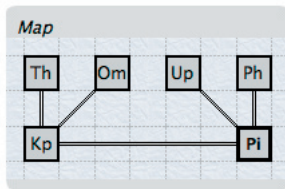
It’s hard to itemise changes in this algorithm, but:

(a) As before, Inform assesses possible map layouts using a numerical measure of geometric distortion called “heat”. The number of possible solutions is so huge that the problem (very likely NP-complete) cannot be solved in any acceptable period of time by systematically searching for the lowest-heat layout. Instead Inform exploits the fact that heat is mainly tied to local problems, not global ones. As a result, we can disconnect the map into pieces, work on those independently, and then reconcile the results (though that can make for awkward stitching at the boundaries). The key advantage of this is that heuristic tricks which would be far too slow applied to a map of, say, 1000 rooms may be around a million times faster on a submap of only 20. Where Inform previously only had one good technique for reducing heat, a heuristic called “cooling”, it now adds four more, “quenching”, “diffusion”, “radiation” and “explosion”. These are all variations on sliding clumps of rooms around, driving them apart, pulling them together, and so on.

(b) Large maps with many awkward areas are now much better rendered. Our stress test in this process has been mechanically generated from the London Underground, assigning IF-style map connections between adjacent stations based on their actual



spatial positions in and around London. (Not Harry Beck’s simplified layout as shown on Tube maps: the *actual* positions.) What makes this stressful is not the size (about 300 “rooms”, i.e., stations) but that the real-life geometry is very knotty, with the density of stations very variable (the area around Bank being especially tight) and almost every track bending, sometimes right around, in the course of a single connection. The old Inform couldn’t even find a way to plot the stations at distinct positions, and had to give up and plot several on top of each other. (Actually, this nearly happens in real life, too.) The new Inform manages to get something which looks just a little like London, and where the Circle Line can just about be seen.



(c) But the improvement can even be seen in quite small maps. Here’s one:

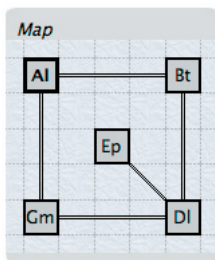
Pi is east of Kappa. Omicron is northeast of Kappa. Upsilon is northwest of Pi. Theta is north of Kappa. Phi is north of Pi.

This doesn’t look hard, but it involves making one map connection three times longer than the others, and all to avoid collisions between rooms maximally distant from each other by movement. Inform used to have great trouble with configurations like this.

(d) Some Inform authors like the World Index to look good so much that they rearrange rooms in the source text to see if that makes things better, and they make heavy use of “clues” like:

Index map with Vosges mapped north of Geneva.

The new method is much less sensitive to creation order of rooms, and indeed rearrangements are unlikely to make the map significantly different. Clues still work, but should be avoided whenever possible. (The map-maker has much more freedom if not tied down.) Authors of existing projects are urged to comment out all of their map clues and see what they get without them; testers have found that they can often all be removed.



(e) Various tricks have sped things up sufficiently to allow us to use a more sophisticated measure of “heat”. Layouts in which a map connection passes through an unconnected room in order to get somewhere are now just a shade “hotter” than those where this doesn’t happen. For example:

Alpha is west of Beta. Gamma is south of Alpha. Delta is east of Gamma. Beta is north of Delta. Epsilon is northwest of Delta.

How should Inform draw this? Clearly it’s a quadrangle and would be easy without Epsilon. Previous builds would just have made a mess of this, plotting Epsilon on top of Alpha, or shoving Alpha out of the quadrangle to make room for it. Inform now draws it as a big quadrangle, with Epsilon occupying the space in the middle. But it only does this because we penalise connections through other rooms — otherwise the best solution draws Epsilon northwest of Alpha.

(f) Similarly, it now generates “heat” if map connections would need to be drawn as broken (see 1(h) above), so this occurs rather less often — at least in cases where it can be avoided, of course.

(g) Directions in IF are often given doubly:

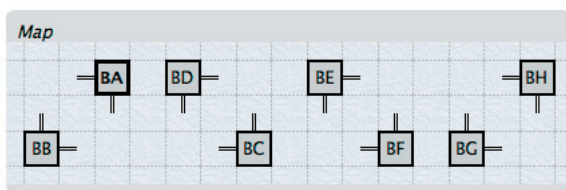
Carfax is north of Folly Bridge. Carfax is above Folly Bridge.

The writer’s idea here is that there’s a single route but that it runs on an upward slope north from the bridge. We have to indicate both on the map, of course, but we also have to make a choice: will C and FB go on the same level map, or on different level maps? This is not easy to solve when there are many such double connections close together, but Inform now tries to keep to a single level where possible. More maps will now be presented as single levels than before.

(h) Bent connections like so are also problematic:

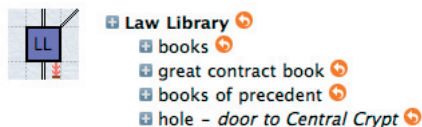
Blockhouse A is east of Blockhouse B. Blockhouse B is south of Blockhouse A.

Here the writer has in mind a path which bends around; perhaps A and B stand on opposite corners of a parade ground. When there appears no danger in doing so, Inform now averages out such pairs of routes for calculational purposes, so that the spatial relationship here is SW-to-NE (though it continues to draw the actual connections as given in the source text). Here are four such pairs of rooms:

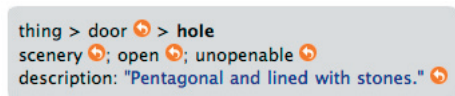


3. Details of rooms and objects

In the catalogue below the map, every room and thing now has a “+” icon indicating that a box of details can be revealed.



If we open the details for the hole, by clicking the lowest of these icons, we reveal:



(a) The heading line for the box gives the kinds involved. The hole is a door, but it’s also a thing (since a door is itself a kind of thing). Notice the orange source link, which

jumps to the line in the source text which specifies that the hole is a door. (Although most things have their kinds described in the same sentences which create them, that's not necessarily so.)

(b) Next the either/or and value properties are listed, along with source links to where these are set.

```
room > Gallery of Still Life
description: "Natural light from the south -- coming in from the courtyard[if the player is on
the stool], though you cannot see all the way down to ground level[from here, even on
the stool[otherwise], you suppose, though you are too short to see out[end if] --
illuminates a series of still life paintings on the north wall: one showing the [Wedding
Treasure] when Lucrezia arrived from Medici-Credenza, the other rather fancifully
entitled [Supper]."
+ east to White Gallery via thick door
= west to Upper Bulb
add: north; northeast; northwest; south; southeast; southwest; up; down;
inside; outside
State Rooms region
```

(c) In the case of rooms, we next have a list of the map connections to other rooms (marking those which are through doors, or blocked by doors, or one-way), and with source links once again. Paste icons are provided to speed up the typing of new map connections: for instance, clicking the “northeast” paste button in the example above pastes in the text

Northeast from Gallery of Still Life is .

so that you need only type the destination.

(d) Again for rooms only: if the room belongs to a region, this is shown (colour-coded following the conventions used in the map) and there's a source link to where this is decided.

```
thing > white apple
edible
elaboration: "(complete with white stem and leaf)"
initial location: in Black Gallery
mentioned in rules:
```

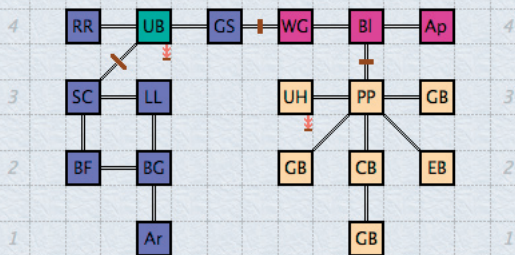
(e) Finally, a concise row of source links marks all of the rules in the source text which explicitly mention this room or thing. There will be plenty of other rules capable of affecting it which don't mention it explicitly — for example, plenty of things are potentially affected by the “can't exceed carrying capacity rule”, but it's just a general rule of play. What we have here are simply convenient links to where the source defines any special behaviour of that particular room or thing.

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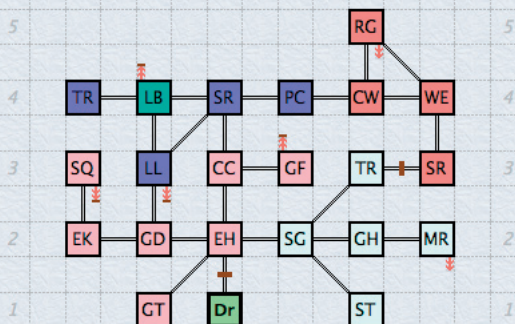
The new World Index certainly isn't perfect, and no map-making algorithm can ever get everything “right”, but we hope that people will find the new look an improvement.

30 November 2010

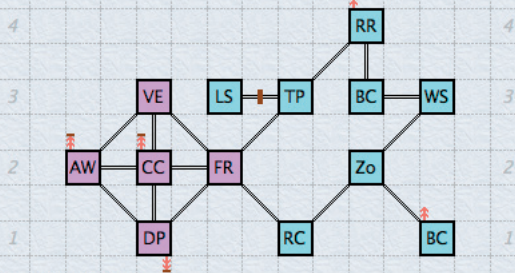
First level up



Starting level



First level down



Second level down

