--:! {field: []: (😃)} <- **Field Functions Library: Produce and Execute Field Plans** ->
muse/docs/lib/field.md

--😐 field: *Fields are rectangular solids defined by a range (a `situation` pair with `fields` keyed properties).* -> field, _field

--:+ *Fields are made up of plots, each plot at least small enough to deal with turtle inventory limitations.*

--:# **Execution train runs from `field.make` to `field.plot` to `field.plan` to execute the plan**

--:: field.make(commands: fieldCommands, faced: ^:) -> *Load field files; return their `field.plot` calls* -> `report: ":" &:`

--:> fieldCommands: *For CLI* -> `:[fieldOpName: ":", ranger: ":", firstPlot: #:?, lastPlot: #:??]`

--:+ *The second entry, `ranger` in `fieldCommands` is a string which may simply be a name for a `range`, (a kind of `place`).*

--:+ *If so, the range name gets the range's features dictionary and the field file name to load (keyed as `features.fields`).*

--:+ *It could also be a string specifying the name of a farm and a farm field name in that farm (separated by a colon).*

--:+ *If so, the farm name specifies the farm's `range` and so the farm range's features dictionary.*

--:+ *The `fields` entry in that dictionary is itself a dictionary, keyed by the farm's field name to specify its range name.*

--:+ *With the proper range name in hand, either directly as above, or from the farm, the field file to load is specified.*

--:: field.plot(commands: field.plotSpan, fieldsOp: (😃, fieldOpName: ":", plots: #:, offset: xyz?) -> *Plots* -> `report: ":" &: &!`

--:+ *Called by field files. Calls `fieldsOp` from field file (which calls `field.plan`).*

--:> field.plotSpan: *{} spans all plots; if only first, default plots after first* -> `:[_:, _:, first: #:?, last: #:??]`

--:: field.plan(planName: ":", fielding: fieldParameters, offset: xyz?) -> *Run plan, default offset {0,0,0}.* -> `report: ":" &: &!`

--:+ *Loads and executes the prototype plan (which calls `field.paths`) for each (odd, even, or last) level of a plot.*

--:> fieldParameters: *bounds (and materials to fill and replace)* -> `:[bounds, fieldParameters.fills?, fieldParameters.removeables??]`

--:> fieldParameters.fills: *Group or list of craft items for fill material* -> `group|craft[]`

--:> fieldParameters.removeables: *Material replaced by fill* -> `group|craft[]`

--:> craft: *Minecraft item `detail.name` without `minecraft:` prefix* -> `":"`

--:: field.extents(:bounds:, :strides:, faced: ":"?) -> *Plots placed* -> `field.count, field.count , eP, eP, striding, ^:, ^:`

--:+ Returns `nplots:[fieldOp #:}, slots:[fieldOp]: #:}, strides: eP, run: eP,
striding, turn: ^:, back: ^:`

--:+ *Extents for* `stride` *(shorter) and* `run` *(longer) virtual axes for each* `opName` *in the* `strides` *entries
unless* `faced`.

--:> field.count: _dictionary keyed by 'opName`for number of elements in field for that
operation_ ->`[fieldOp]: #:`

--:> strides: *dictionary keyed by* `opName` *for the distance along the stride axis for a striding ->*
`[fieldOp]: #:`

--:> striding: *dictionary keyed by* `opName` *of vectors incrementing game coordinate positions for* `turn`
-> `[fieldOp]: xyz`

--:> eP: *pair of coordinates for extents ->* `:[xyz, xyz]`

--:> fieldOp: *Operation name in the set for a particular kind of field ->* ":"

--:# **Path generator: flying ox plow paths through given three dimensional rectangular
bounds.**
--:+ *Ox plow paths minimize travel to plow a field. Flying oxen (aka turtles) do that in three
dimensions.*

--:: field.paths(bounds: xyz[]) -> *Called by plan prototype file to generate plans for plot. ->* `paths,
yDelta: #:, xzEdge: facing`

--:> paths: *Flying ox traverse of three dimensional rectangular solid ->* `{start: ":"[], odd: ":"
[], even: ":"[], last: ":"[]}`
--:+ *Returns paths, vertical traverse (*`yDelta: #:`*), and orientation of longest horizontal edge for
bounded block.*

--:# **Cut, fill, till, and traverse points defining rectangular volumes** using `field.plan` to
optimize traversal.

--:: field.cut(places: :[nearPlace: ":", farPlace: ":"]) -> *Quarry out blocks from one place to the other. ->*
`":" &:`

--:- cut point point -> *Quarry out blocks bound by named points (defining a rectangular solid).*

--:: field.fill(parameters: :[nearPlace: ":", farPlace: ":", fill: ":", target: ":"?]) -> *Fill, Till, Replace. ->* `":"
&:`

--:< *Filling and target may be one of the turtle categories or a Minecraft detail name without prefix*
`minecraft:`

--:- fill point point filling ?target -> *Layer fill bounds by points; optionally swaps out only target
blocks.*

--:: field.till(parameters: :[nearPlace: ":", farPlace: ":", seed: ":"]) -> *Till the seed from one place to the
other. ->* `":" &:`

--:< *Seed may be one of the turtle categories or a Minecraft detail name without the prefix* `"minecraft:"`

--:- till point point seed `->` *Till the seed bounds by named points (defining a rectangular solid).*

--:: field.fence(parameters: :[ranger: ":", fencing: ":"?]) `->` *Put fencing using* `Layer` *plan.* `-> ":"`

--:- fence range [item] `->` *Put item or available wooden fence from one point to another in range.*