A tutorial for the CAD program LayoutEditor

LayoutEditor is available from

www.layouteditor.net

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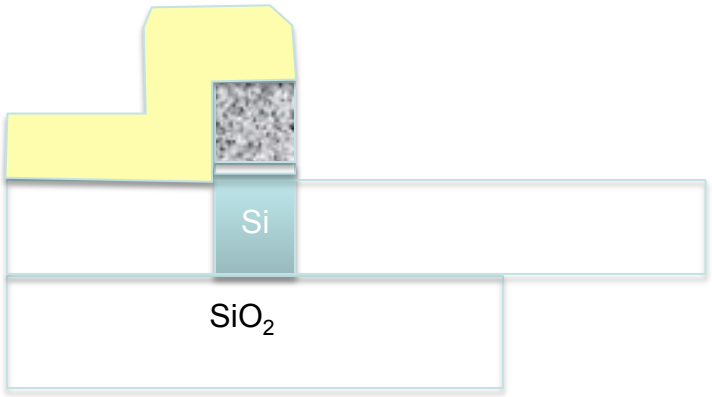
Common terminology

Layers	designate processing steps
Cells	are parts, or parts of parts
Top-level cell	contains the whole enchilada

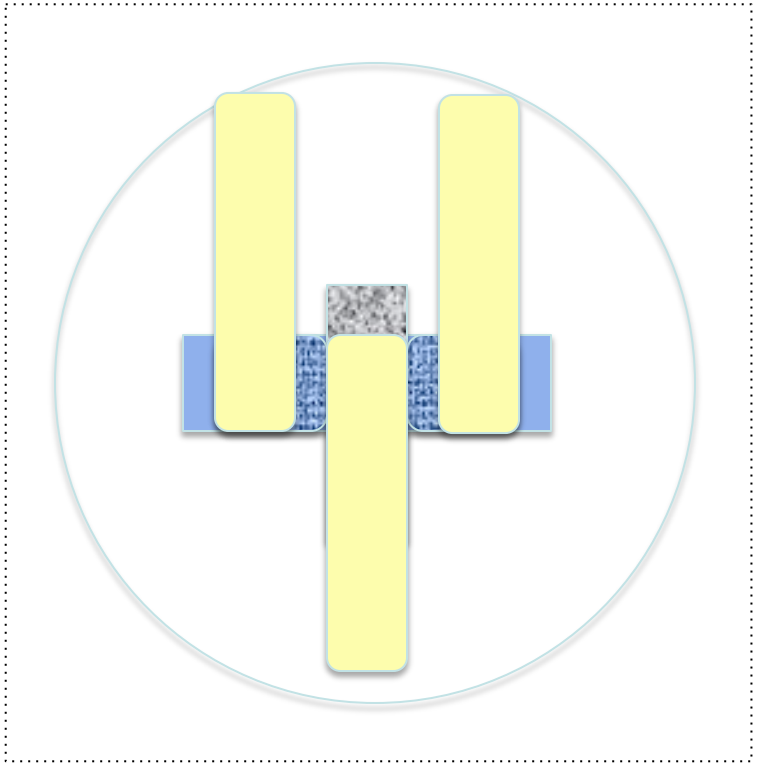
Typical example

Side view



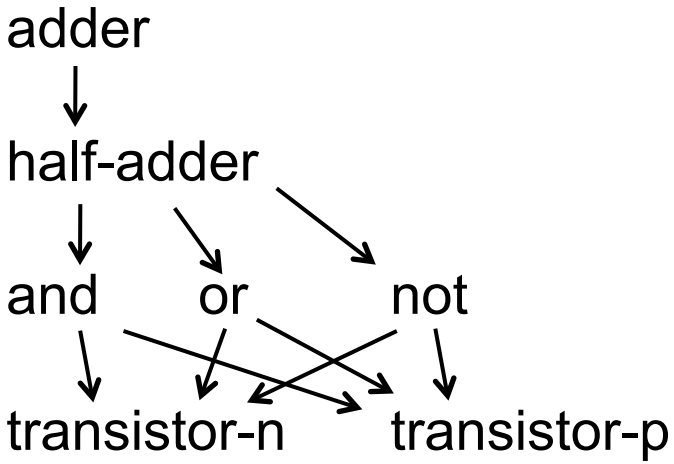
Top view

CELL “TRANSISTOR”

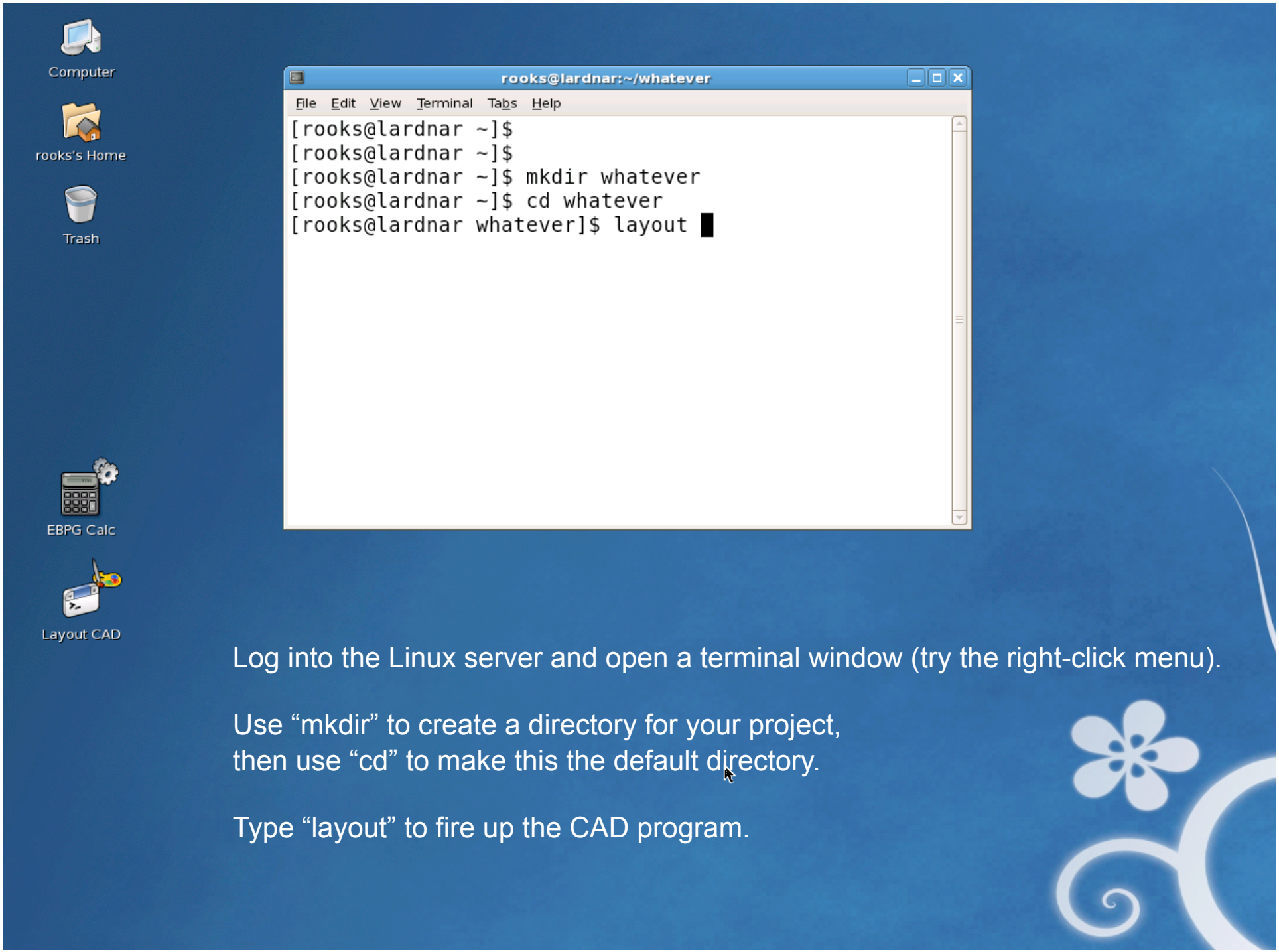


Fill/isolation oxide	LAYER 2
Gate oxide	LAYER 3
Gate polysilicon	LAYER 4
Implant dopants	LAYER 5
Metal wiring	LAYER 6

Your design should be a heirarchy of cells



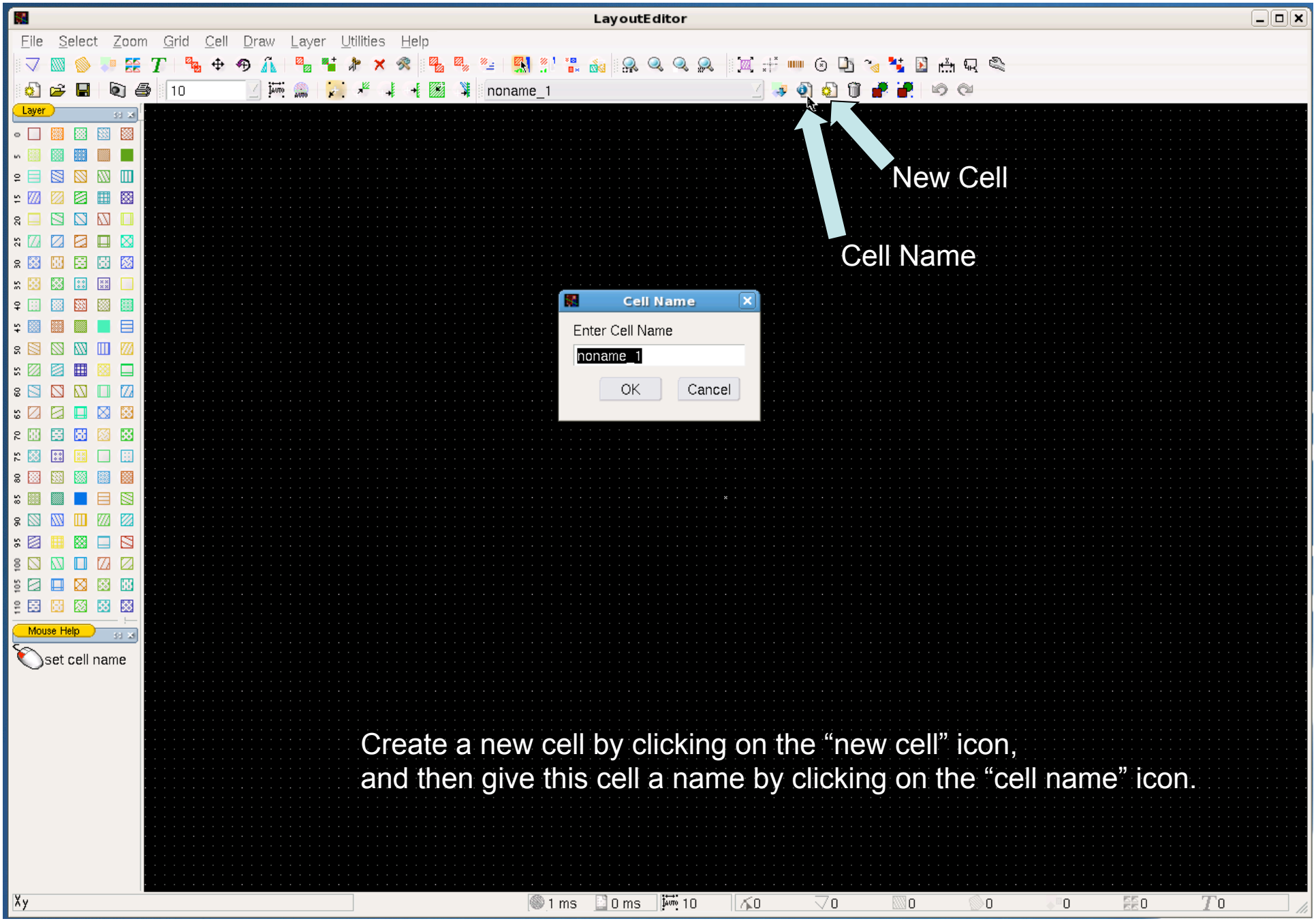
To produce one mask plate for one processing step, flatten the heiarchy and pull out one LAYER.

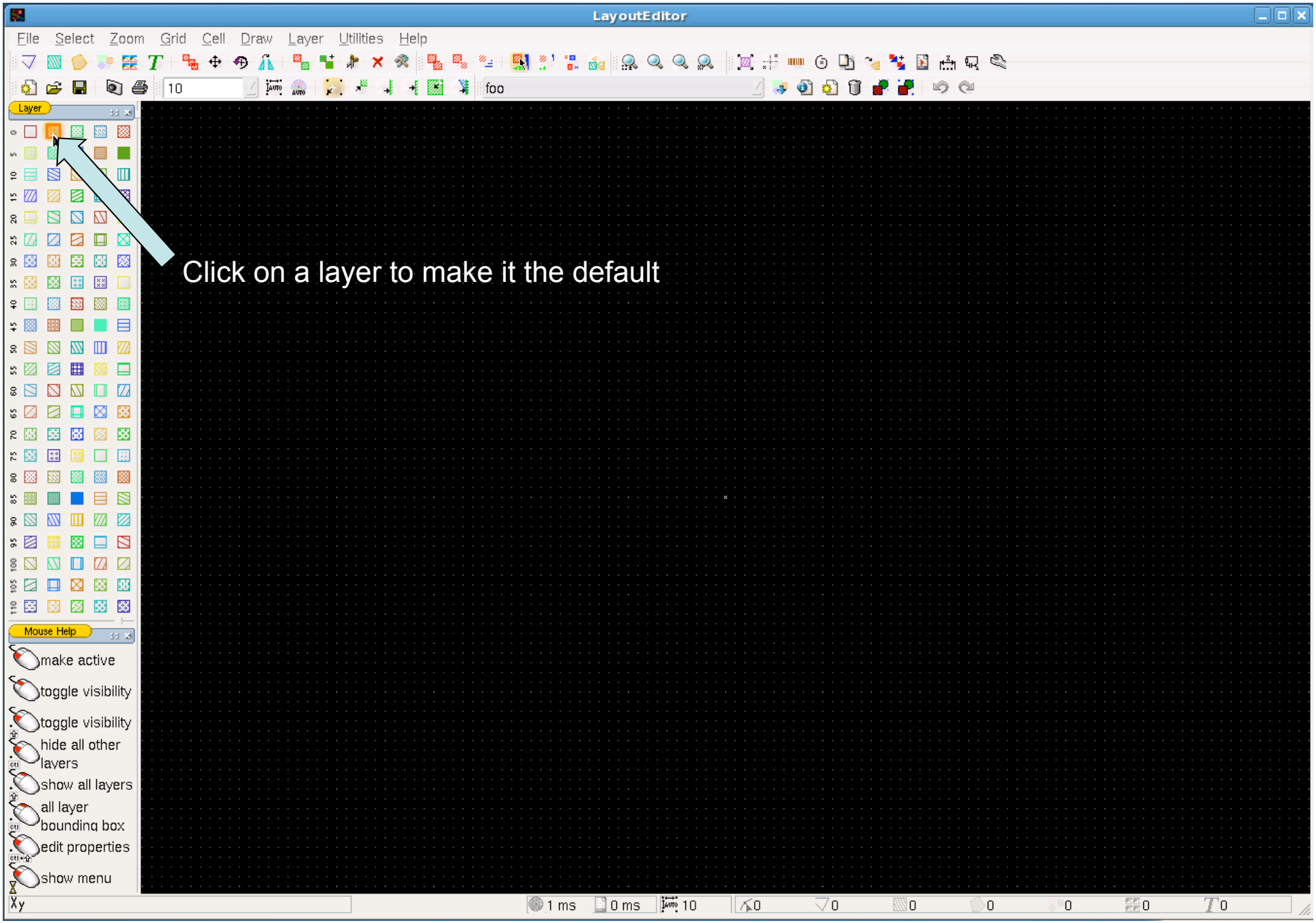


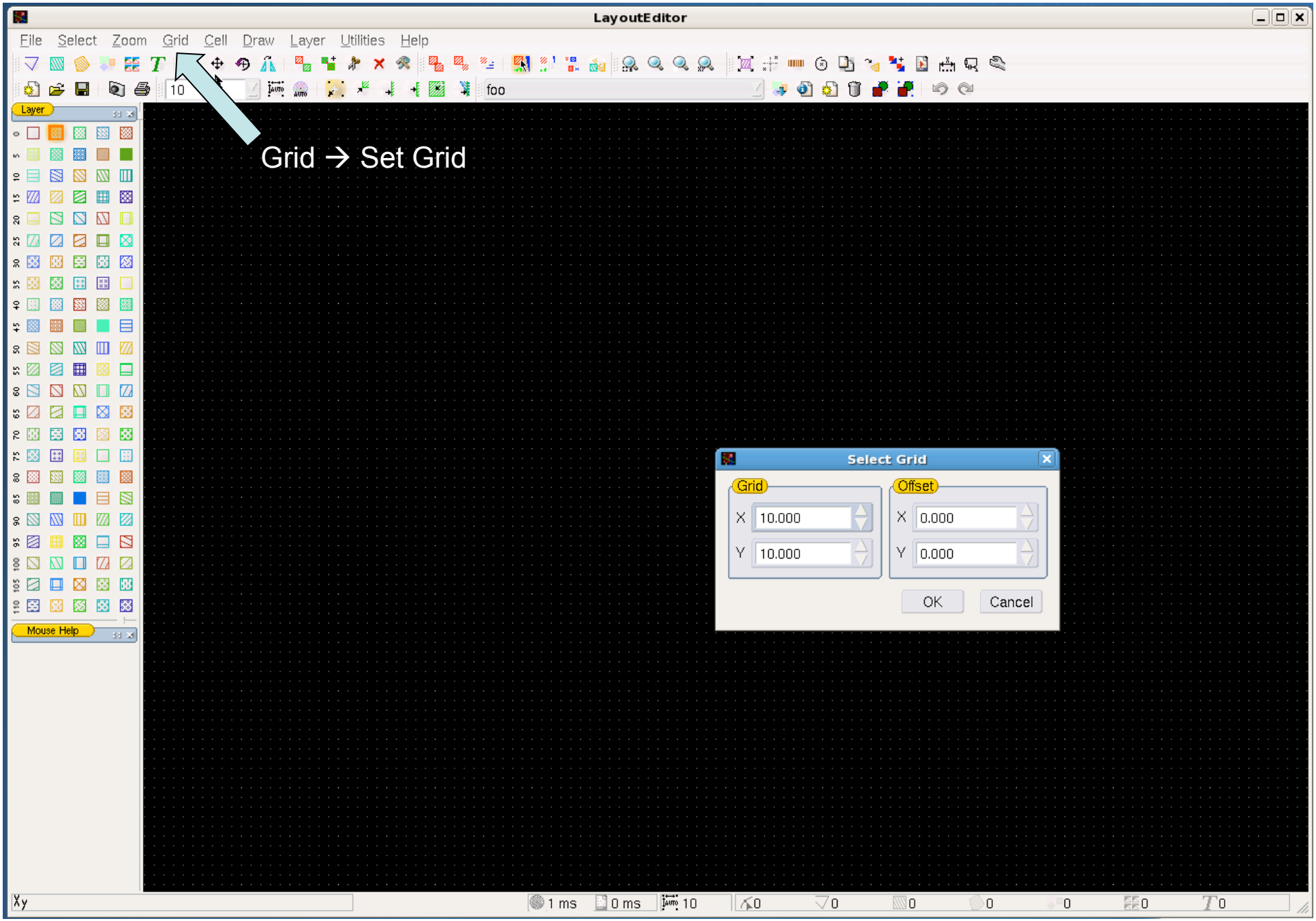
Log into the Linux server and open a terminal window (try the right-click menu).

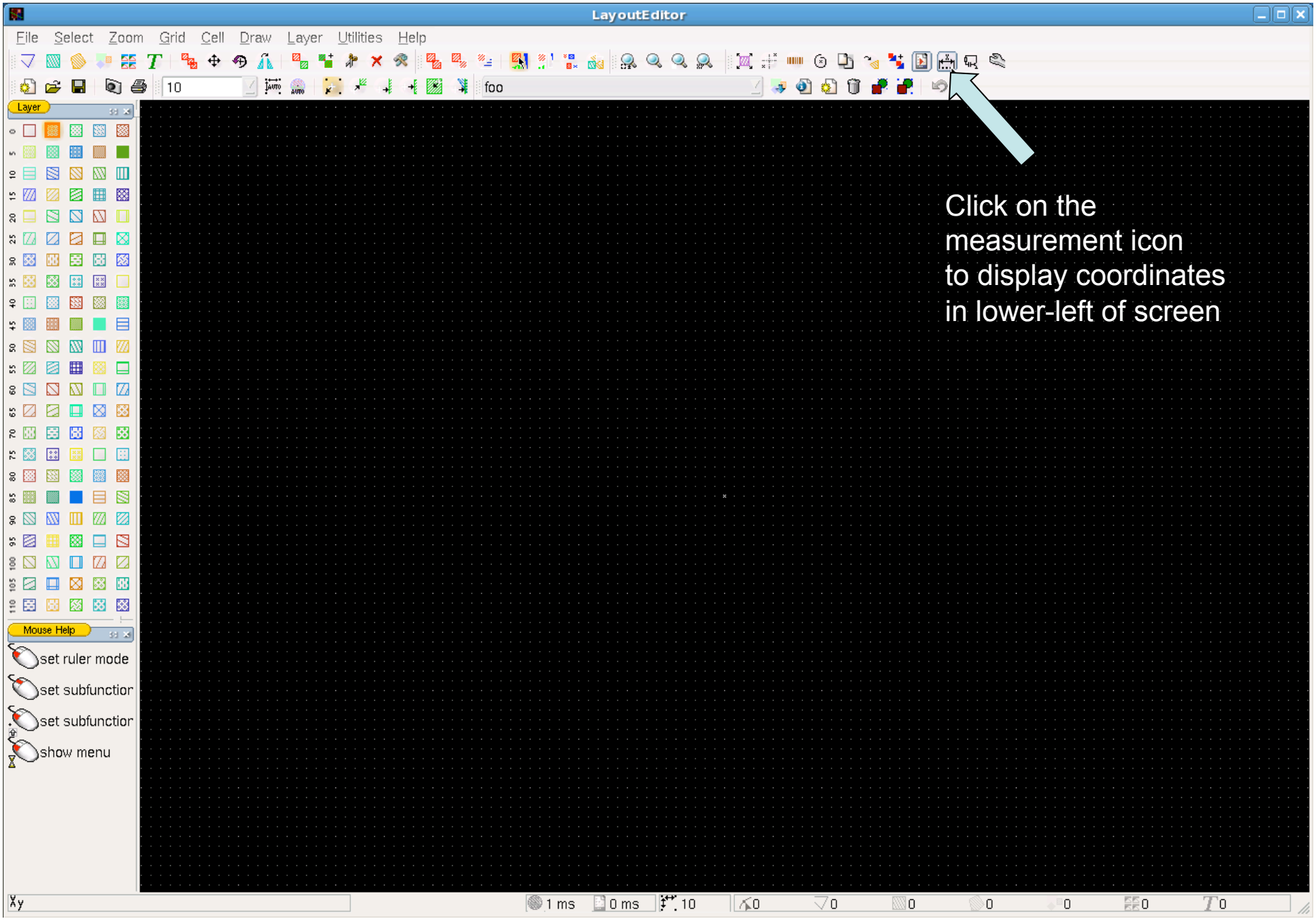
Use “mkdir” to create a directory for your project,
then use “cd” to make this the default directory.

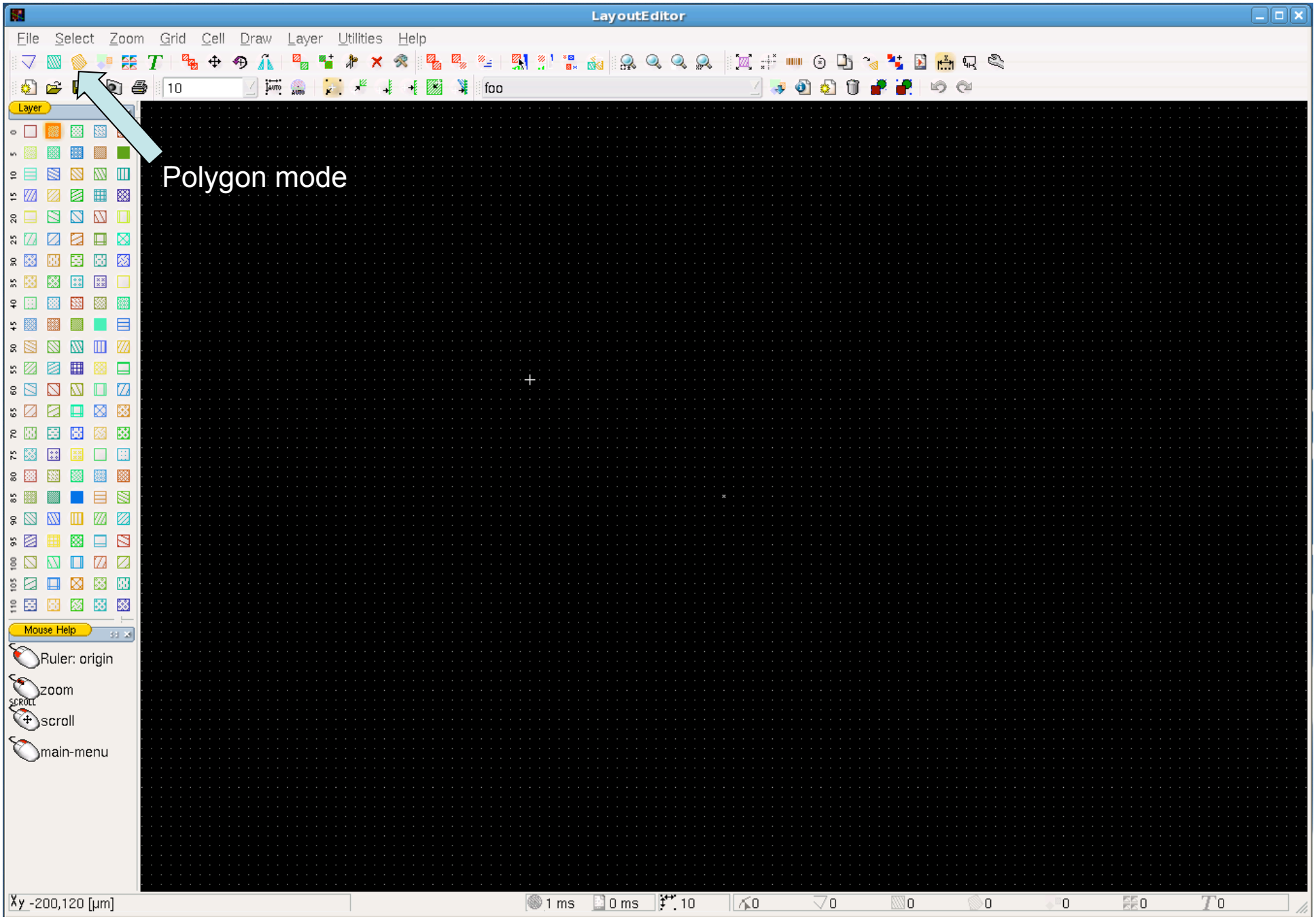
Type “layout” to fire up the CAD program.

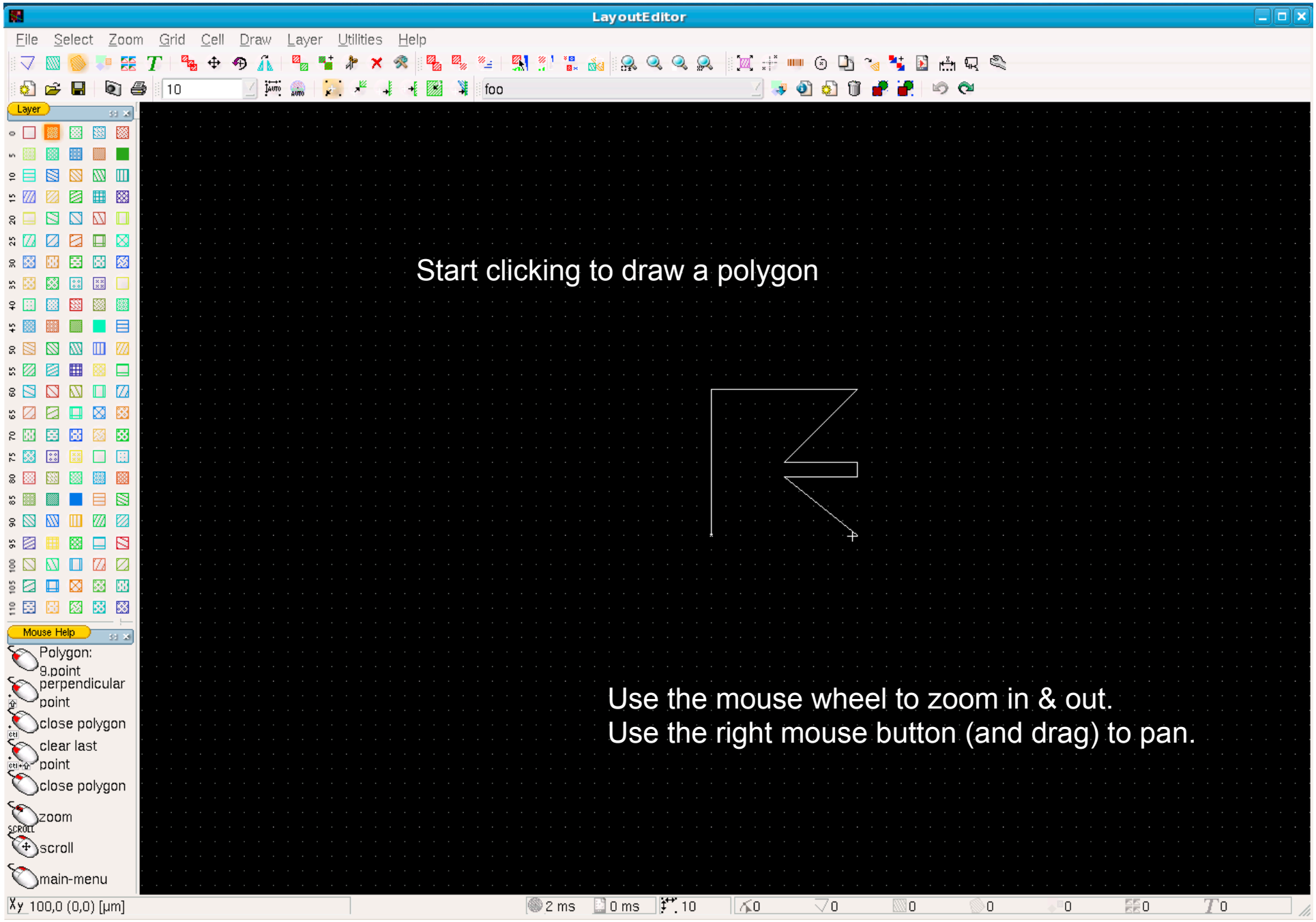

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
noname_1
New Cell
Cell Name
Cell Name
Enter Cell Name
noname_1
OK
Cancel
Layer
Mouse Help
set cell name
Create a new cell by clicking on the “new cell” icon,
and then give this cell a name by clicking on the “cell name” icon.

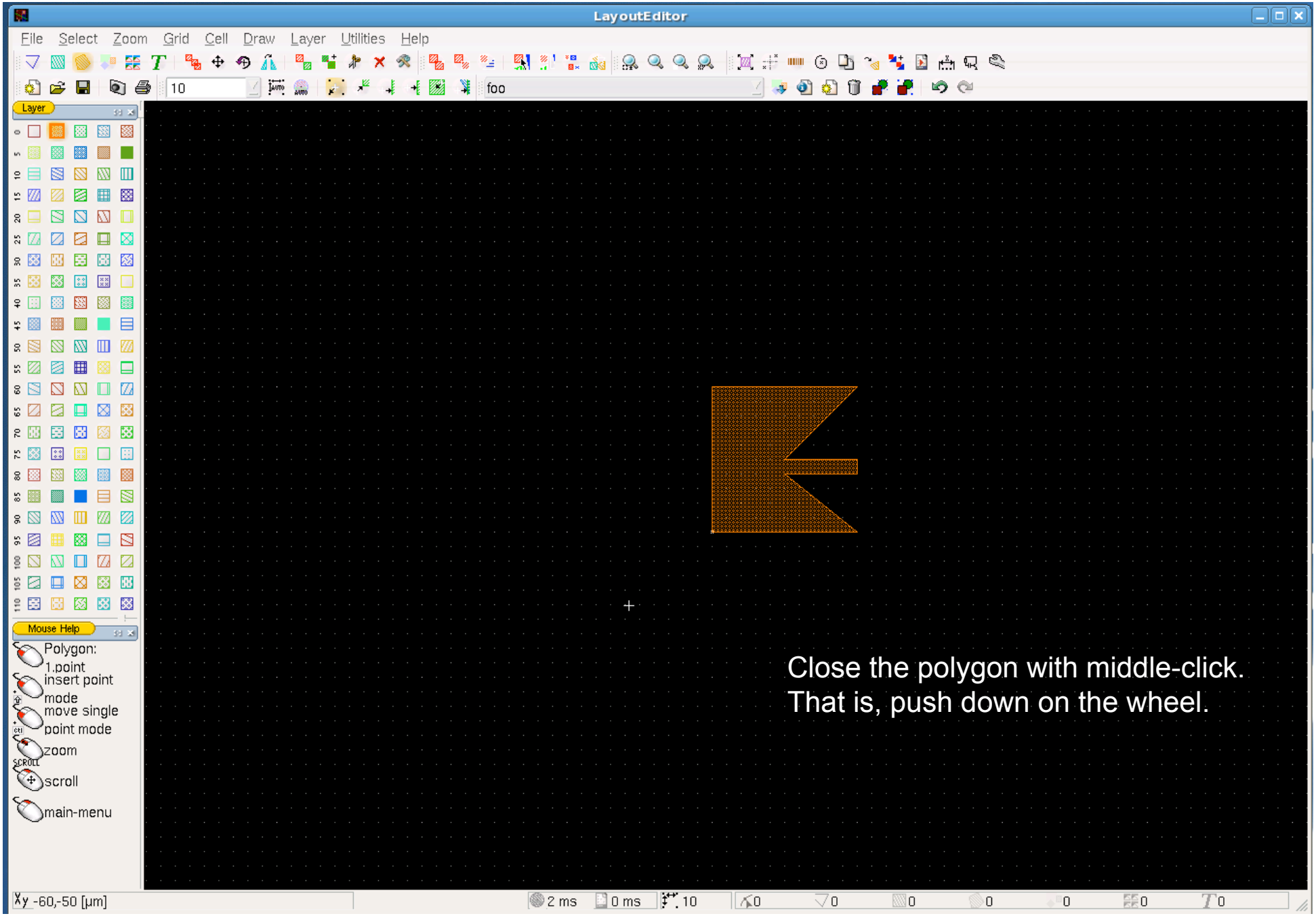

LayoutEditor
File
Select
Zoom
Grid
Cell
Draw
Layer
Utilities
Help
10
foo
Layer
Mouse Help
make active
toggle visibility
toggle visibility
hide all other layers
show all layers
all layer bounding box
edit properties
show menu
Click on a layer to make it the default
1 ms
0 ms
10

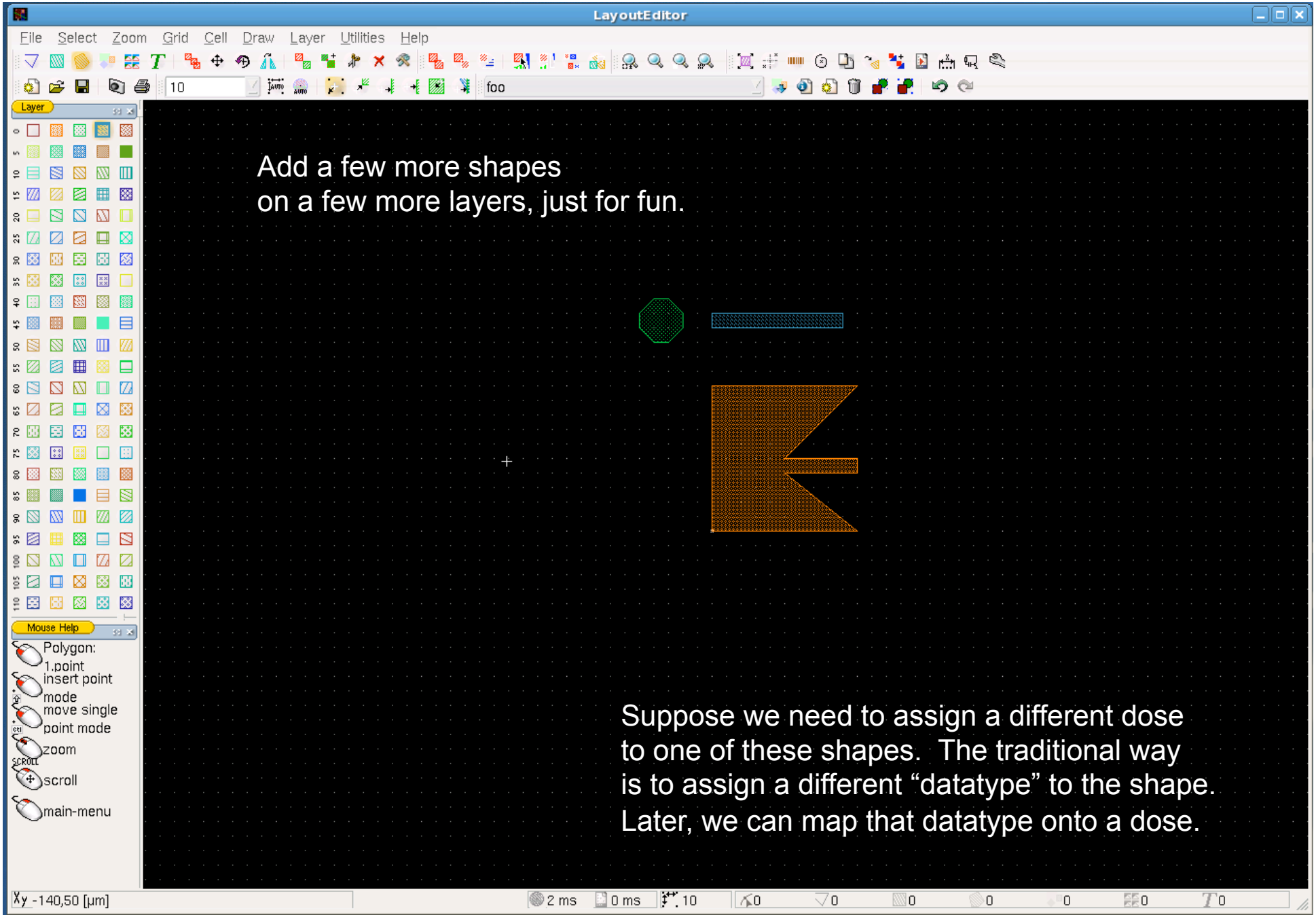

LayoutEditor
File
Select
Zoom
Grid
Cell
Draw
Layer
Utilities
Help
Grid → Set Grid
Layer
Mouse Help
Select Grid
Grid
X
10.000
Y
10.000
Offset
X
0.000
Y
0.000
OK
Cancel

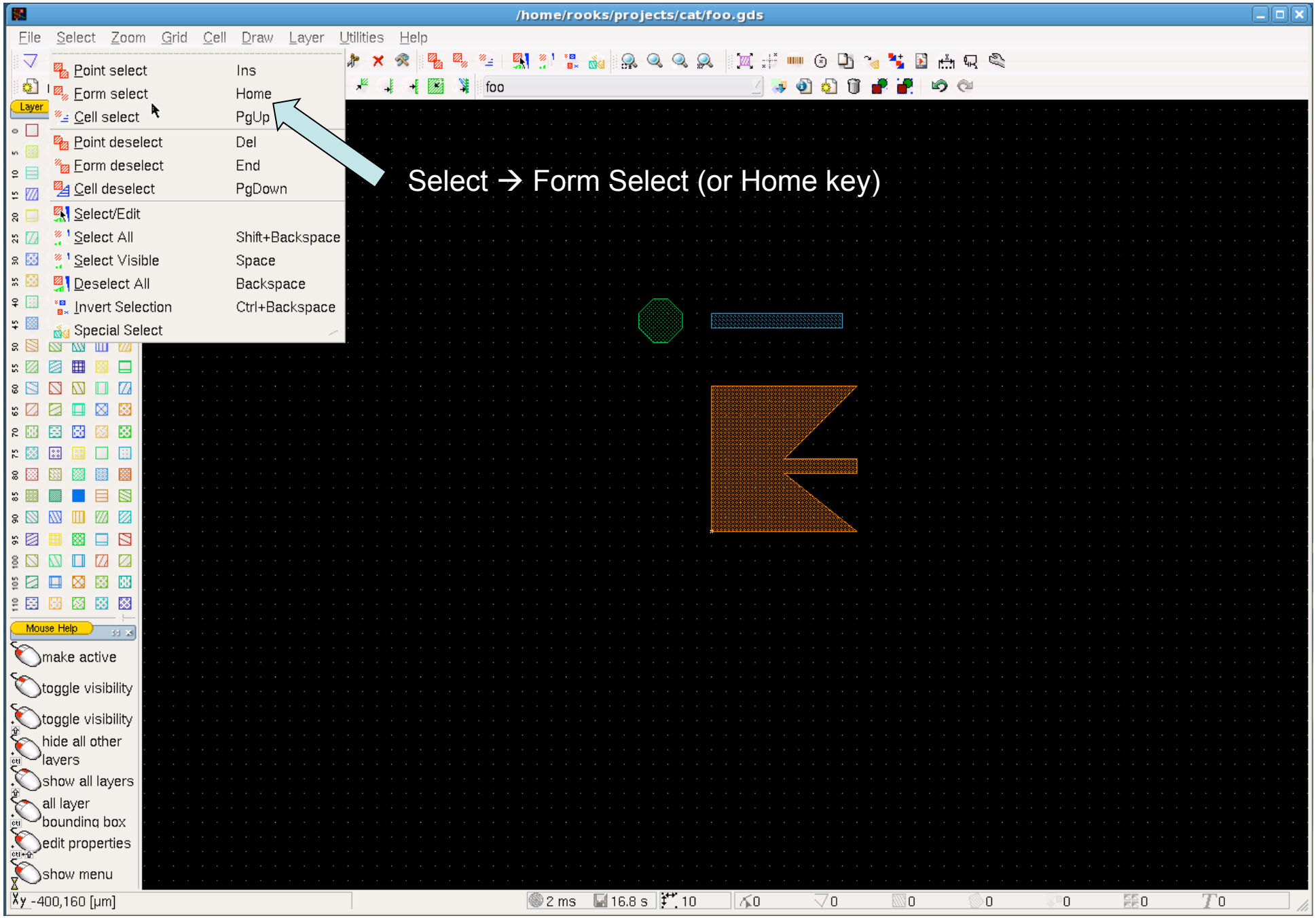

LayoutEditor
File
Select
Zoom
Grid
Cell
Draw
Layer
Utilities
Help
10
foo
Layer
Mouse Help
set ruler mode
set subfunctior
set subfunctior
show menu
Click on the
measurement icon
to display coordinates
in lower-left of screen
Xy
1 ms
0 ms
10

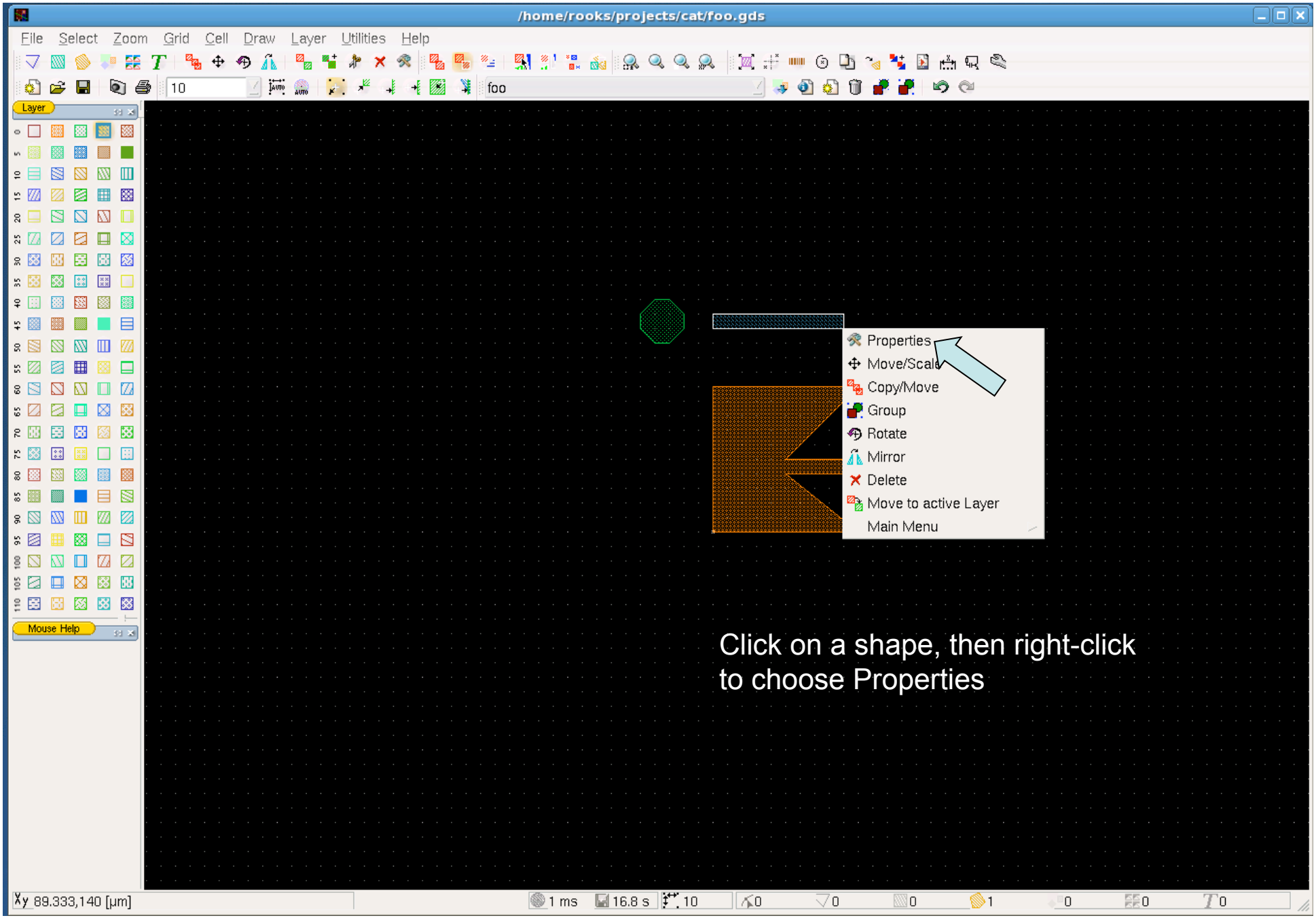

LayoutEditor
File
Select
Zoom
Grid
Cell
Draw
Layer
Utilities
Help
10
foo
Layer
Polygon mode
Mouse Help
Ruler: origin
zoom
scroll
main-menu
xy -200,120 [µm]
1 ms
0 ms
10

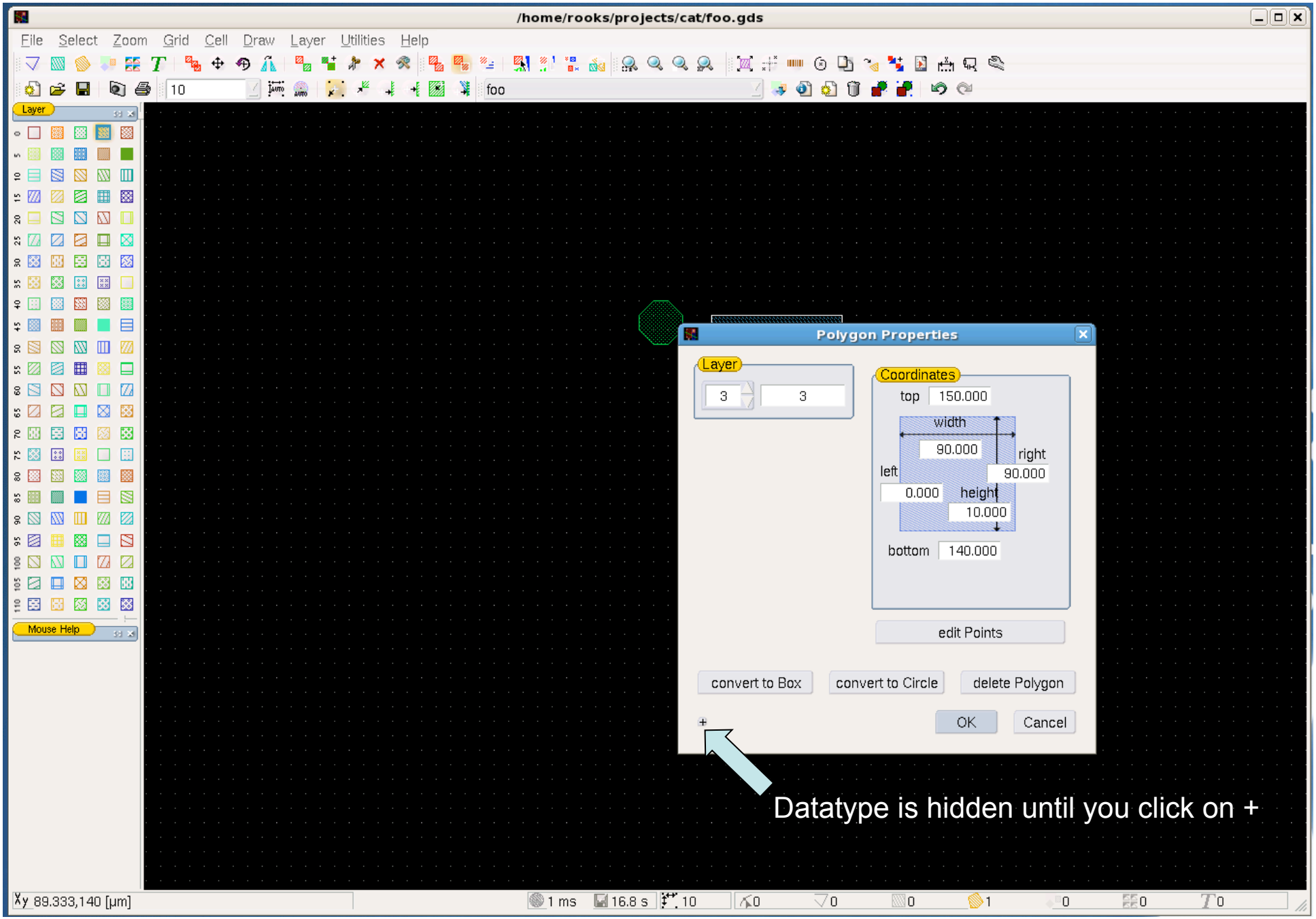

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
Polygon: 9.point
perpendicular point
close polygon
clear last point
close polygon
zoom
scroll
main-menu
Start clicking to draw a polygon
Use the mouse wheel to zoom in & out.
Use the right mouse button (and drag) to pan.
xy 100,0 (0,0) [µm]
2 ms
0 ms
10

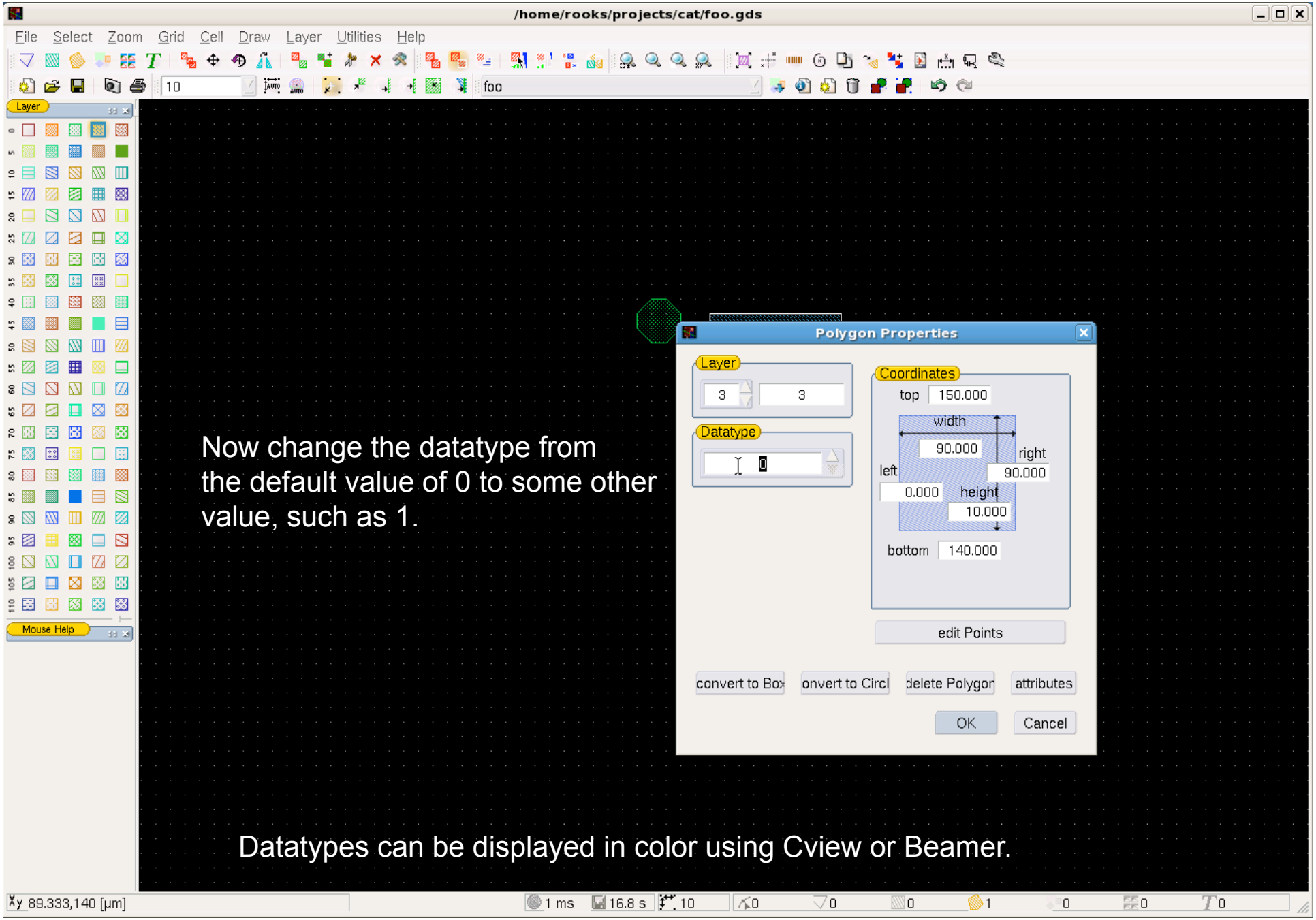

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
Polygon:
1.point
insert point
mode
move single
point mode
zoom
scroll
main-menu
Close the polygon with middle-click.
That is, push down on the wheel.
-60,-50 [µm]
2 ms
0 ms
10

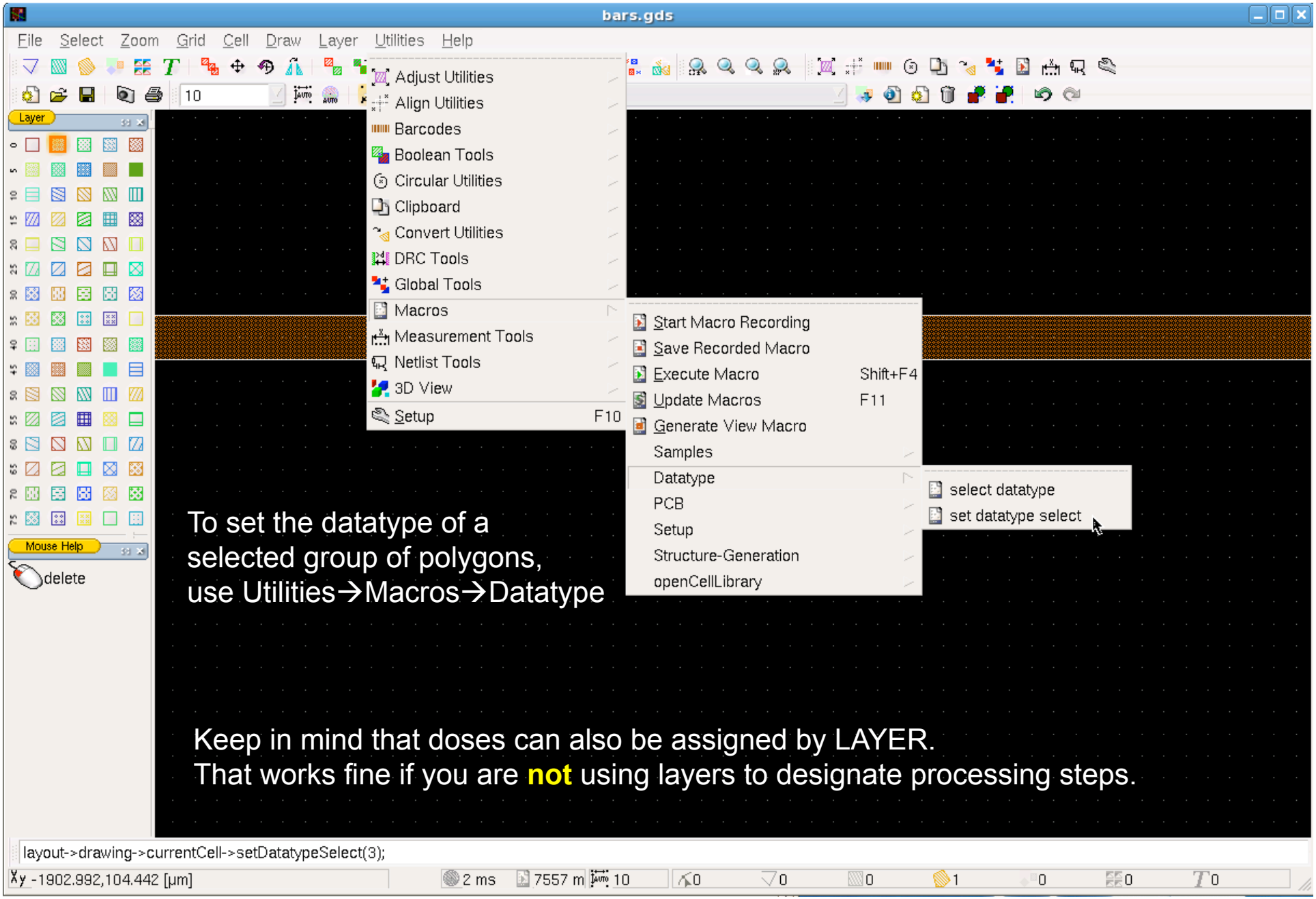

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
Polygon:
1.point
insert point
mode
move single
point mode
zoom
scroll
main-menu
Add a few more shapes
on a few more layers, just for fun.
Suppose we need to assign a different dose
to one of these shapes. The traditional way
is to assign a different “datatype” to the shape.
Later, we can map that datatype onto a dose.
xy -140,50 [µm]
2 ms
0 ms
10

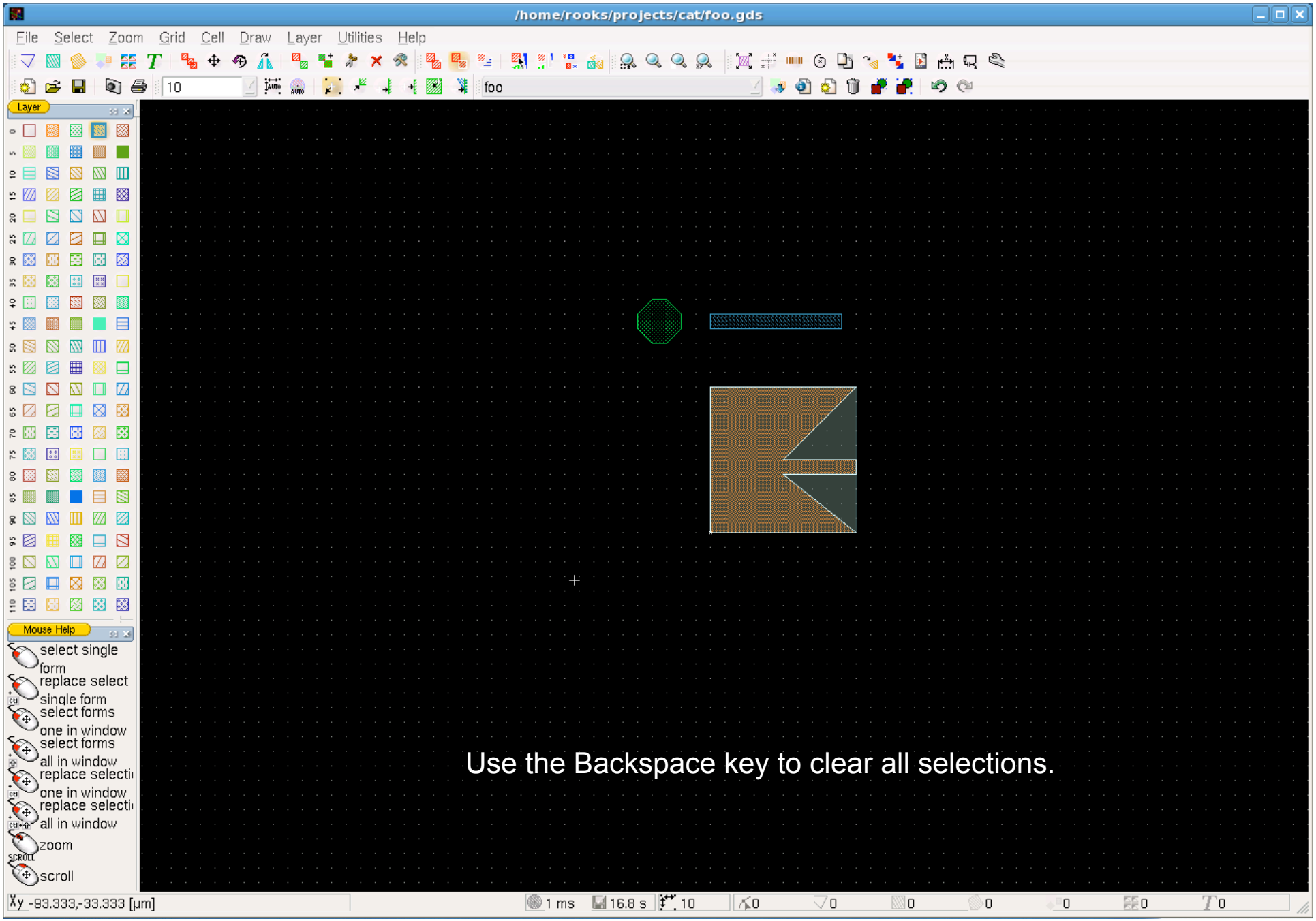

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Point select Ins
Form select Home
Cell select PgUp
Point deselect Del
Form deselect End
Cell deselect PgDown
Select/Edit
Select All Shift+Backspace
Select Visible Space
Deselect All Backspace
Invert Selection Ctrl+Backspace
Special Select
foo
Select → Form Select (or Home key)
Layer
Mouse Help
make active
toggle visibility
toggle visibility
hide all other layers
show all layers
all layer bounding box
edit properties
show menu
xy -400,160 [µm]
2 ms
16.8 s
10

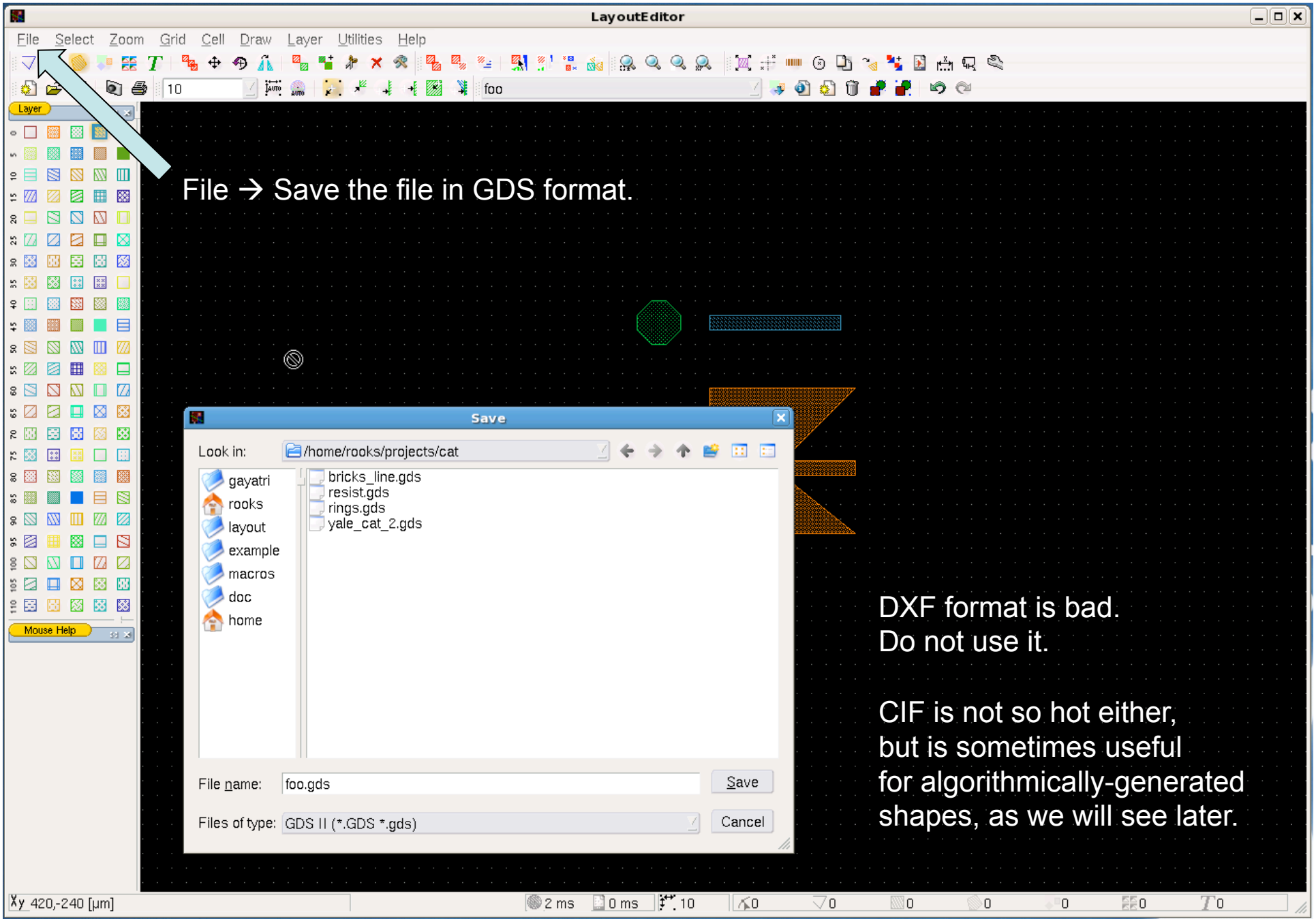

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
Properties
Move/Scale
Copy/Move
Group
Rotate
Mirror
Delete
Move to active Layer
Main Menu
Click on a shape, then right-click
to choose Properties
89.333,140 [µm]
1 ms
16.8 s
10

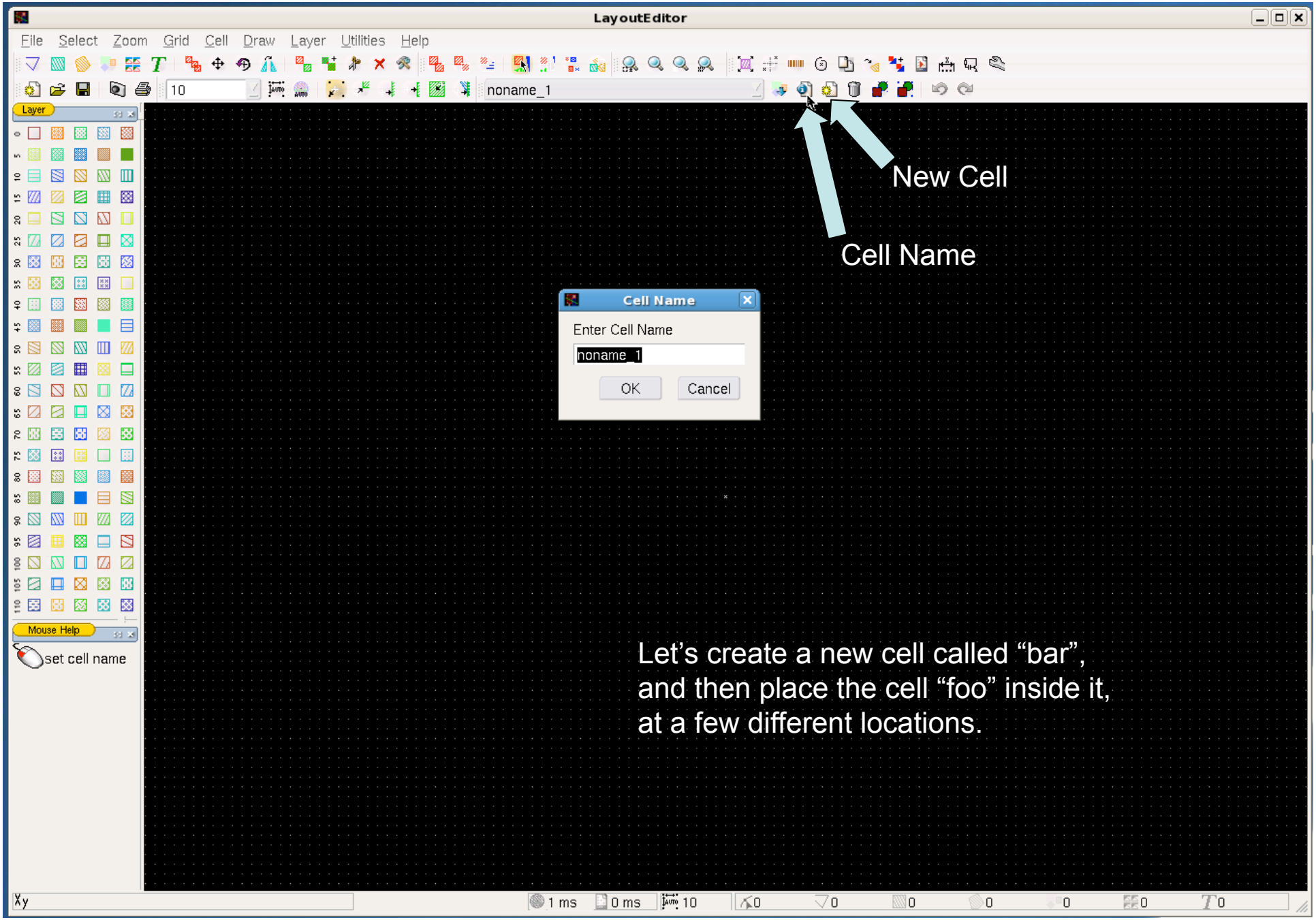

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Layer
Mouse Help
Polygon Properties
Layer
3
3
Coordinates
top 150.000
width
90.000
right
left
90.000
0.000
height
10.000
bottom 140.000
edit Points
convert to Box
convert to Circle
delete Polygon
OK
Cancel
Datatype is hidden until you click on +

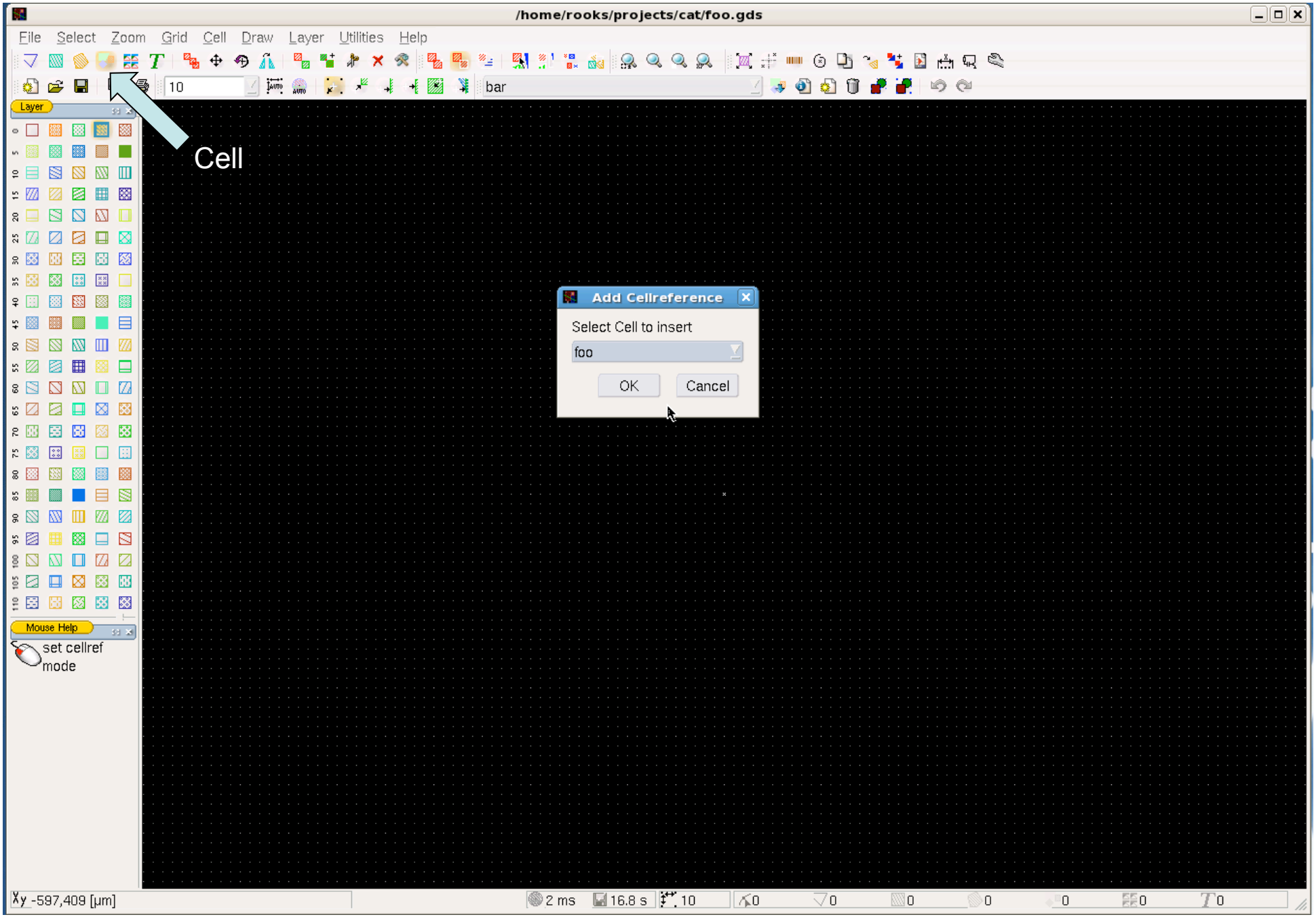

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
Polygon Properties
Layer
3
3
Datatype
0
Coordinates
top 150.000
width
90.000
right
left
90.000
0.000
height
10.000
bottom 140.000
edit Points
convert to Box
onvert to Circl
delete Polygon
attributes
OK
Cancel
Now change the datatype from the default value of 0 to some other value, such as 1.
Datatypes can be displayed in color using Cview or Beamer.
xy 89.333,140 [µm]
1 ms
16.8 s
10

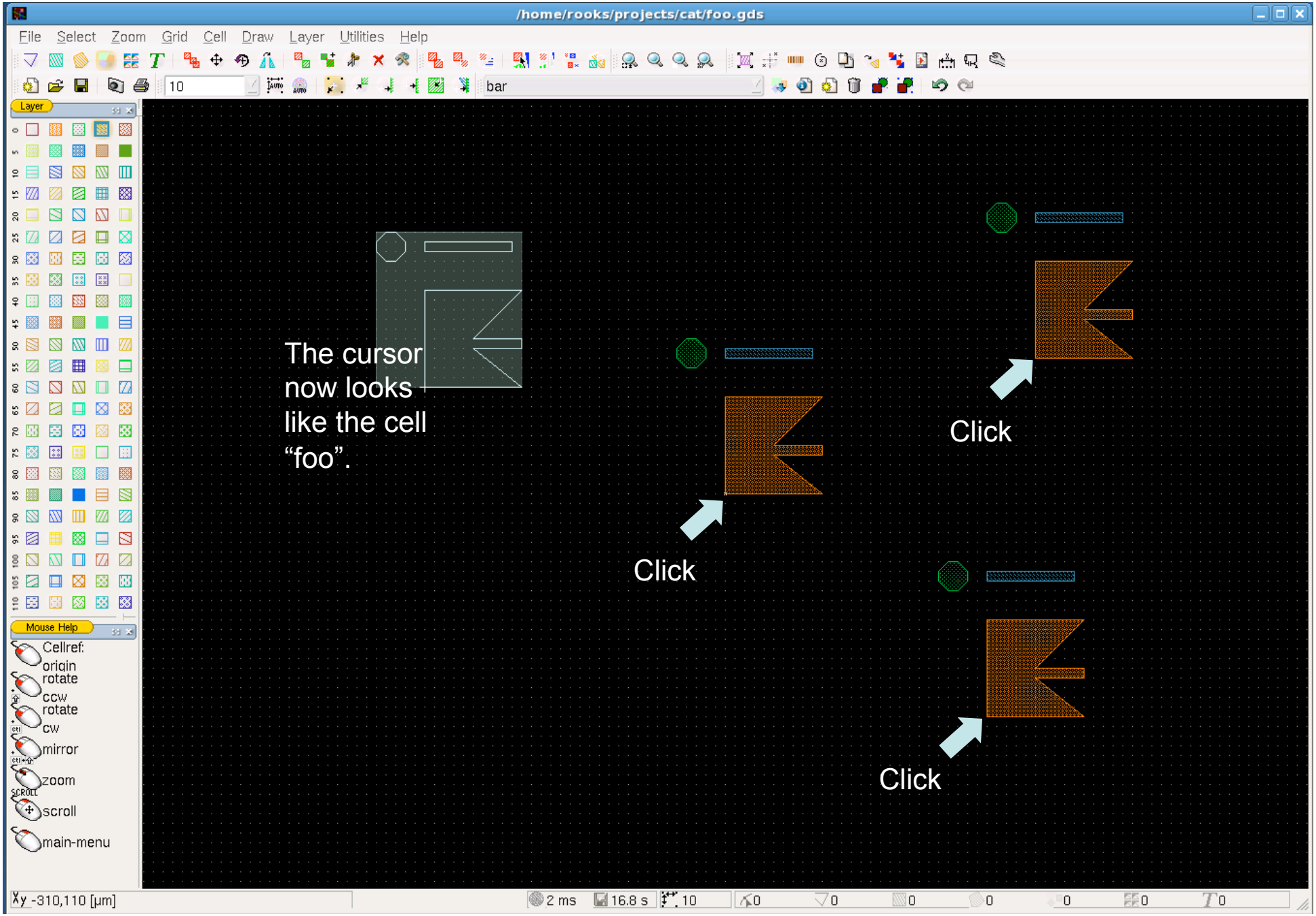

bars.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Adjust Utilities
Align Utilities
Barcodes
Boolean Tools
Circular Utilities
Clipboard
Convert Utilities
DRC Tools
Global Tools
Macros
Measurement Tools
Netlist Tools
3D View
Setup F10
Start Macro Recording
Save Recorded Macro
Execute Macro Shift+F4
Update Macros F11
Generate View Macro
Samples
Datatype
PCB
Setup
Structure-Generation
openCellLibrary
select datatype
set datatype select
Layer
Mouse Help
delete
To set the datatype of a
selected group of polygons,
use Utilities→Macros→Datatype
Keep in mind that doses can also be assigned by LAYER.
That works fine if you are not using layers to designate processing steps.
layout->drawing->currentCell->setDatatypeSelect(3);
xy -1902.992,104.442 [µm]
2 ms
7557 m
10

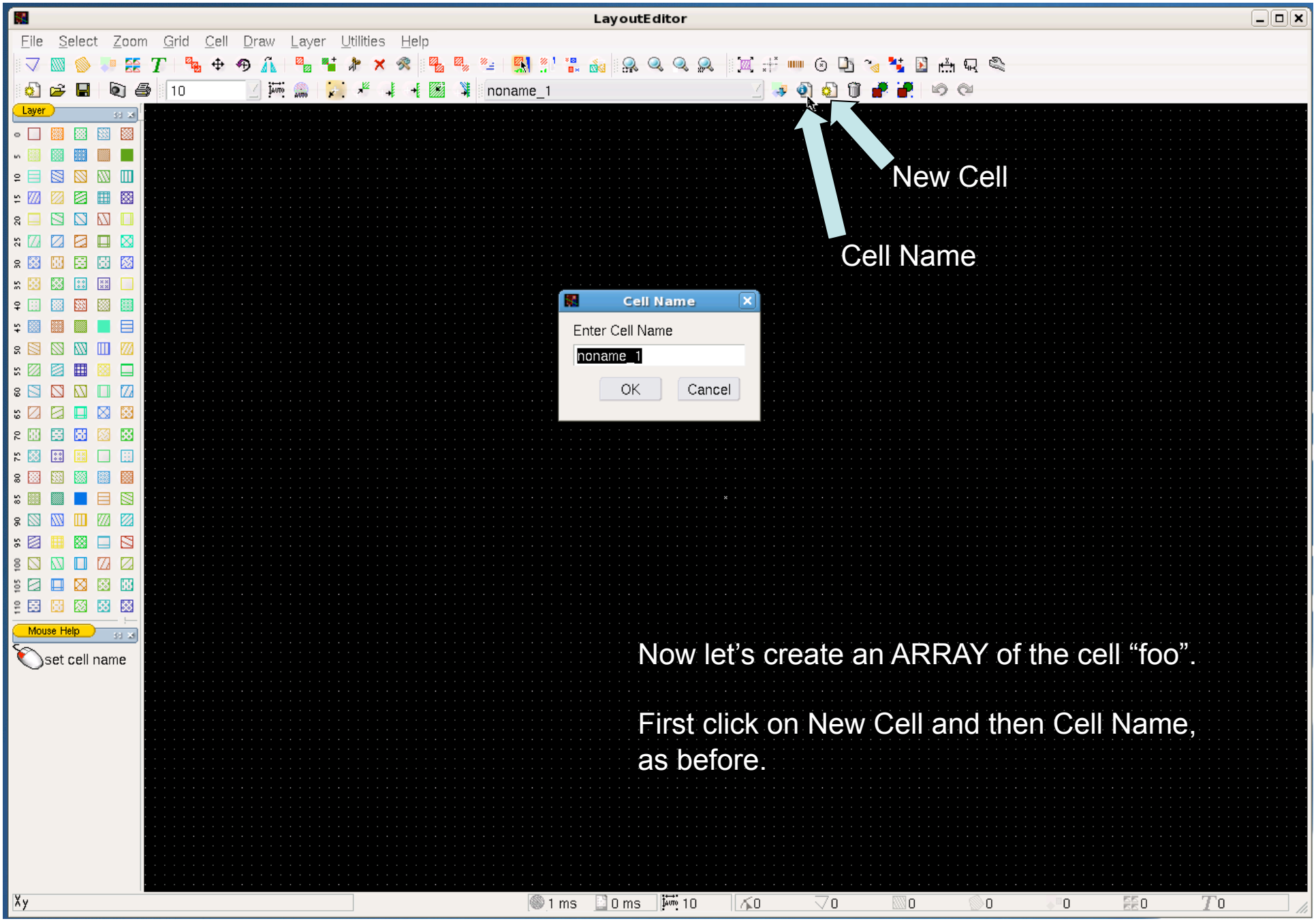

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
select single form
replace select single form
select forms one in window
select forms all in window
replace selecti one in window
replace selecti all in window
zoom
scroll
Use the Backspace key to clear all selections.
Xy -93.333,-33.333 [µm]
1 ms
16.8 s
10

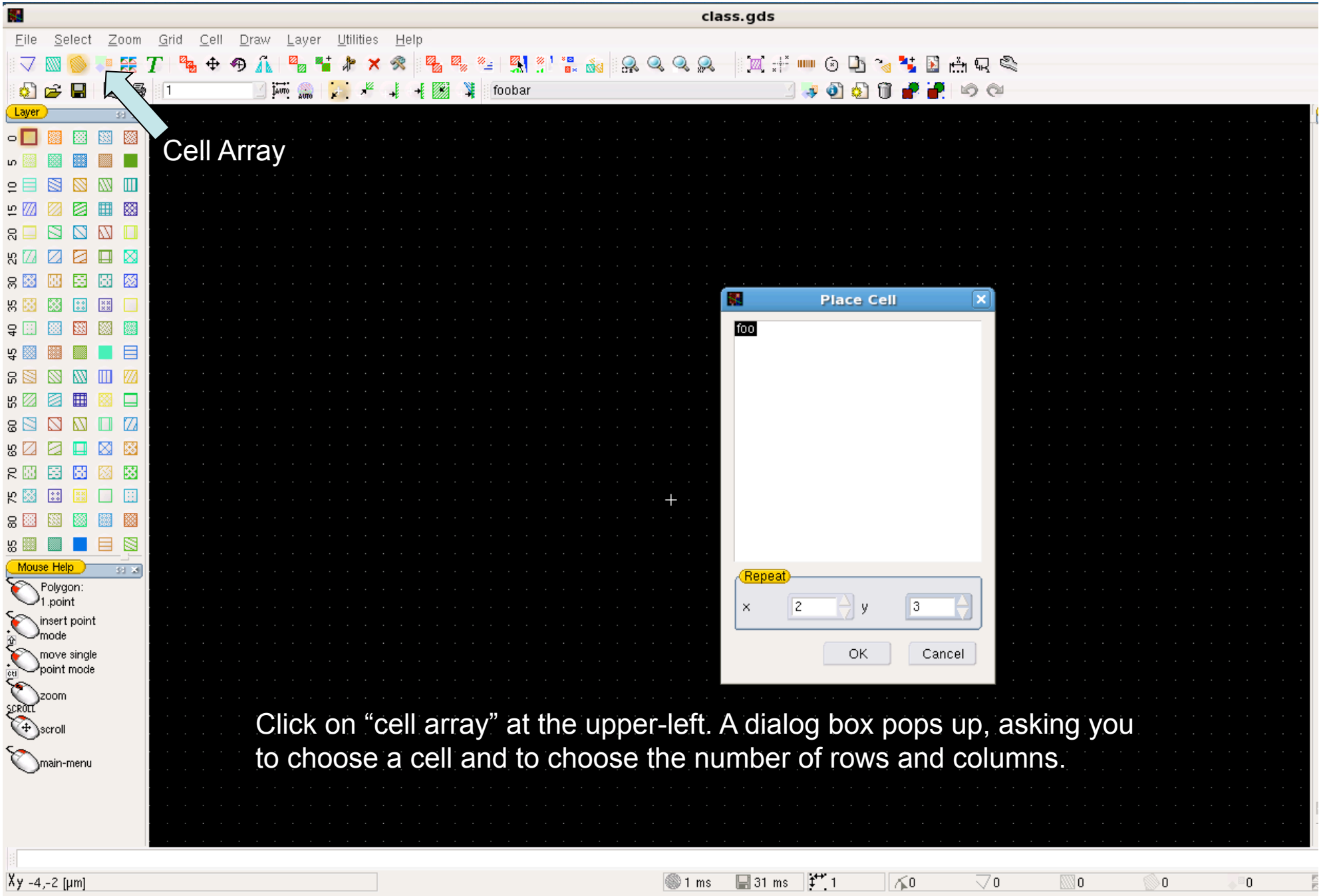

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foo
Layer
Mouse Help
File → Save the file in GDS format.
Save
Look in: /home/rooks/projects/cat
gayatri
rooks
layout
example
macros
doc
home
bricks_line.gds
resist.gds
rings.gds
yale_cat_2.gds
File name: foo.gds
Save
Files of type: GDS II (*.GDS *.gds)
Cancel
DXF format is bad.
Do not use it.
CIF is not so hot either,
but is sometimes useful
for algorithmically-generated
shapes, as we will see later.
Xy 420,-240 [µm]
2 ms
0 ms
10

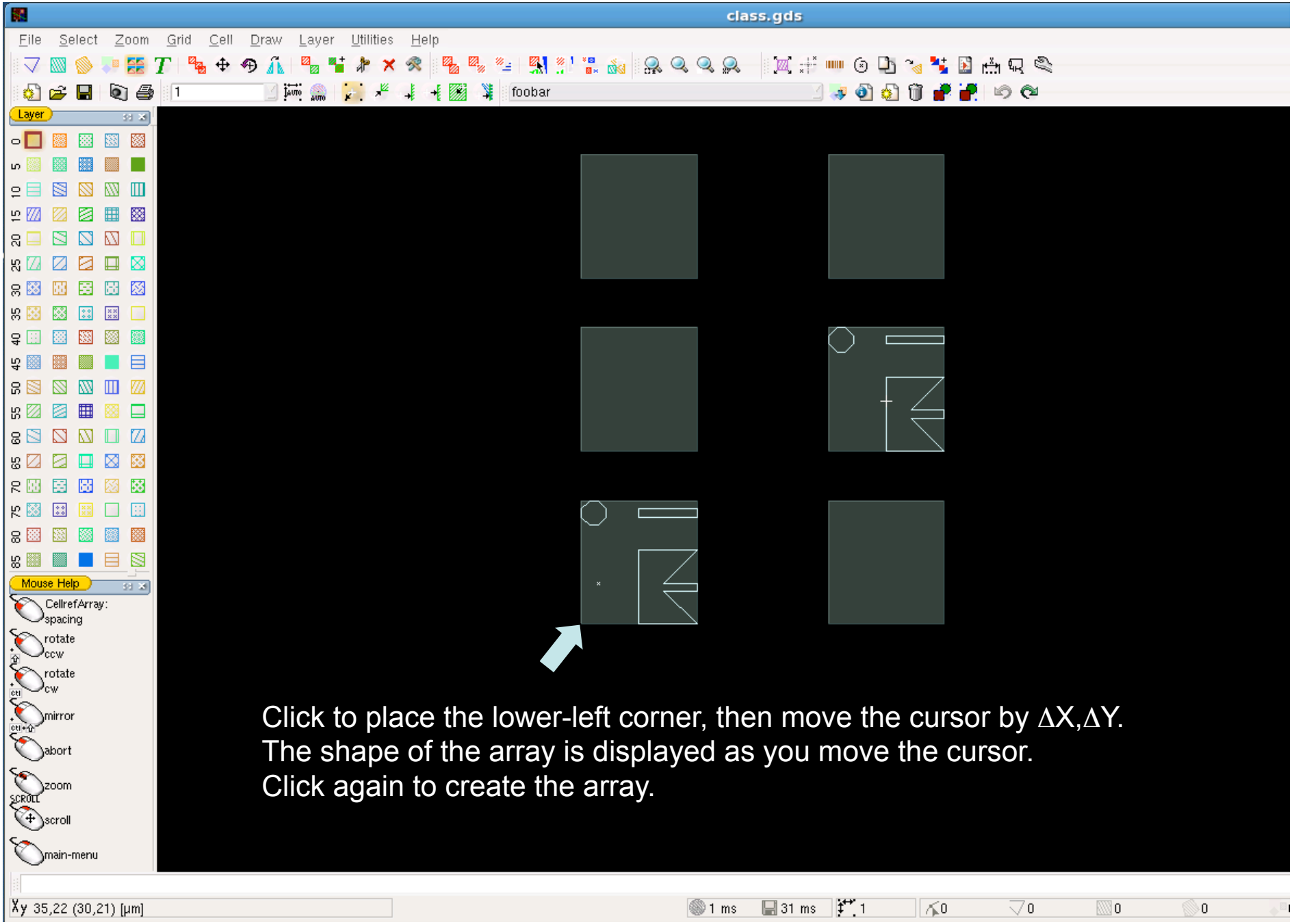

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
noname_1
New Cell
Cell Name
Cell Name
Enter Cell Name
noname_1
OK
Cancel
Layer
Mouse Help
set cell name
Let’s create a new cell called “bar”,
and then place the cell “foo” inside it,
at a few different locations.

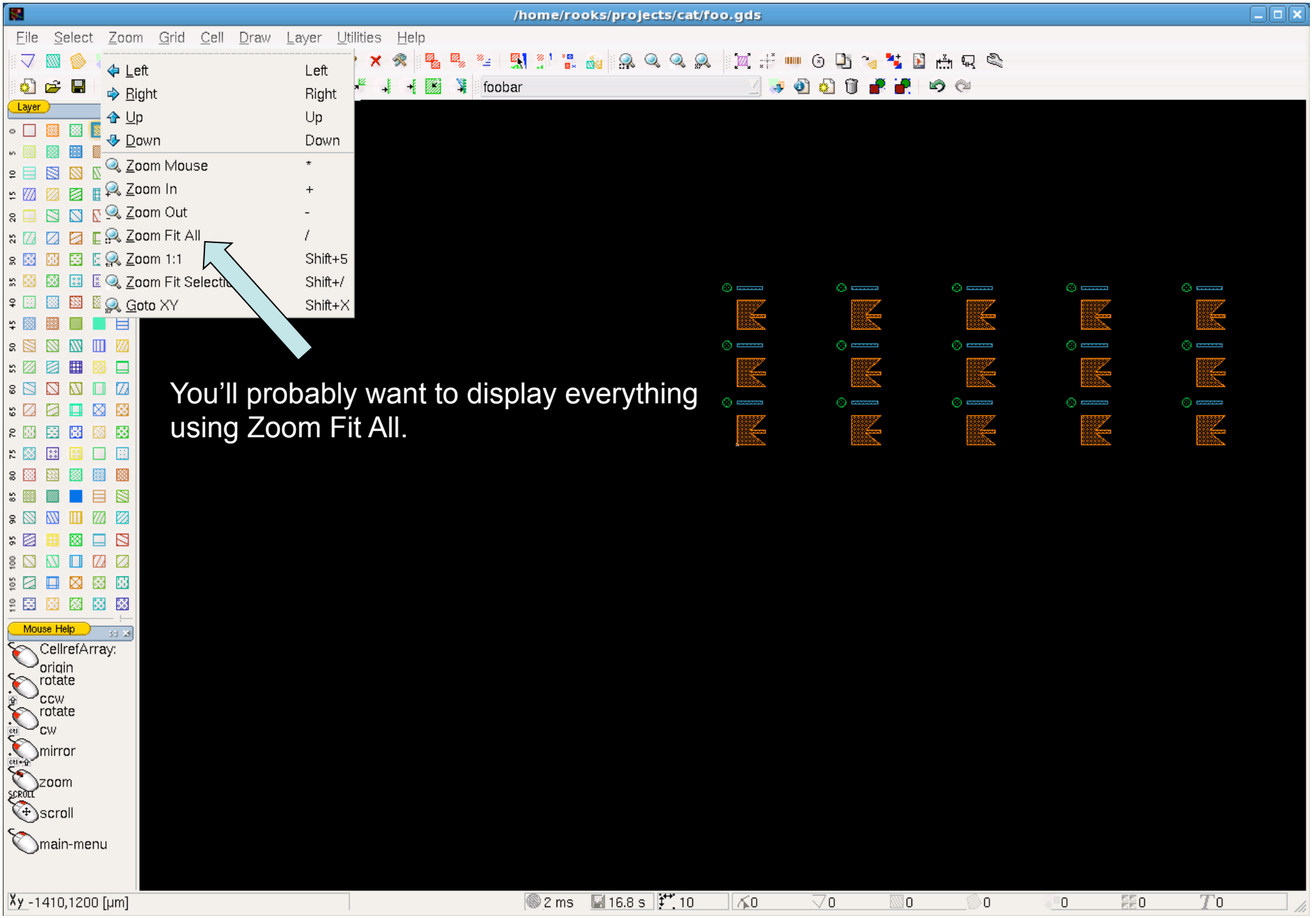

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
bar
Layer
Cell
Add Cellreference
Select Cell to insert
foo
OK
Cancel
Mouse Help
set cellref mode
-597,409 [µm]
2 ms
16.8 s
10

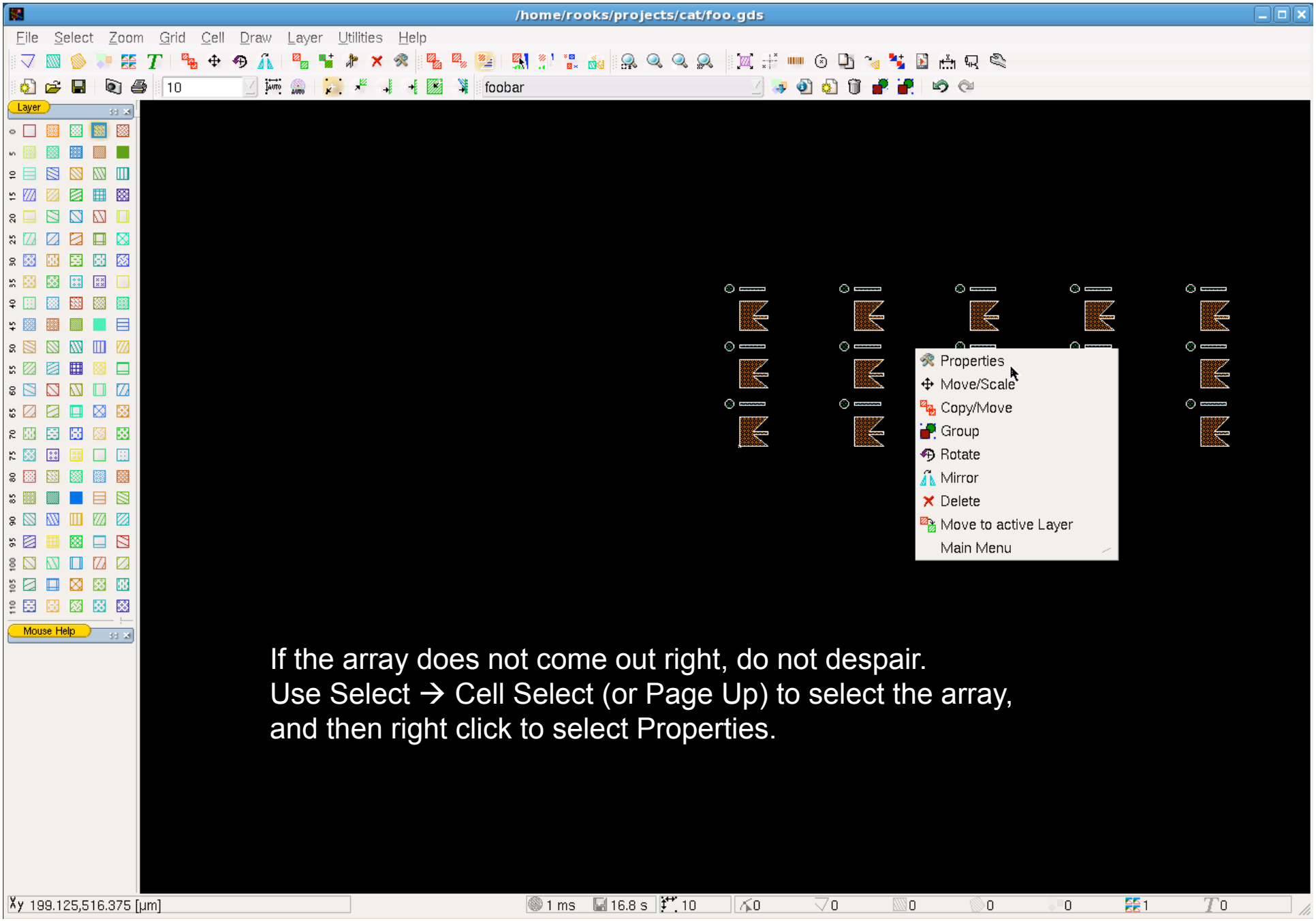

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Layer
Mouse Help
Cellref:
origin
rotate
ccw
rotate
cw
mirror
zoom
scroll
main-menu
The cursor now looks like the cell "foo".
Click
Click
Click
y -310,110 [µm]
2 ms
16.8 s

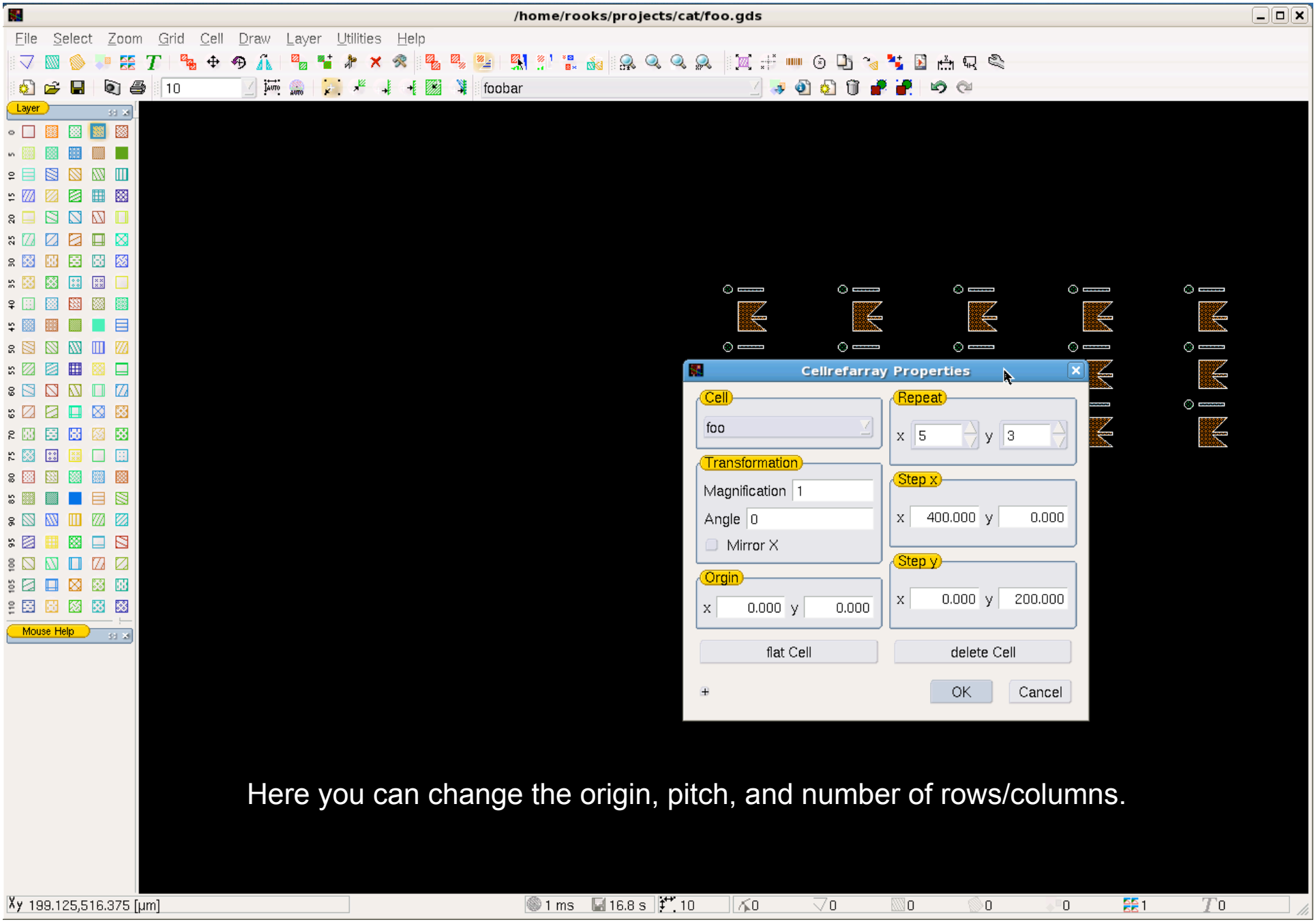

LayoutEditor
File Select Zoom Grid Cell Draw Layer Utilities Help
noname_1
New Cell
Cell Name
Cell Name
Enter Cell Name
noname_1
OK
Cancel
Layer
Mouse Help
set cell name
Now let’s create an ARRAY of the cell “foo”.
First click on New Cell and then Cell Name, as before.

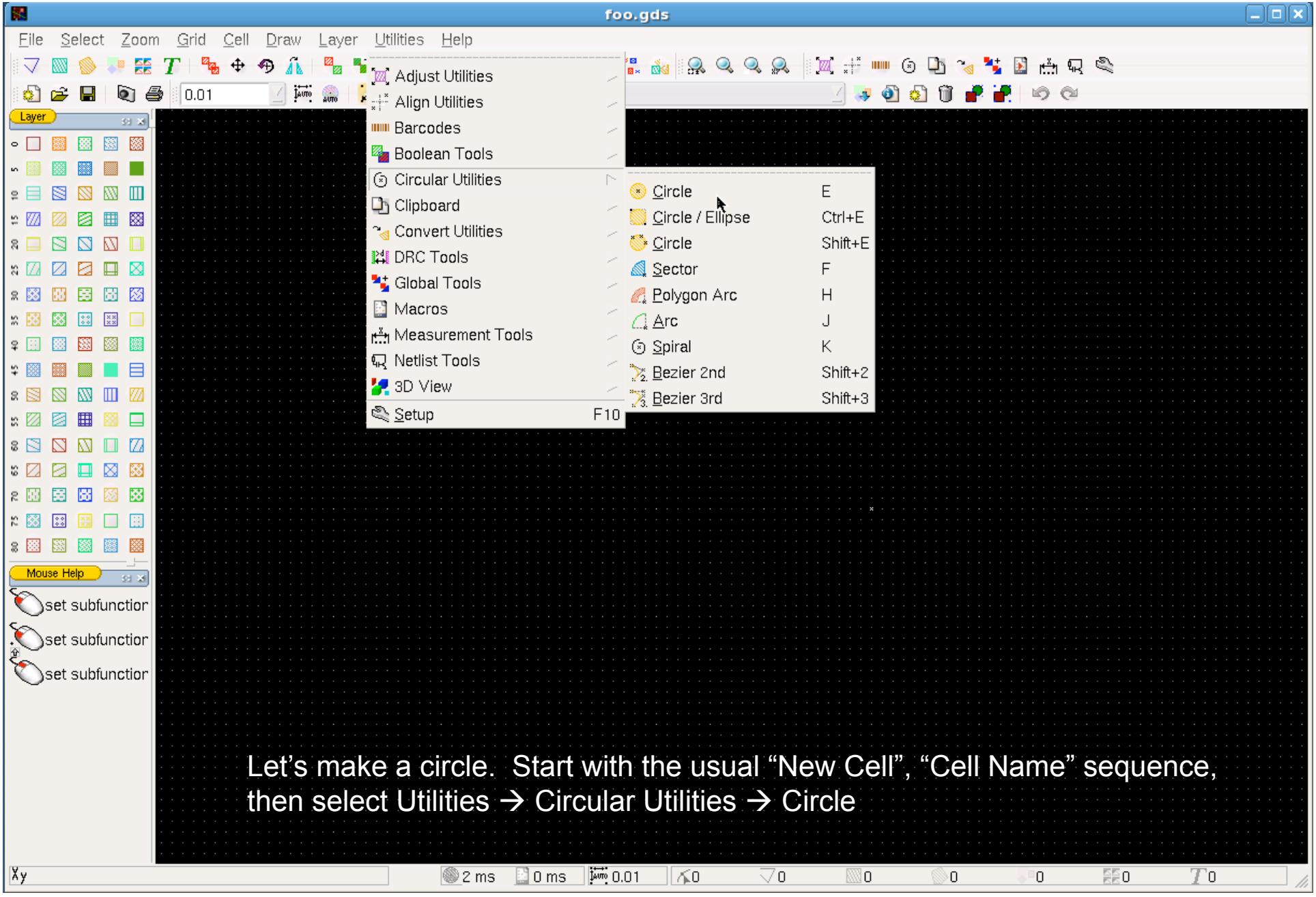

class.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
foobar
Layer
Cell Array
Place Cell
foo
Repeat
x 2 y 3
OK Cancel
Mouse Help
Polygon: 1.point
insert point mode
move single point mode
zoom
scroll
main-menu
Click on “cell array” at the upper-left. A dialog box pops up, asking you to choose a cell and to choose the number of rows and columns.
xy -4,-2 [µm]
1 ms 31 ms 1

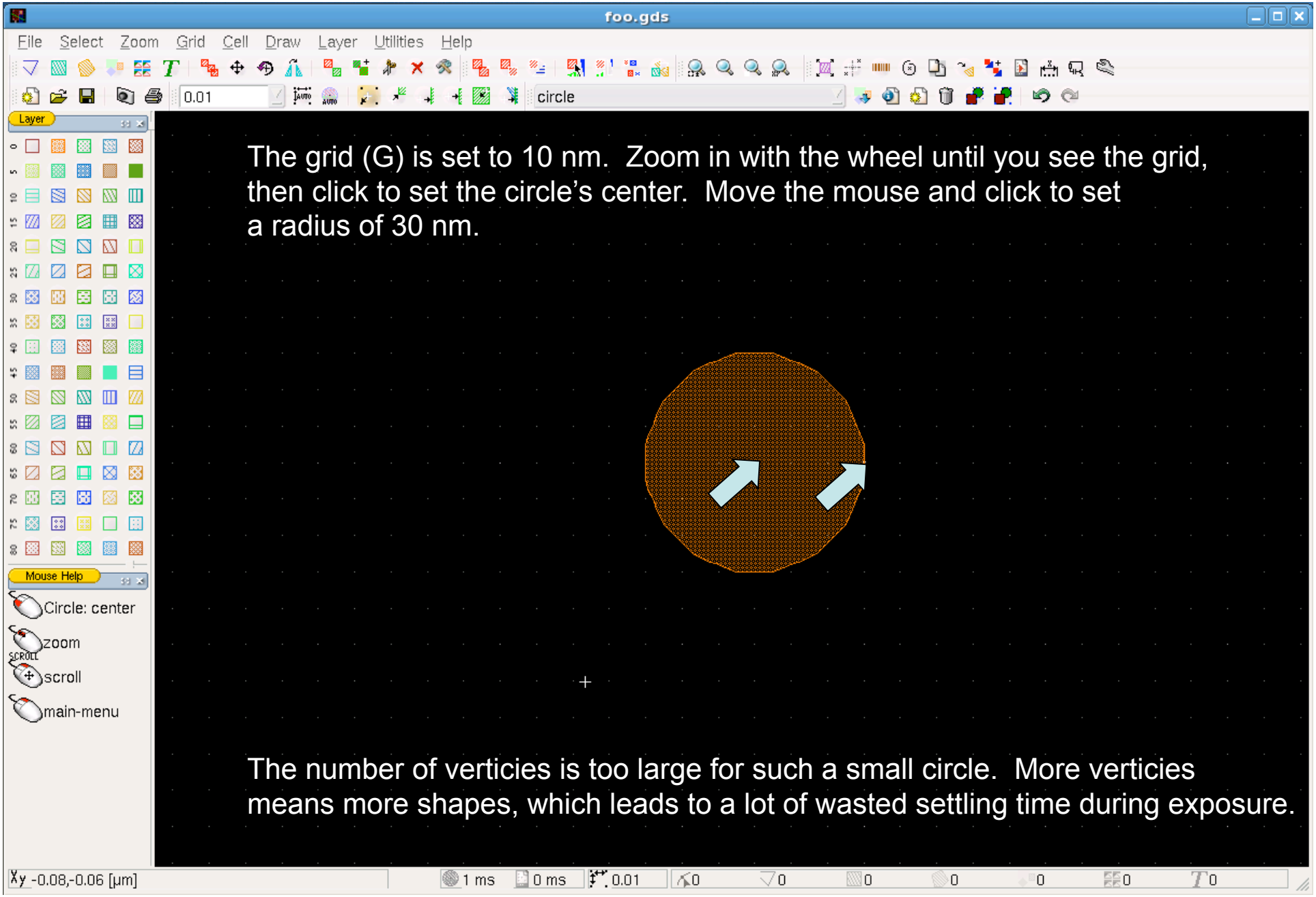

class.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
foobar
Layer
Mouse Help
CellrefArray: spacing
rotate ccw
rotate cw
mirror
abort
zoom
scroll
main-menu
Click to place the lower-left corner, then move the cursor by ΔX,ΔY.
The shape of the array is displayed as you move the cursor.
Click again to create the array.
xy 35,22 (30,21) [µm]
1 ms
31 ms
1
0
0
0
0

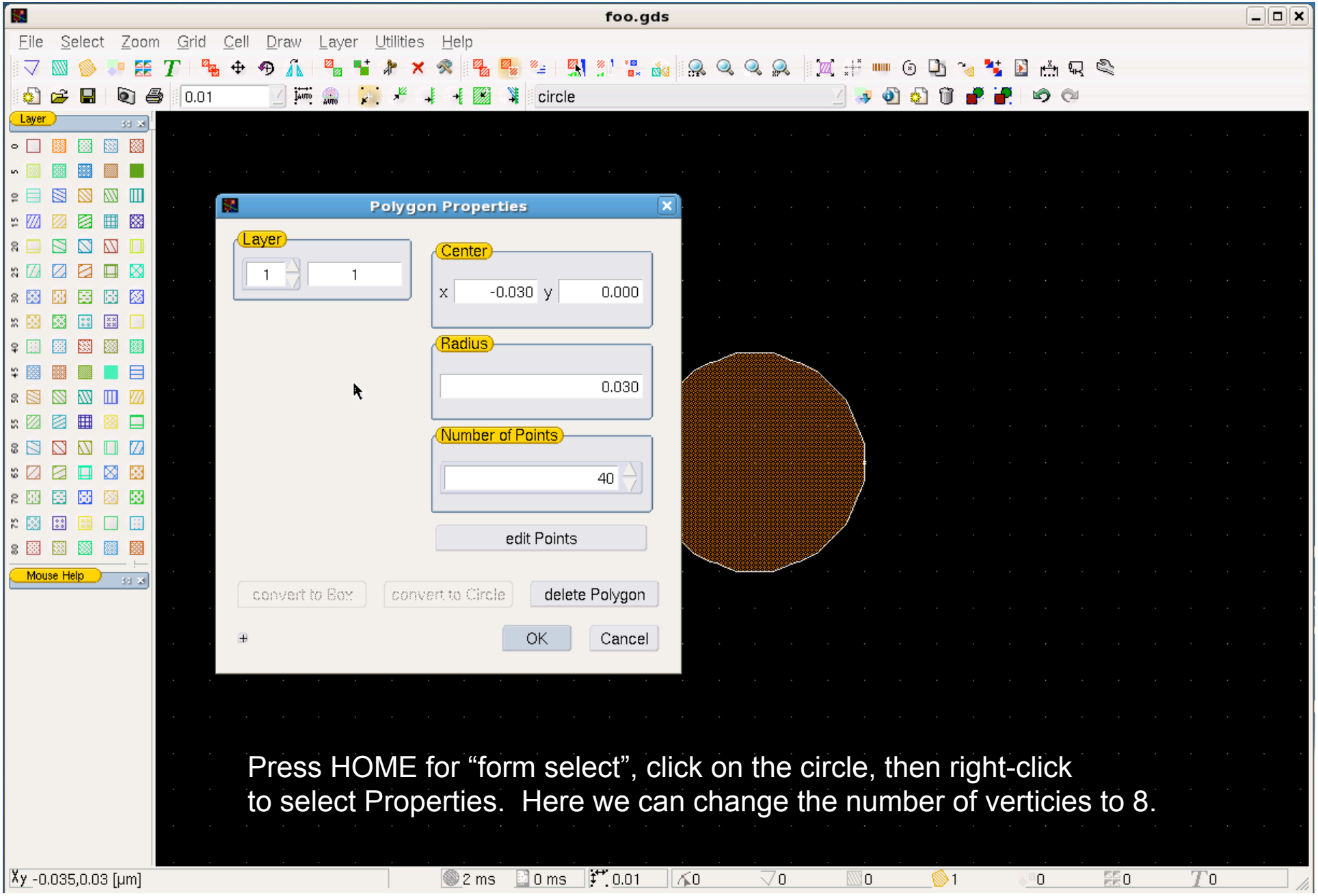

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Left Left
Right Right
Up Up
Down Down
Zoom Mouse *
Zoom In +
Zoom Out -
Zoom Fit All /
Zoom 1:1 Shift+5
Zoom Fit Selecti Shift+/
Goto XY Shift+X
foobar
Layer
Mouse Help
CellrefArray:
origin
rotate
ccw
rotate
cw
mirror
zoom
scroll
main-menu
You'll probably want to display everything using Zoom Fit All.
xy -1410,1200 [µm]
2 ms
16.8 s
10

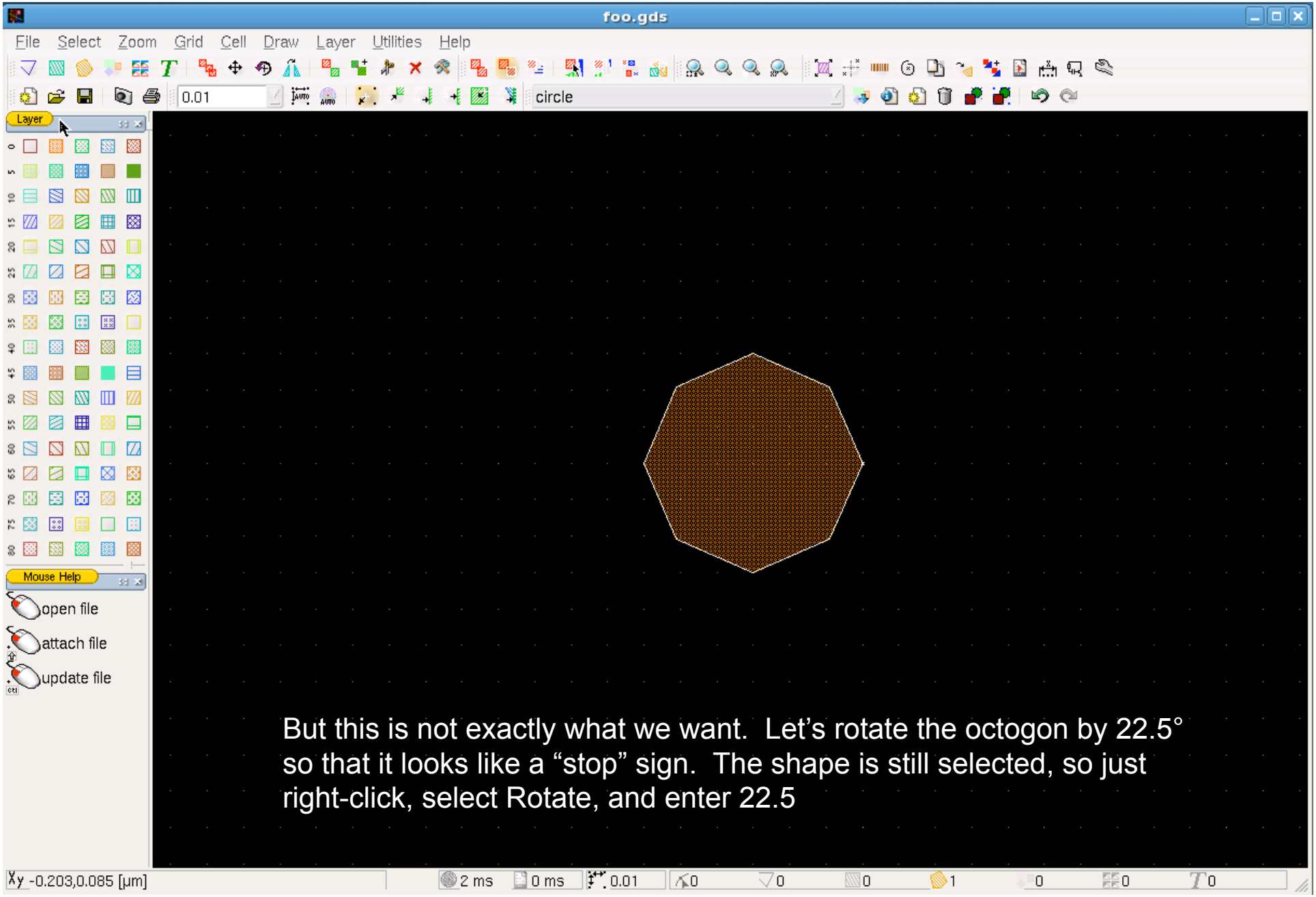

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foobar
Layer
Mouse Help
Properties
Move/Scale
Copy/Move
Group
Rotate
Mirror
Delete
Move to active Layer
Main Menu
If the array does not come out right, do not despair.
Use Select → Cell Select (or Page Up) to select the array,
and then right click to select Properties.
Xy 199.125,516.375 [µm]
1 ms
16.8 s
10

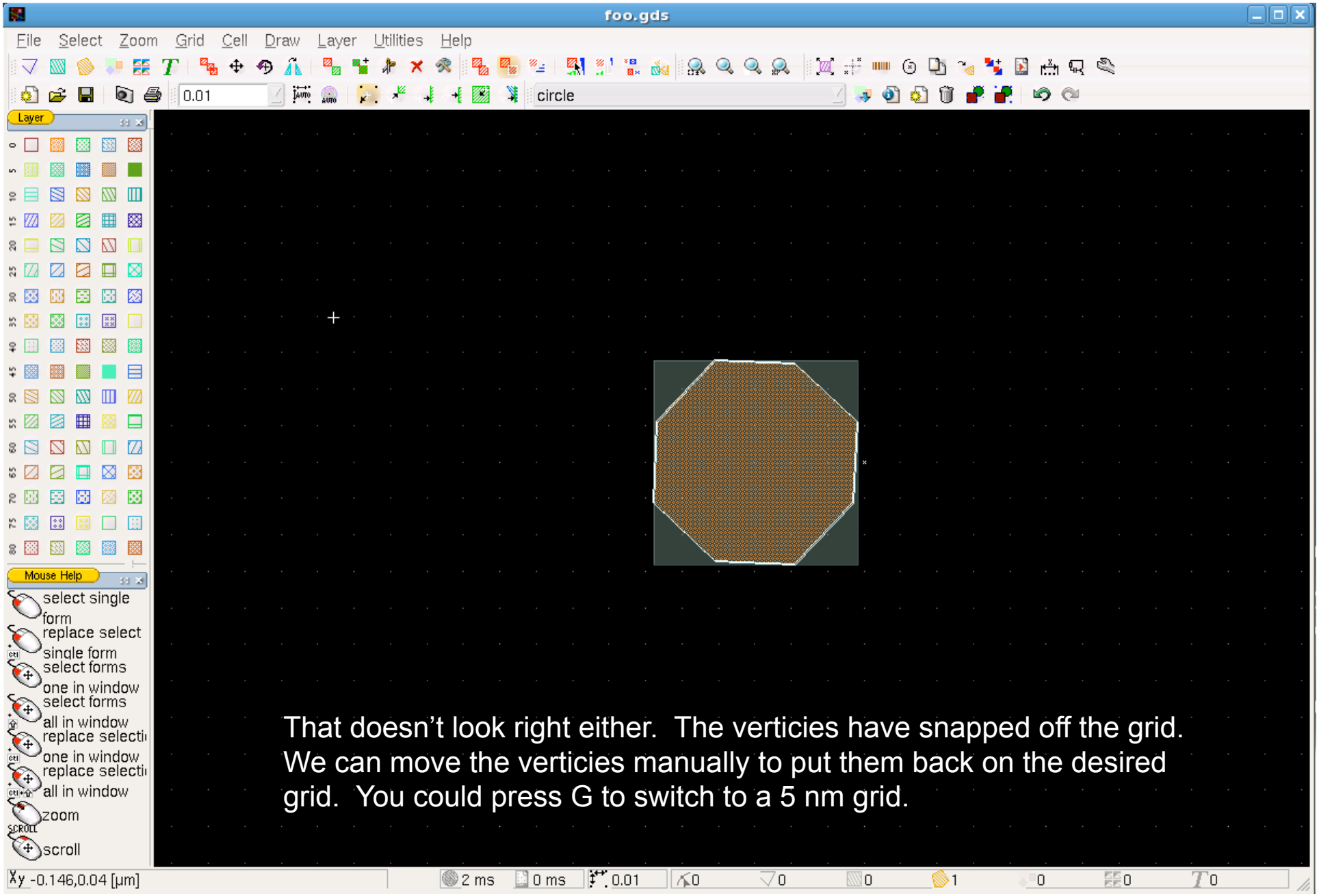

/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
foobar
Layer
Mouse Help
Cellrefarray Properties
Cell
foo
Repeat
x 5 y 3
Transformation
Magnification 1
Angle 0
Mirror X
Step x
x 400.000 y 0.000
Orgin
x 0.000 y 0.000
Step y
x 0.000 y 200.000
flat Cell
delete Cell
OK
Cancel
Here you can change the origin, pitch, and number of rows/columns.
xy 199.125,516.375 [µm]
1 ms
16.8 s
10

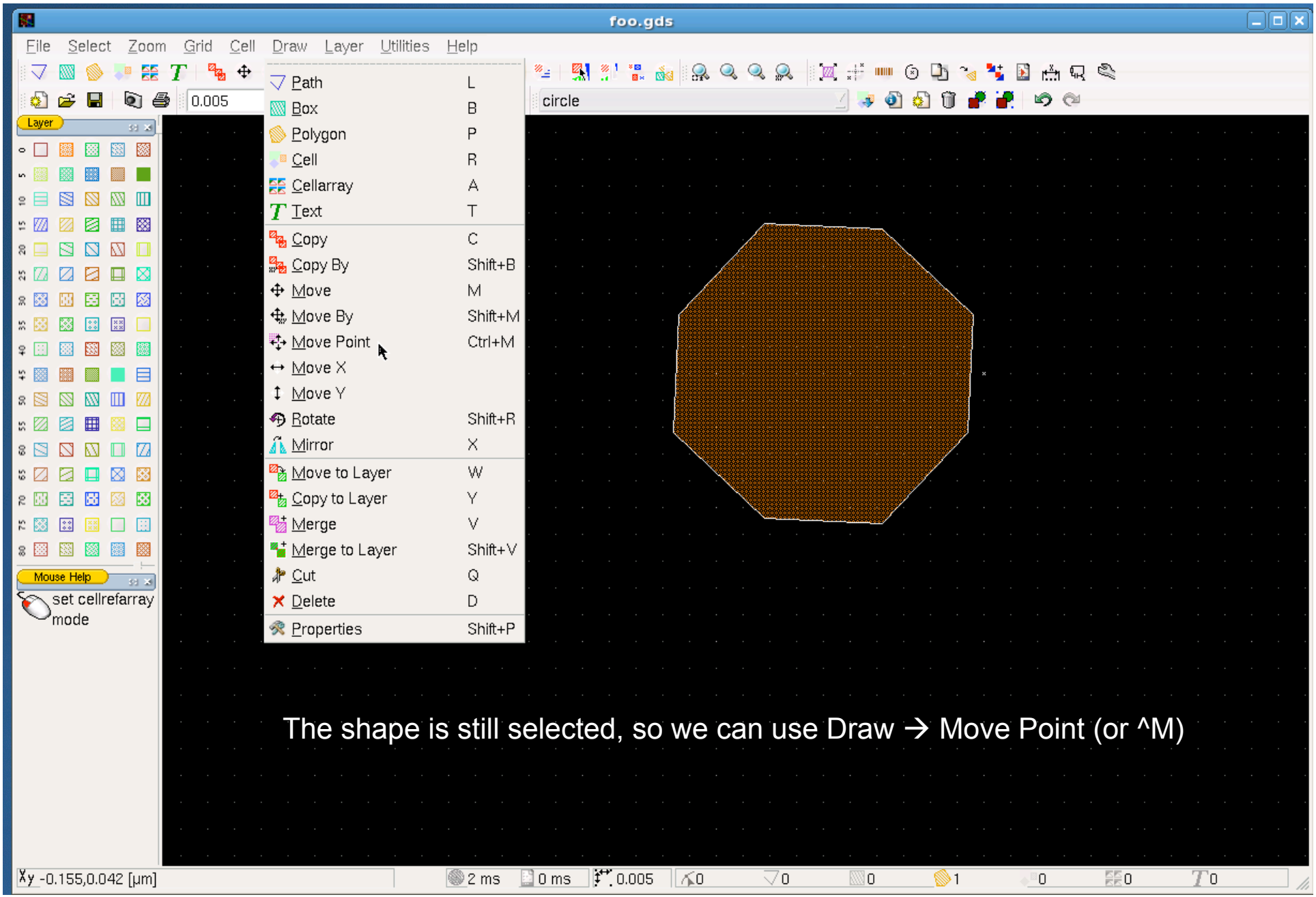

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Adjust Utilities
Align Utilities
Barcodes
Boolean Tools
Circular Utilities
Clipboard
Convert Utilities
DRC Tools
Global Tools
Macros
Measurement Tools
Netlist Tools
3D View
Setup F10
Circle E
Circle / Ellipse Ctrl+E
Circle Shift+E
Sector F
Polygon Arc H
Arc J
Spiral K
Bezier 2nd Shift+2
Bezier 3rd Shift+3
Layer
Mouse Help
set subfunctior
set subfunctior
set subfunctior
Let's make a circle. Start with the usual "New Cell", "Cell Name" sequence, then select Utilities → Circular Utilities → Circle

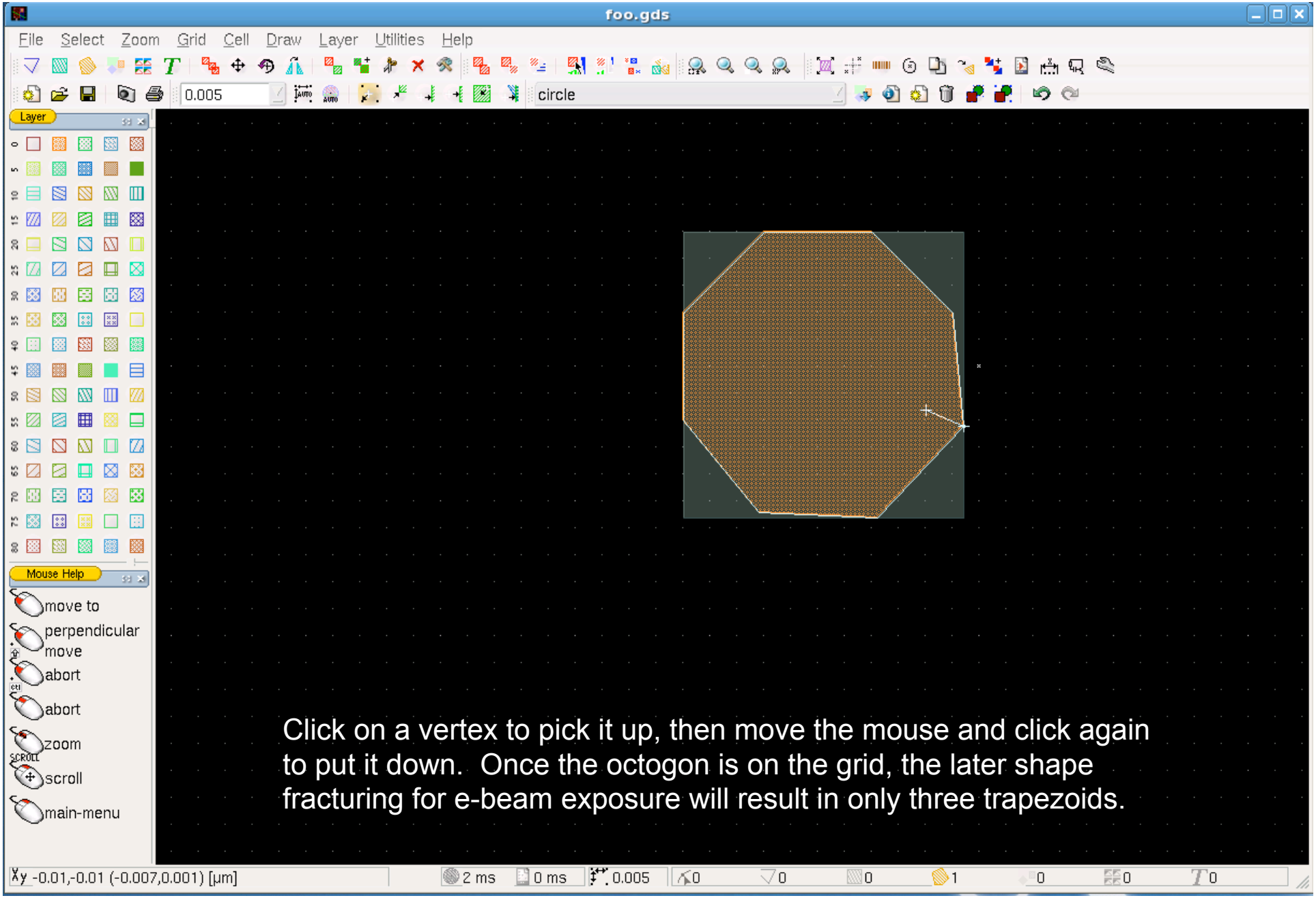

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.01
circle
Layer
Mouse Help
Circle: center
zoom
scroll
main-menu
The grid (G) is set to 10 nm. Zoom in with the wheel until you see the grid, then click to set the circle's center. Move the mouse and click to set a radius of 30 nm.
The number of verticies is too large for such a small circle. More verticies means more shapes, which leads to a lot of wasted settling time during exposure.
-0.08,-0.06 [µm]
1 ms
0 ms
0.01

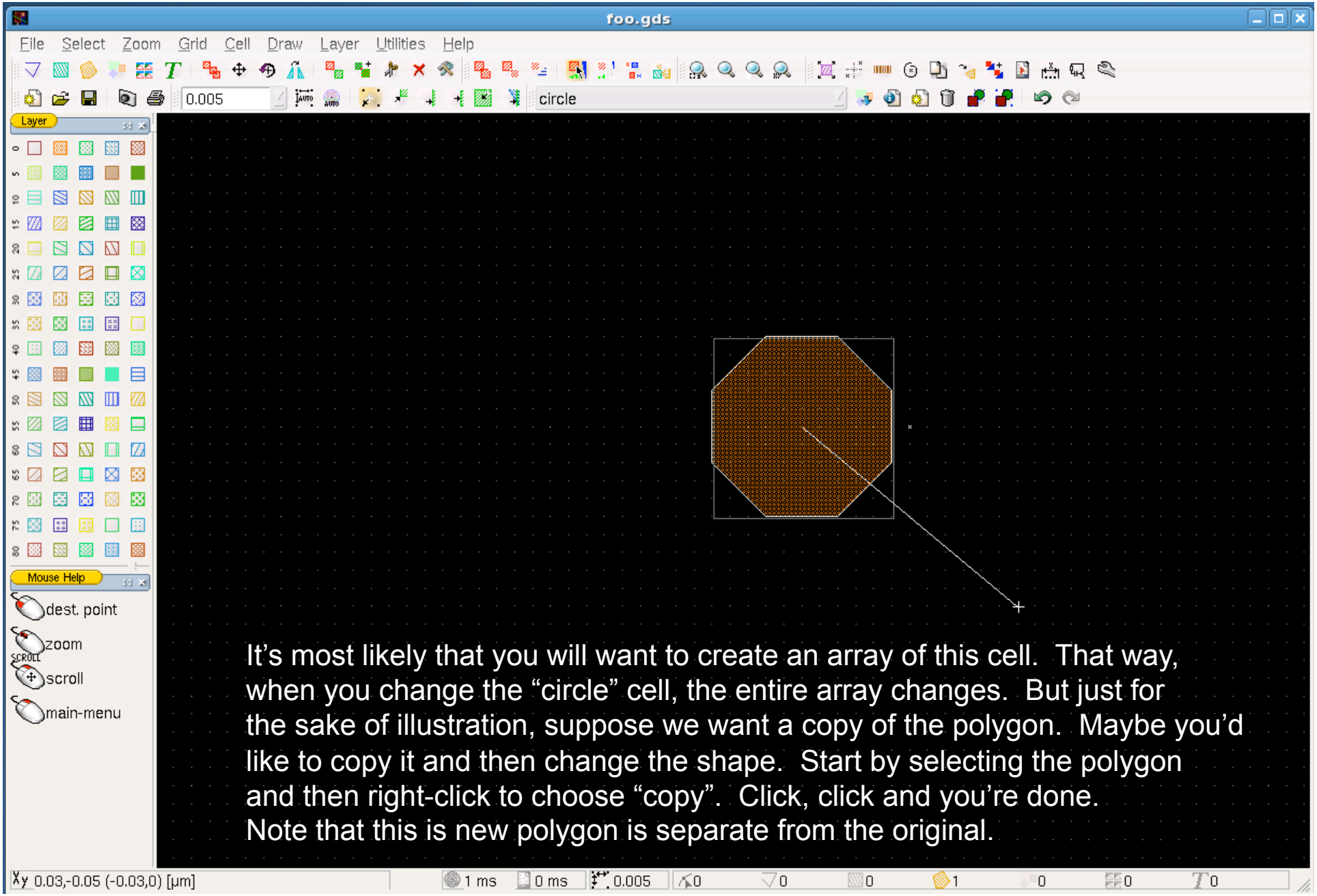

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.01
circle
Layer
Mouse Help
Polygon Properties
Layer
1
1
Center
x -0.030 y 0.000
Radius
0.030
Number of Points
40
edit Points
convert to Box
convert to Circle
delete Polygon
OK
Cancel
Press HOME for “form select”, click on the circle, then right-click
to select Properties. Here we can change the number of verticies to 8.
xy -0.035,0.03 [µm]
2 ms
0 ms
0.01

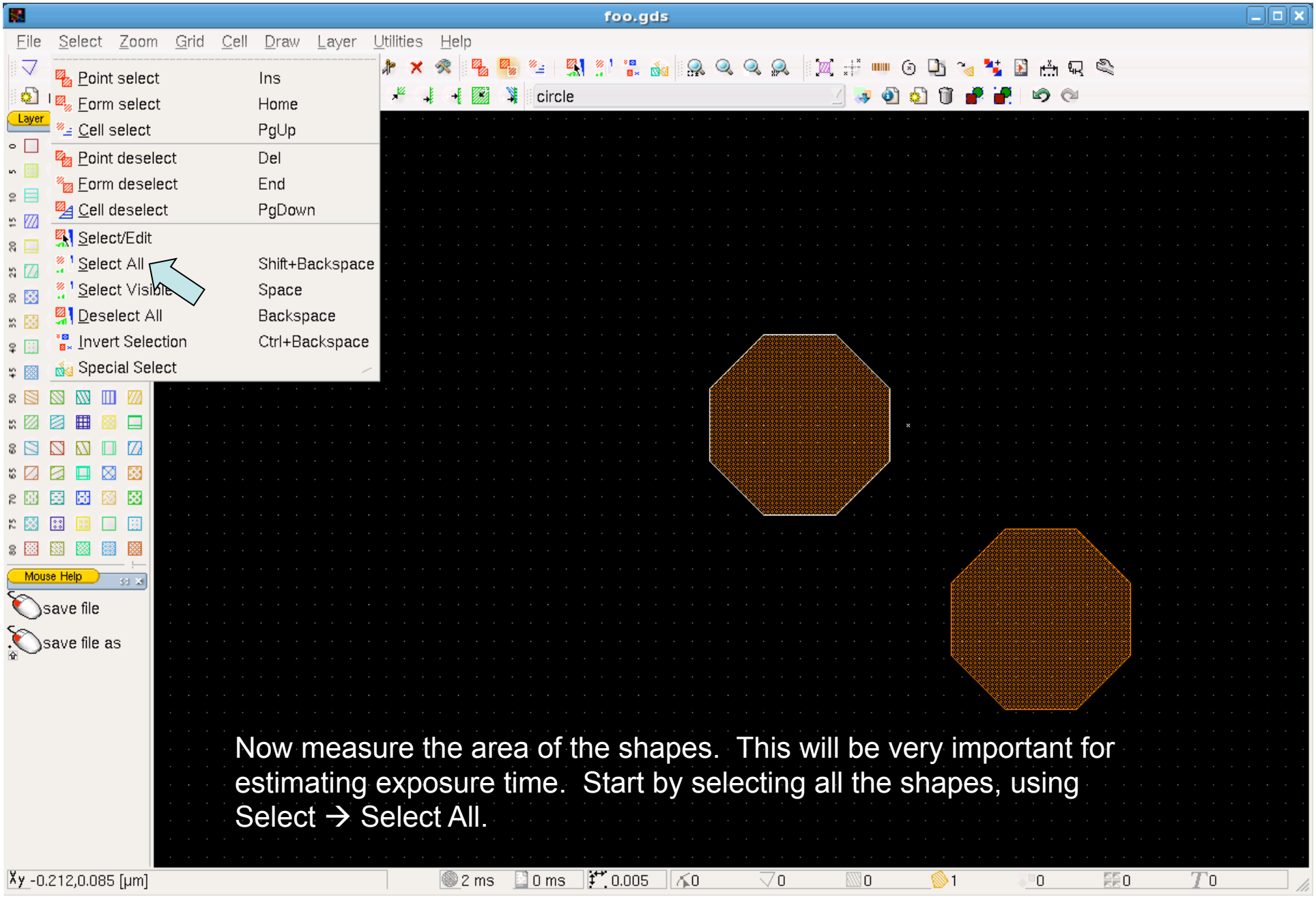

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.01
circle
Layer
Mouse Help
open file
attach file
update file
But this is not exactly what we want. Let's rotate the octogon by 22.5° so that it looks like a "stop" sign. The shape is still selected, so just right-click, select Rotate, and enter 22.5
Xy -0.203,0.085 [µm]
2 ms
0 ms
0.01

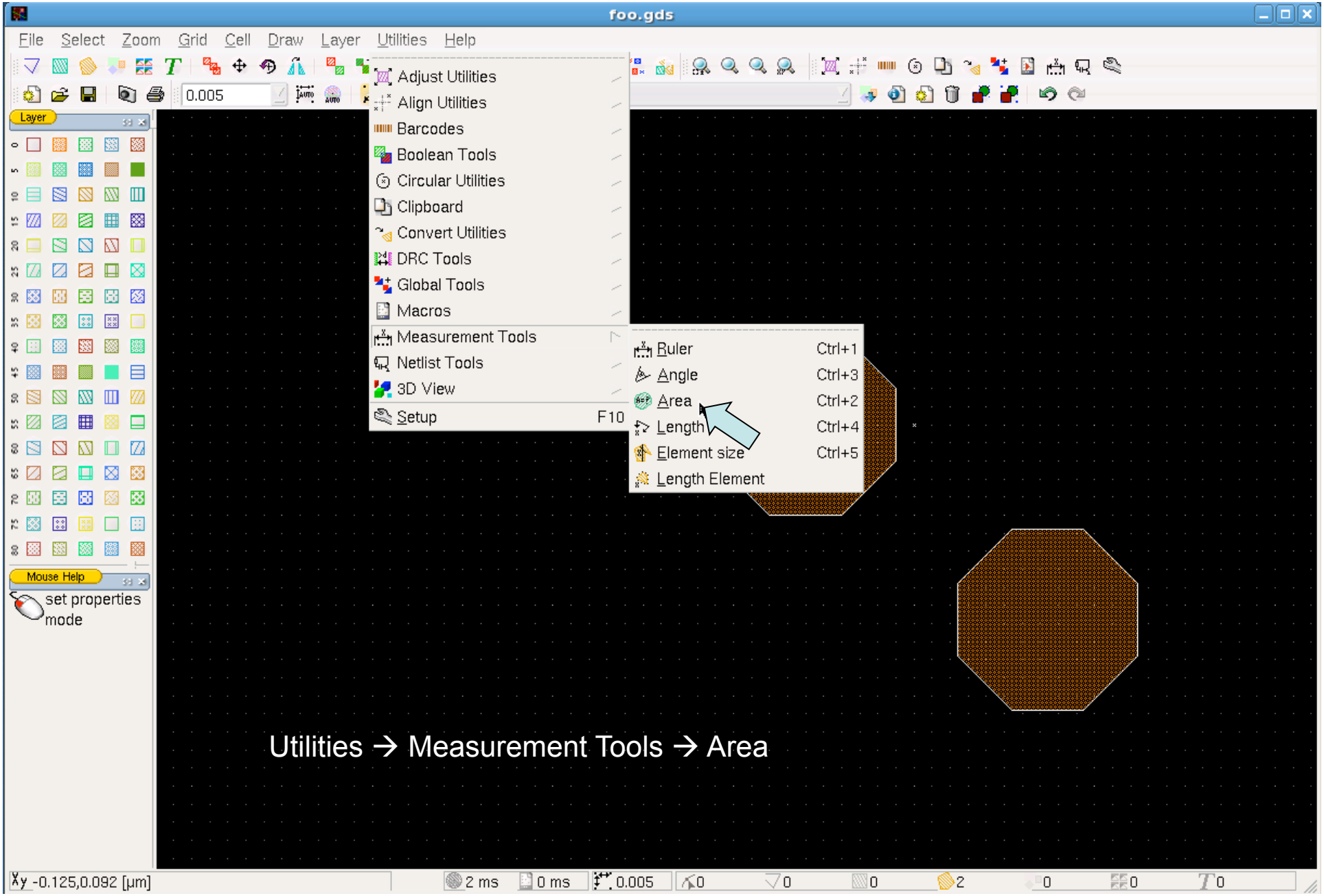

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.01
circle
Layer
Mouse Help
select single form
replace select single form
select forms one in window
select forms all in window
replace selecti one in window
replace selecti all in window
zoom
scroll
That doesn't look right either. The verticies have snapped off the grid. We can move the verticies manually to put them back on the desired grid. You could press G to switch to a 5 nm grid.
xy -0.146,0.04 [µm]
2 ms
0 ms
0.01


foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.005
circle
Layer
Path L
Box B
Polygon P
Cell R
Cellarray A
Text T
Copy C
Copy By Shift+B
Move M
Move By Shift+M
Move Point Ctrl+M
Move X
Move Y
Rotate Shift+R
Mirror X
Move to Layer W
Copy to Layer Y
Merge V
Merge to Layer Shift+V
Cut Q
Delete D
Properties Shift+P
Mouse Help
set cellrefarray mode
The shape is still selected, so we can use Draw → Move Point (or ^M)
xy -0.155,0.042 [µm]
2 ms
0 ms
0.005


foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.005
circle
Layer
Mouse Help
move to
perpendicular move
abort
abort
zoom
scroll
main-menu
Click on a vertex to pick it up, then move the mouse and click again to put it down. Once the octogon is on the grid, the later shape fracturing for e-beam exposure will result in only three trapezoids.
xy -0.01,-0.01 (-0.007,0.001) [µm]
2 ms
0 ms
0.005


foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.005
circle
Layer
Mouse Help
dest. point
zoom
scroll
main-menu
It's most likely that you will want to create an array of this cell. That way, when you change the "circle" cell, the entire array changes. But just for the sake of illustration, suppose we want a copy of the polygon. Maybe you'd like to copy it and then change the shape. Start by selecting the polygon and then right-click to choose "copy". Click, click and you're done.
Note that this is new polygon is separate from the original.
0.03,-0.05 (-0.03,0) [µm]
1 ms
0 ms
0.005


foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Point select Ins
Form select Home
Cell select PgUp
Point deselect Del
Form deselect End
Cell deselect PgDown
Select/Edit
Select All Shift+Backspace
Select Visible Space
Deselect All Backspace
Invert Selection Ctrl+Backspace
Special Select
circle
Layer
Mouse Help
save file
save file as
Now measure the area of the shapes. This will be very important for estimating exposure time. Start by selecting all the shapes, using Select → Select All.
Xy -0.212,0.085 [µm]
2 ms
0 ms
0.005

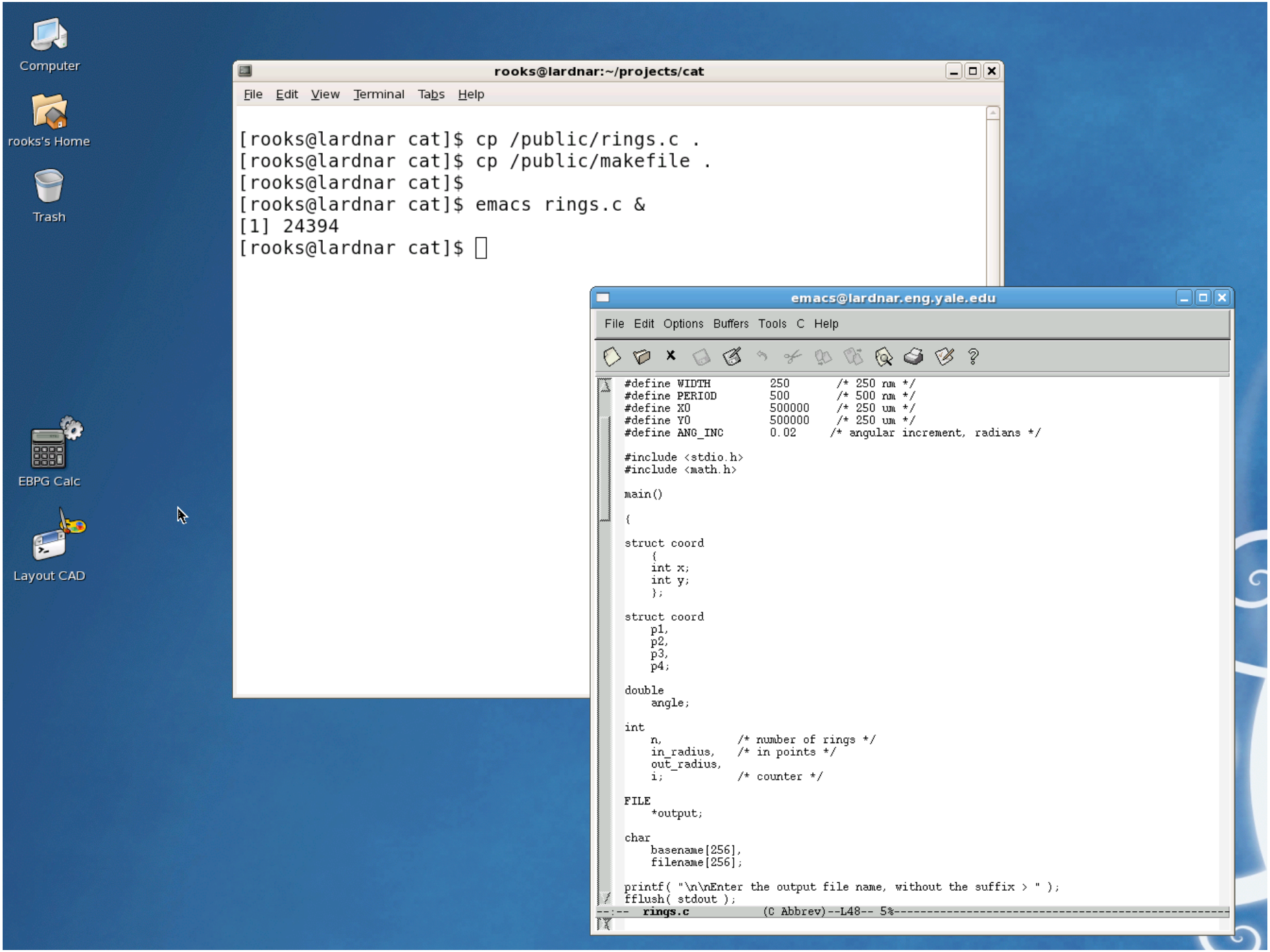

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
Adjust Utilities
Align Utilities
Barcodes
Boolean Tools
Circular Utilities
Clipboard
Convert Utilities
DRC Tools
Global Tools
Macros
Measurement Tools
Netlist Tools
3D View
Setup F10
Ruler Ctrl+1
Angle Ctrl+3
Area Ctrl+2
Length Ctrl+4
Element size Ctrl+5
Length Element
Layer
Mouse Help
set properties mode
Utilities → Measurement Tools → Area
-0.125,0.092 [µm]

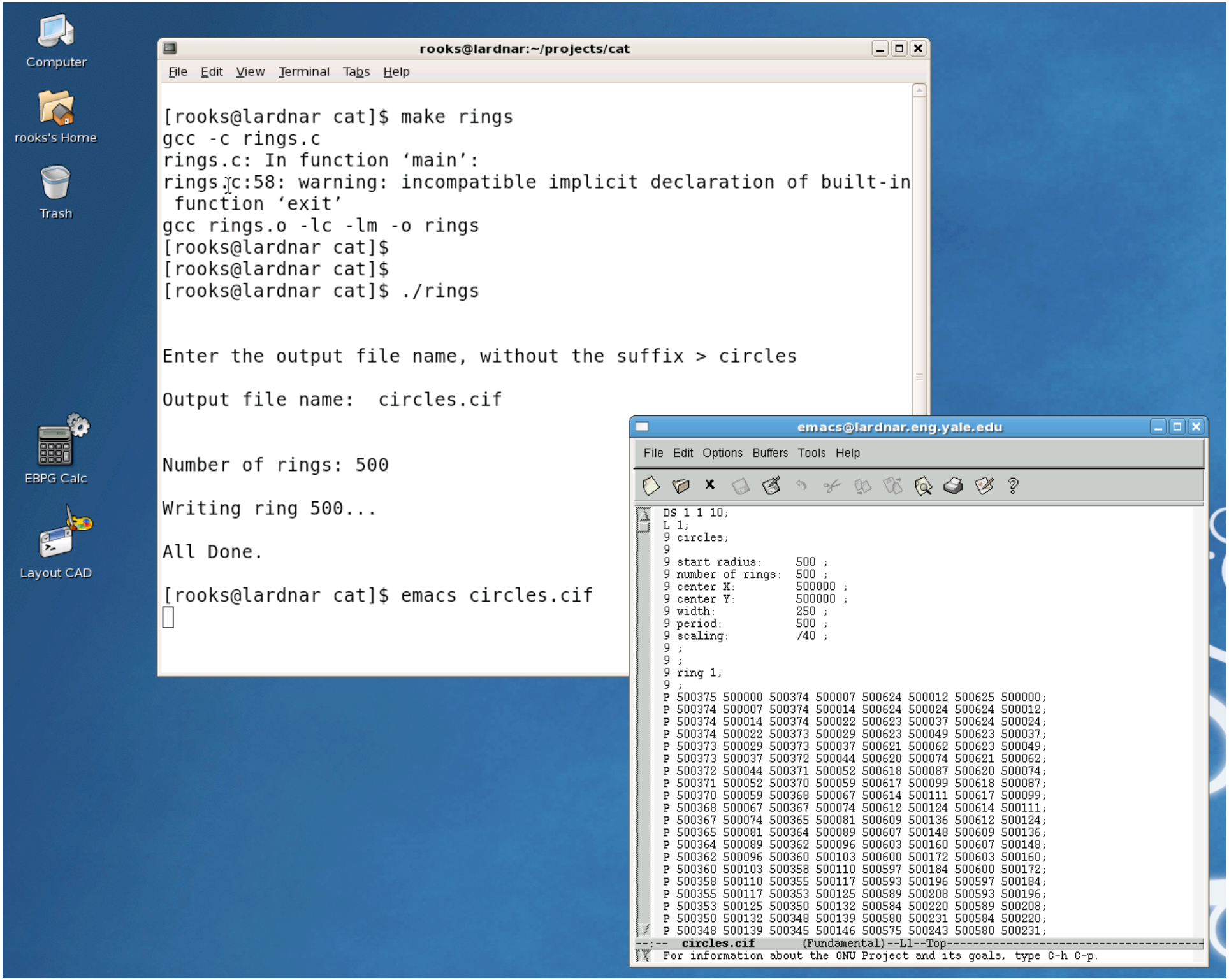
That's the basic idea. You'll want to figure out other functions, such as how to select and copy groups of objects. There are also some very useful Boolean functions under the Utilities menu.

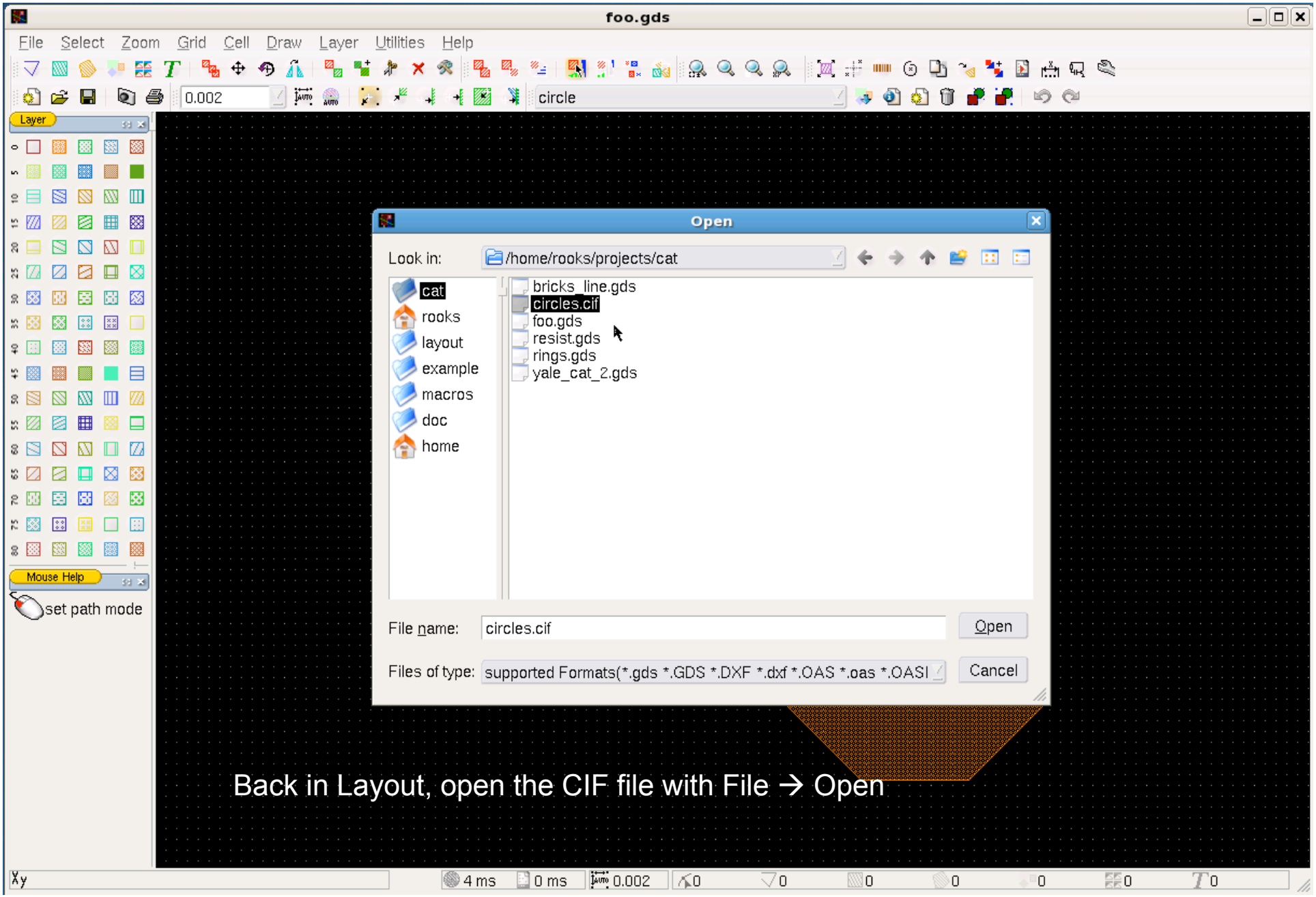
Now for something completely different: Algorithmic CAD

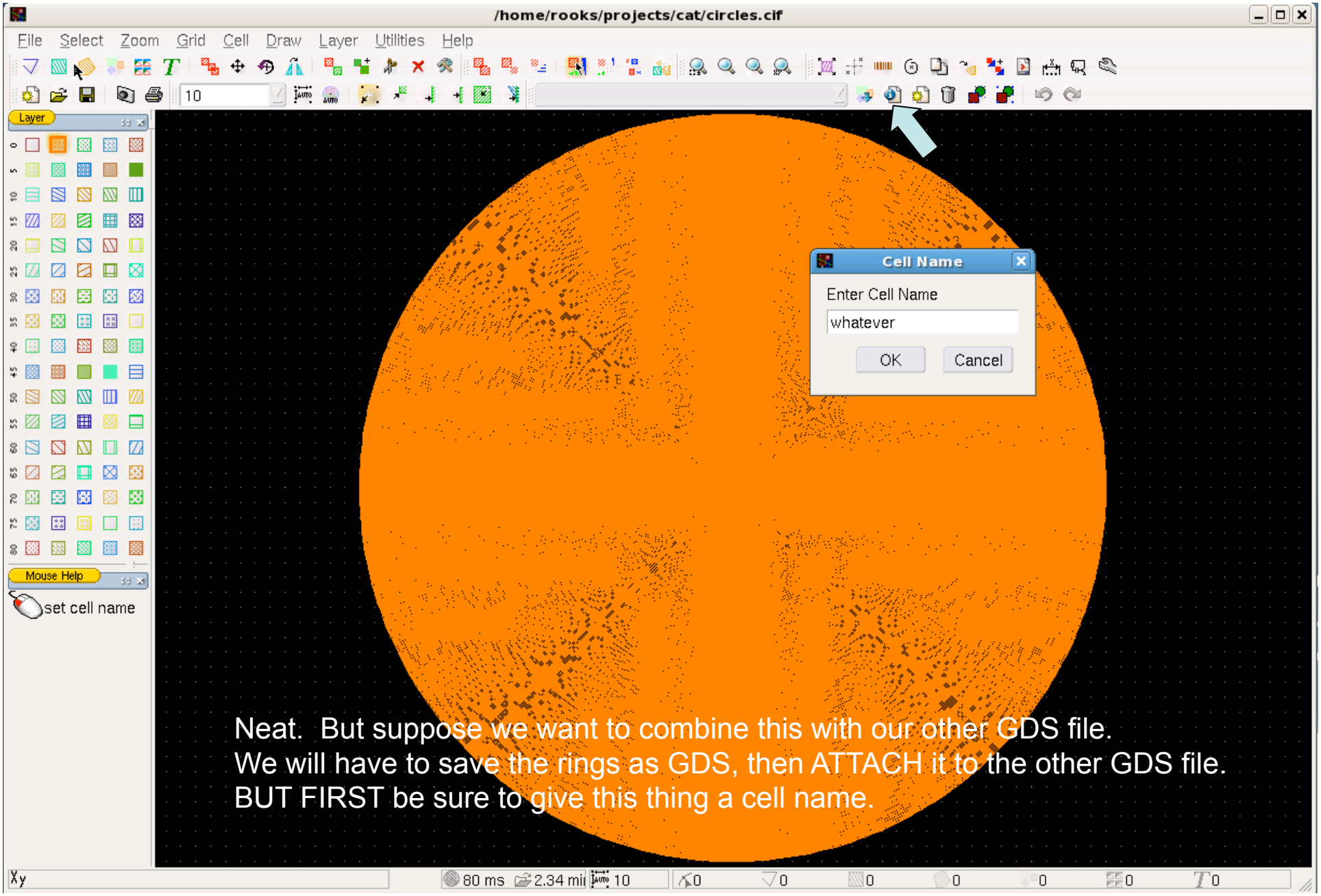
You will find an example C program on Lardnar, in /public

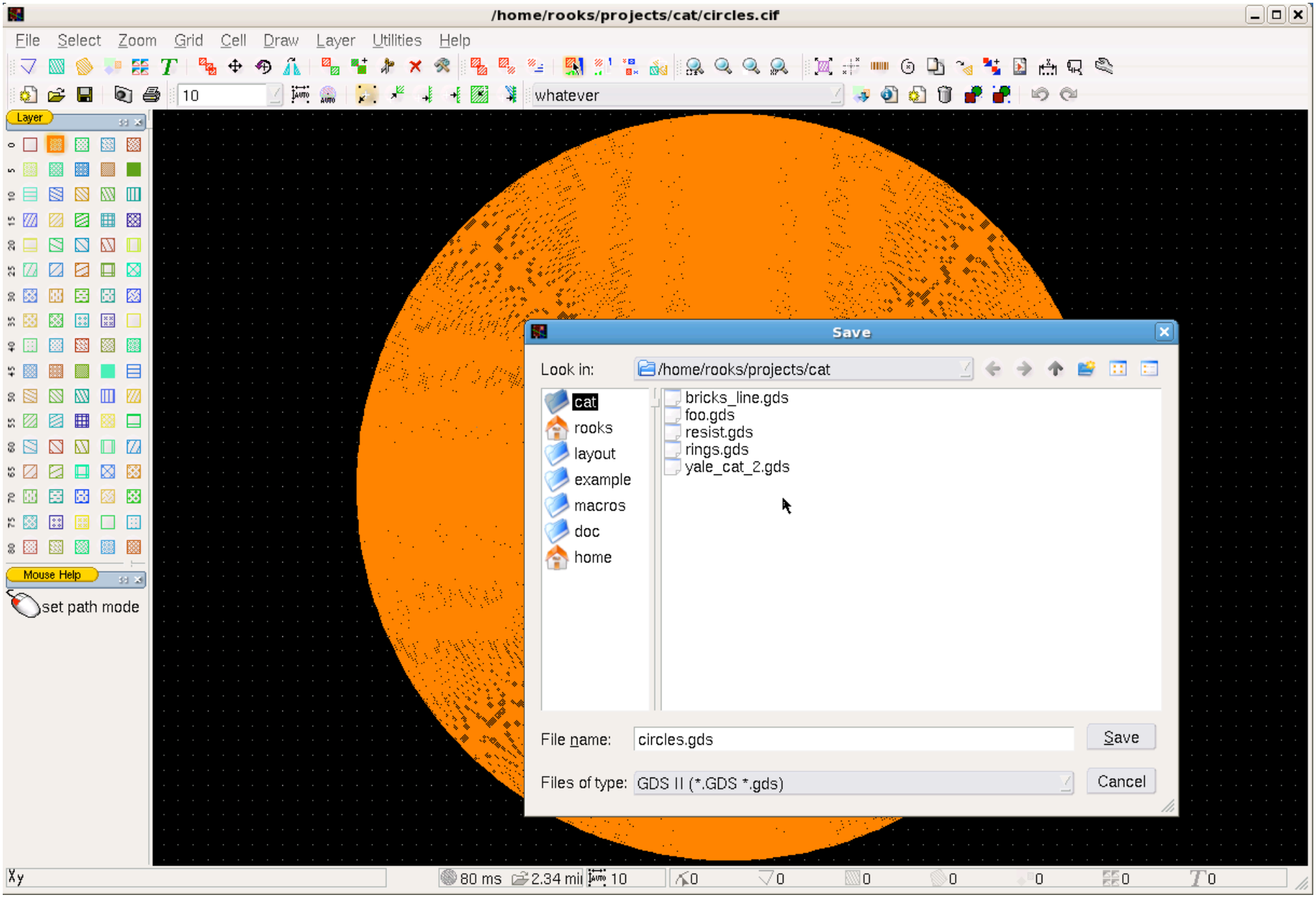
This program generates polygons in CIF format, which is handy because it is a simple text file. CIF is not good as a general-purpose format (e.g. it does not have arrays) but it is good for algorithmically generated shapes.

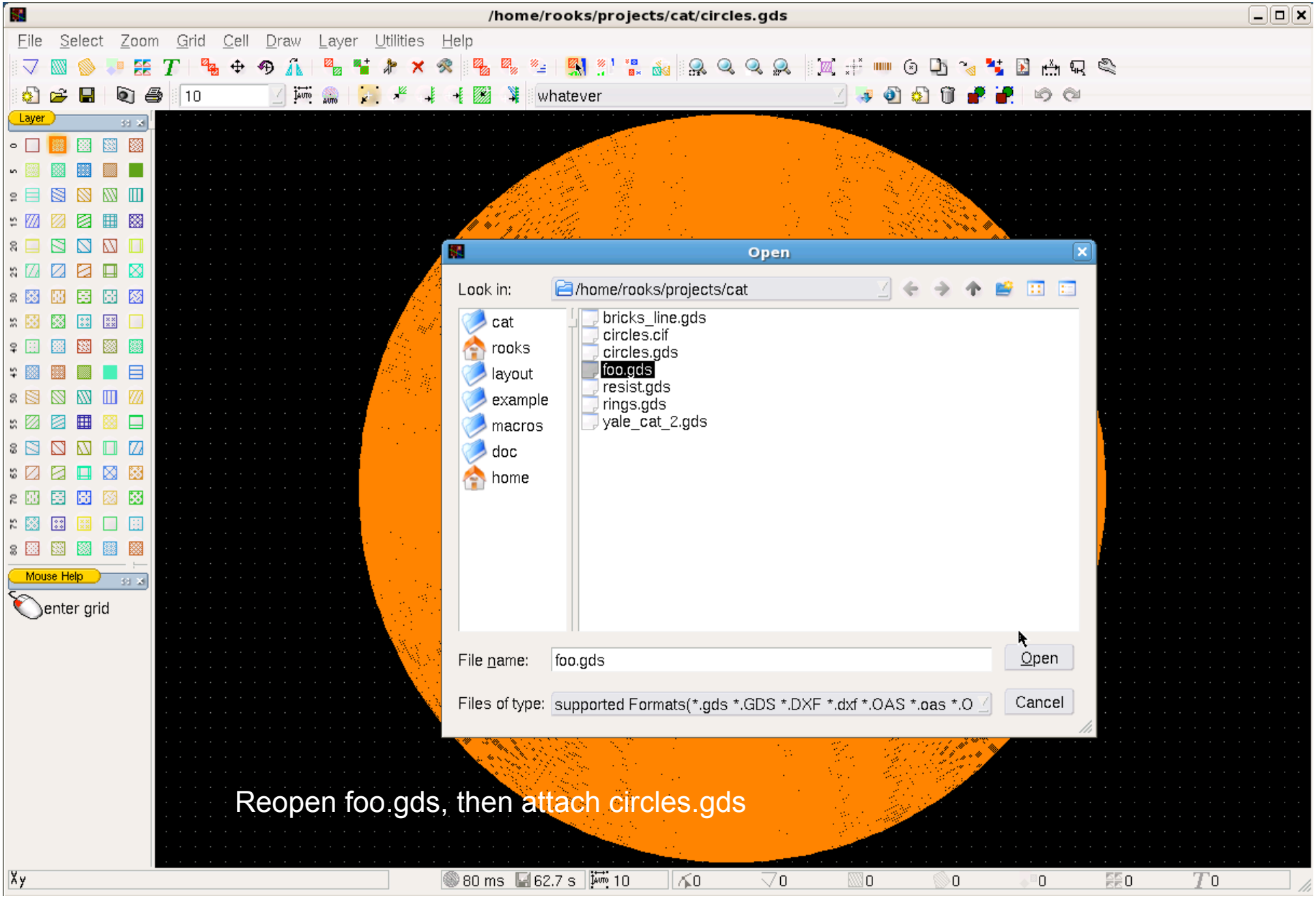

Computer
rooks's Home
Trash
EBPG Calc
Layout CAD
rooks@lardnar:~/projects/cat
File Edit View Terminal Tabs Help
[rooks@lardnar cat]$ cp /public/rings.c .
[rooks@lardnar cat]$ cp /public/makefile .
[rooks@lardnar cat]$
[rooks@lardnar cat]$ emacs rings.c &
[1] 24394
[rooks@lardnar cat]$
emacs@lardnar.eng.yale.edu
File Edit Options Buffers Tools C Help
#define WIDTH 250 /* 250 nm */
#define PERIOD 500 /* 500 nm */
#define XO 500000 /* 250 um */
#define YO 500000 /* 250 um */
#define ANG_INC 0.02 /* angular increment, radians */
#include <stdio.h>
#include <math.h>
main()
{
struct coord
{
int x;
int y;
};
struct coord
p1,
p2,
p3,
p4;
double
angle;
int
n, /* number of rings */
in_radius, /* in points */
out_radius,
i; /* counter */
FILE
*output;
char
basename[256],
filename[256];
printf("\n\nEnter the output file name, without the suffix > ");
fflush(stdout);
--:-- rings.c (C Abbrev)--L48-- 5%

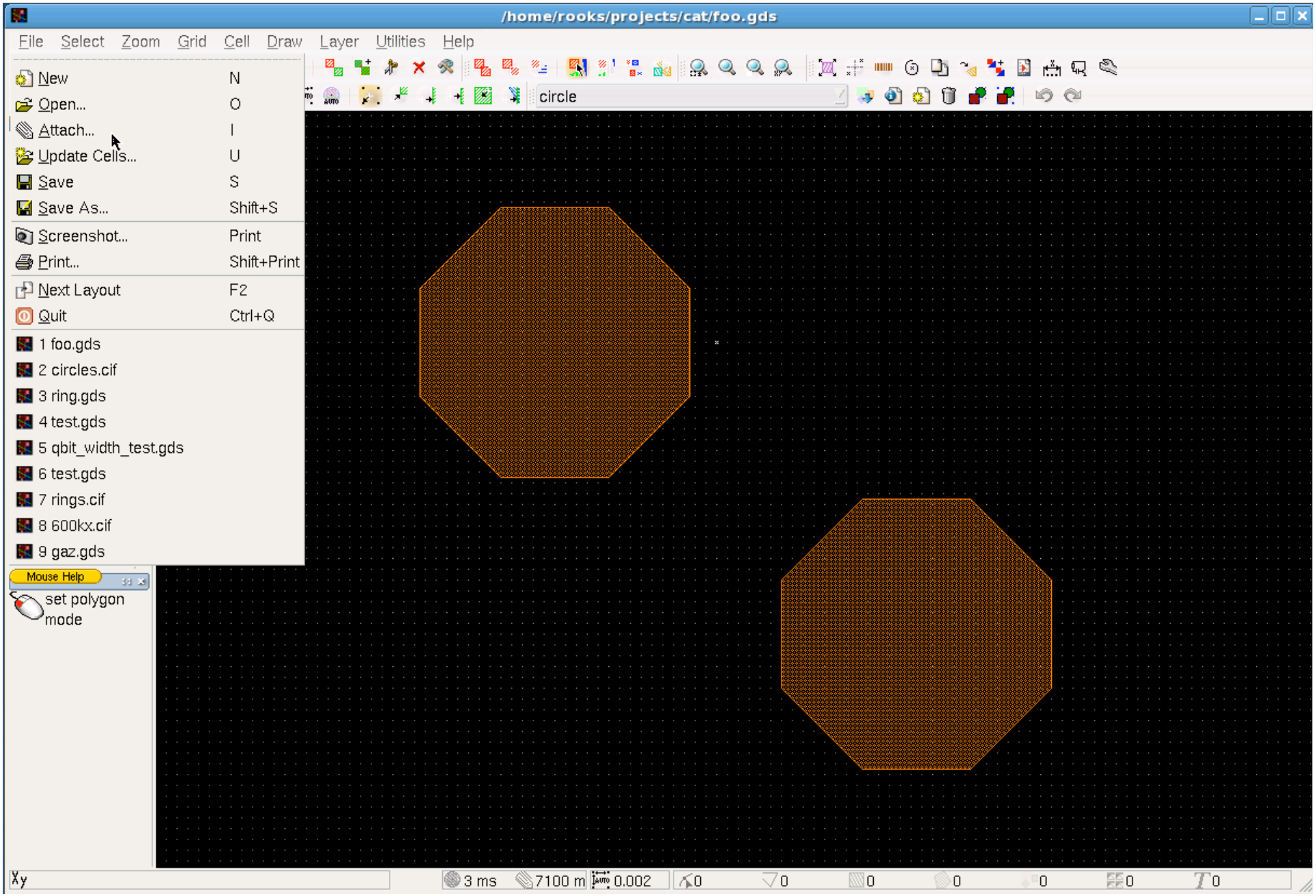

Computer
rooks's Home
Trash
EBPG Calc
Layout CAD
rooks@lardnar:~/projects/cat
File Edit View Terminal Tabs Help
[rooks@lardnar cat]$ make rings
gcc -c rings.c
rings.c: In function ‘main’:
rings.c:58: warning: incompatible implicit declaration of built-in
function ‘exit’
gcc rings.o -lc -lm -o rings
[rooks@lardnar cat]$
[rooks@lardnar cat]$
[rooks@lardnar cat]$ ./rings
Enter the output file name, without the suffix > circles
Output file name: circles.cif
Number of rings: 500
Writing ring 500...
All Done.
[rooks@lardnar cat]$ emacs circles.cif
emacs@lardnar.eng.yale.edu
File Edit Options Buffers Tools Help
DS 1 1 10;
L 1;
9 circles;
9
9 start radius: 500 ;
9 number of rings: 500 ;
9 center X: 500000 ;
9 center Y: 500000 ;
9 width: 250 ;
9 period: 500 ;
9 scaling: /40 ;
9 ;
9 ;
9 ring 1;
9 ;
P 500375 500000 500374 500007 500624 500012 500625 500000;
P 500374 500007 500374 500014 500624 500024 500624 500012;
P 500374 500014 500374 500022 500623 500037 500624 500024;
P 500374 500022 500373 500029 500623 500049 500623 500037;
P 500373 500029 500373 500037 500621 500062 500623 500049;
P 500373 500037 500372 500044 500620 500074 500621 500062;
P 500372 500044 500371 500052 500618 500087 500620 500074;
P 500371 500052 500370 500059 500617 500099 500618 500087;
P 500370 500059 500368 500067 500614 500111 500617 500099;
P 500368 500067 500367 500074 500612 500124 500614 500111;
P 500367 500074 500365 500081 500609 500136 500612 500124;
P 500365 500081 500364 500089 500607 500148 500609 500136;
P 500364 500089 500362 500096 500603 500160 500607 500148;
P 500362 500096 500360 500103 500600 500172 500603 500160;
P 500360 500103 500358 500110 500597 500184 500600 500172;
P 500358 500110 500355 500117 500593 500196 500597 500184;
P 500355 500117 500353 500125 500589 500208 500593 500196;
P 500353 500125 500350 500132 500584 500220 500589 500208;
P 500350 500132 500348 500139 500580 500231 500584 500220;
P 500348 500139 500345 500146 500575 500243 500580 500231;
--:-- circles.cif (Fundamental)--L1--Top
For information about the GNU Project and its goals, type C-h C-p.

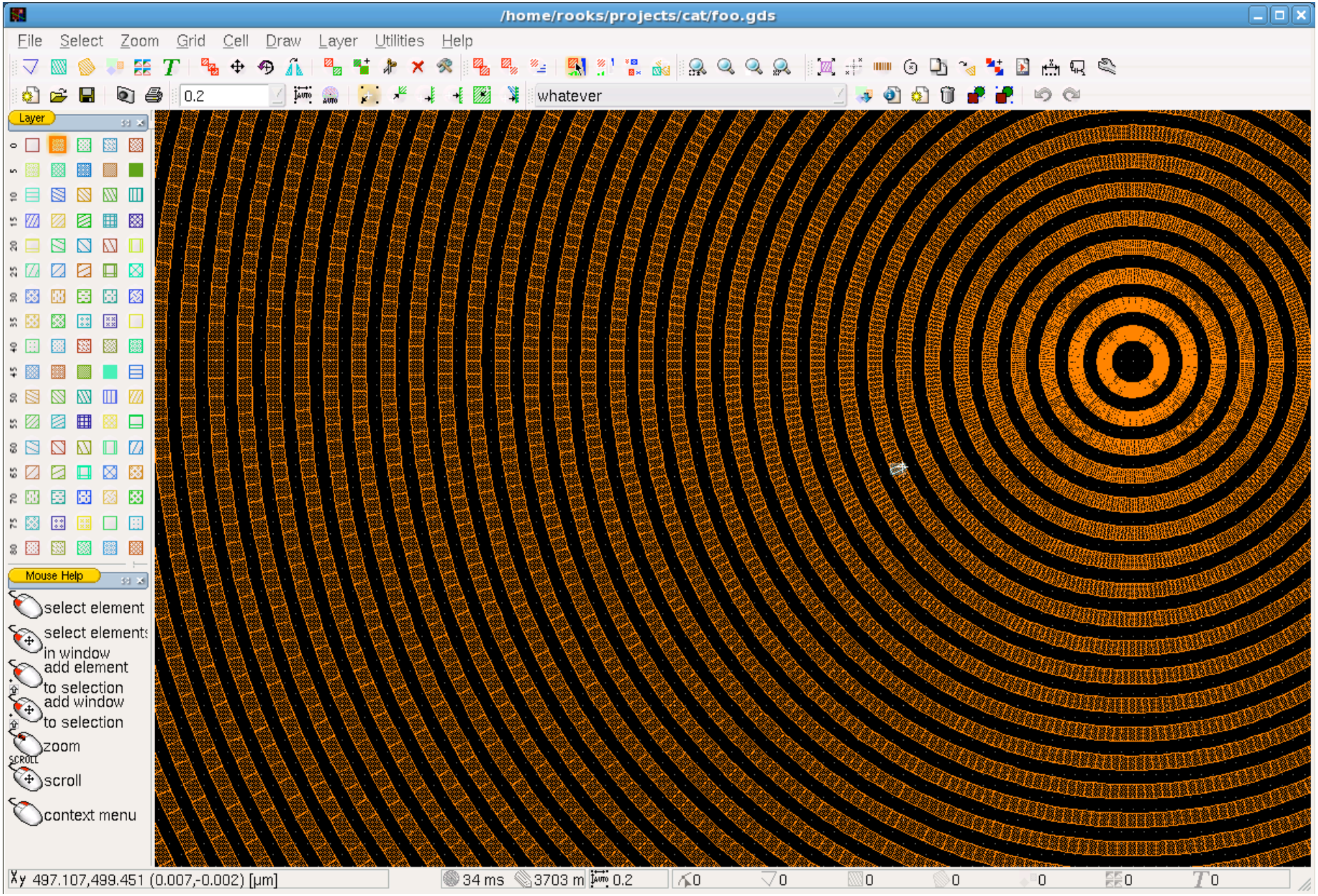

foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
0.002
circle
Layer
Mouse Help
set path mode
Open
Look in:
/home/rooks/projects/cat
cat
rooks
layout
example
macros
doc
home
bricks_line.gds
circles.cif
foo.gds
resist.gds
rings.gds
yale_cat_2.gds
File name:
circles.cif
Open
Files of type:
supported Formats(*.gds *.GDS *.DXF *.dxf *.OAS *.oas *.OASI
Cancel
Back in Layout, open the CIF file with File → Open
4 ms
0 ms
0.002


/home/rooks/projects/cat/circles.cif
File Select Zoom Grid Cell Draw Layer Utilities Help
10
Layer
Mouse Help
set cell name
Cell Name
Enter Cell Name
whatever
OK
Cancel
Neat. But suppose we want to combine this with our other GDS file.
We will have to save the rings as GDS, then ATTACH it to the other GDS file.
BUT FIRST be sure to give this thing a cell name.
Xy
80 ms
2.34 mil
10


/home/rooks/projects/cat/circles.cif
File Select Zoom Grid Cell Draw Layer Utilities Help
10
whatever
Layer
Mouse Help
set path mode
Save
Look in: /home/rooks/projects/cat
cat
rooks
layout
example
macros
doc
home
bricks_line.gds
foo.gds
resist.gds
rings.gds
yale_cat_2.gds
File name: circles.gds
Save
Files of type: GDS II (*.GDS *.gds)
Cancel
80 ms 2.34 mi 10

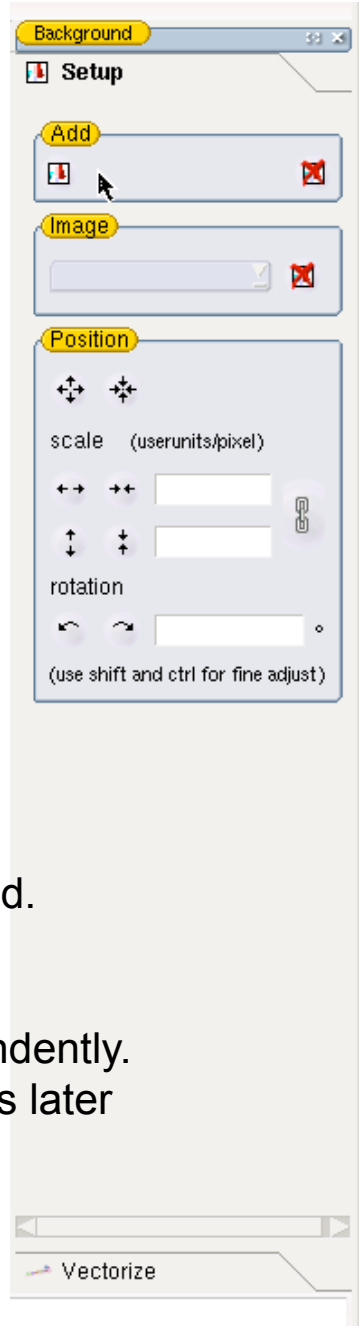

/home/rooks/projects/cat/circles.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
10
whatever
Layer
Mouse Help
enter grid
Open
Look in: /home/rooks/projects/cat
cat
rooks
layout
example
macros
doc
home
bricks_line.gds
circles.cif
circles.gds
foo.gds
resist.gds
rings.gds
yale_cat_2.gds
File name: foo.gds
Open
Files of type: supported Formats(*.gds *.GDS *.DXF *.dxf *.OAS *.oas *.O
Cancel
Reopen foo.gds, then attach circles.gds
80 ms 62.7 s 10


/home/rooks/projects/cat/foo.gds
File Select Zoom Grid Cell Draw Layer Utilities Help
New N
Open... O
Attach... I
Update Cells... U
Save S
Save As... Shift+S
Screenshot... Print
Print... Shift+Print
Next Layout F2
Quit Ctrl+Q
1 foo.gds
2 circles.cif
3 ring.gds
4 test.gds
5 qbit_width_test.gds
6 test.gds
7 rings.cif
8 600kx.cif
9 gaz.gds
circle
Mouse Help
set polygon mode
Xy
3 ms
7100 m
0.002



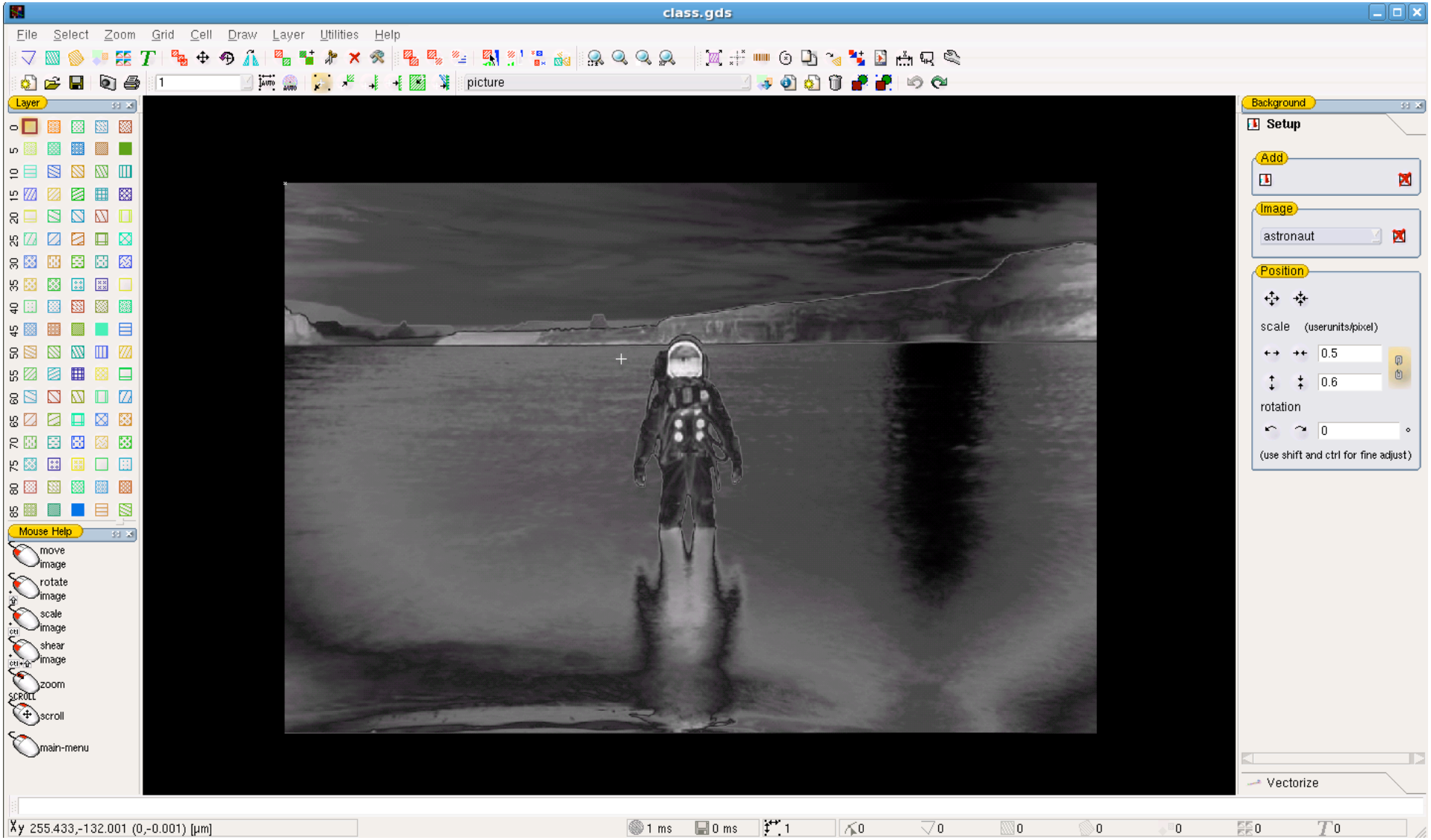
Now the cell “whatever” can be placed inside other cells. Or whatever.

Using microscope images in CAD

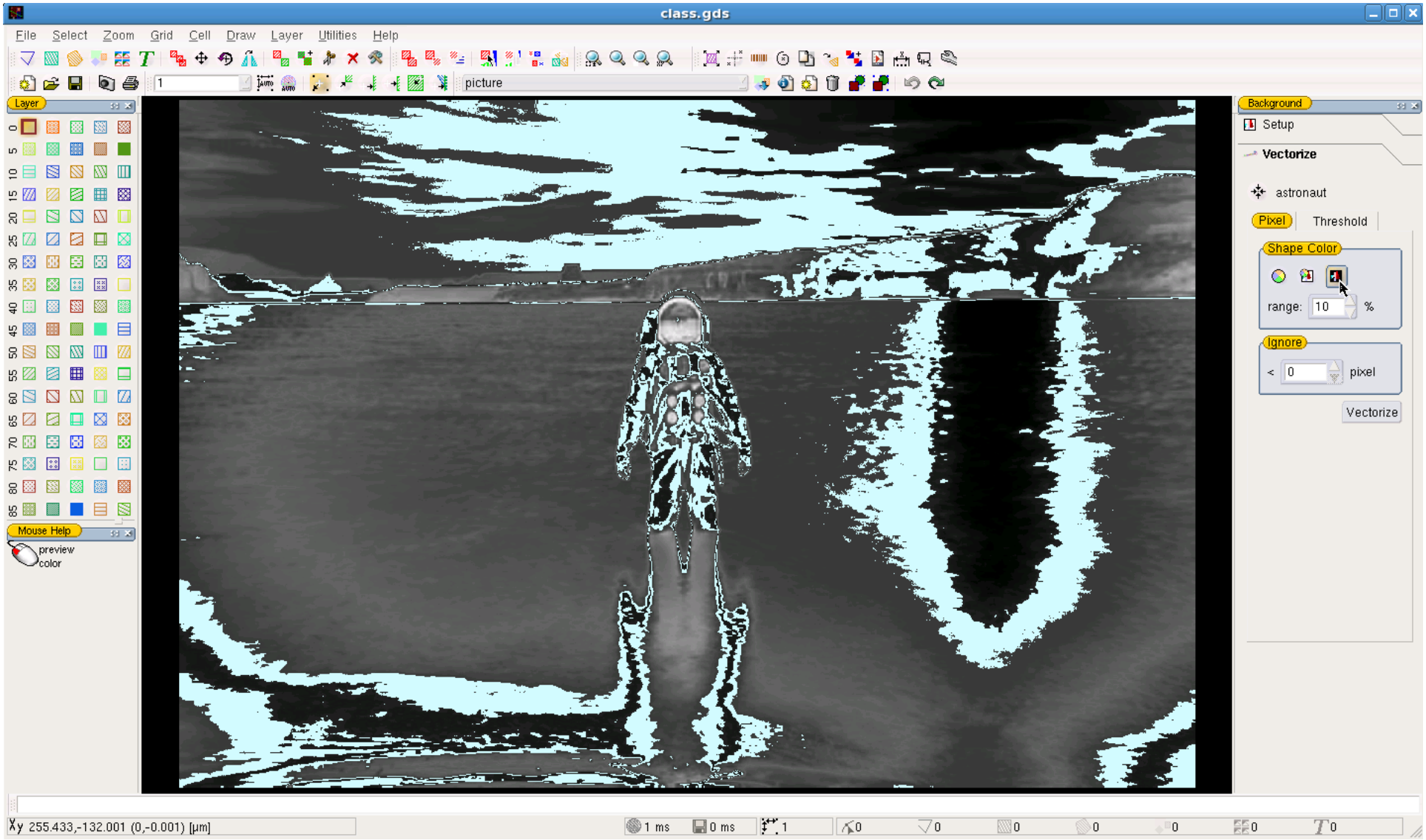


Start by adding an image to the background.
Look in /public for an image.

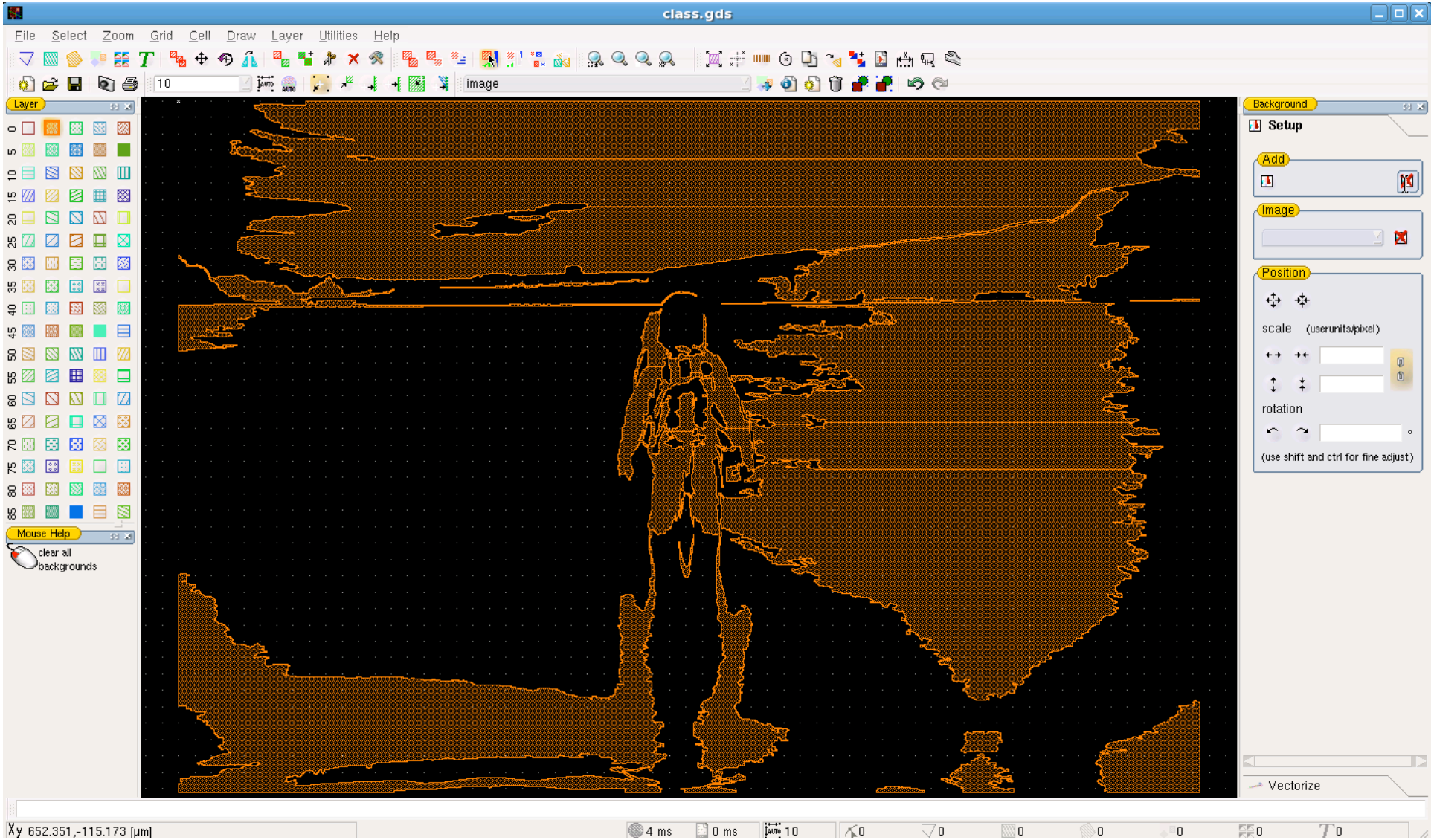
At this step X and Y can be scaled independently.
But rotation does not work right – so do this later
as part of cell placement.



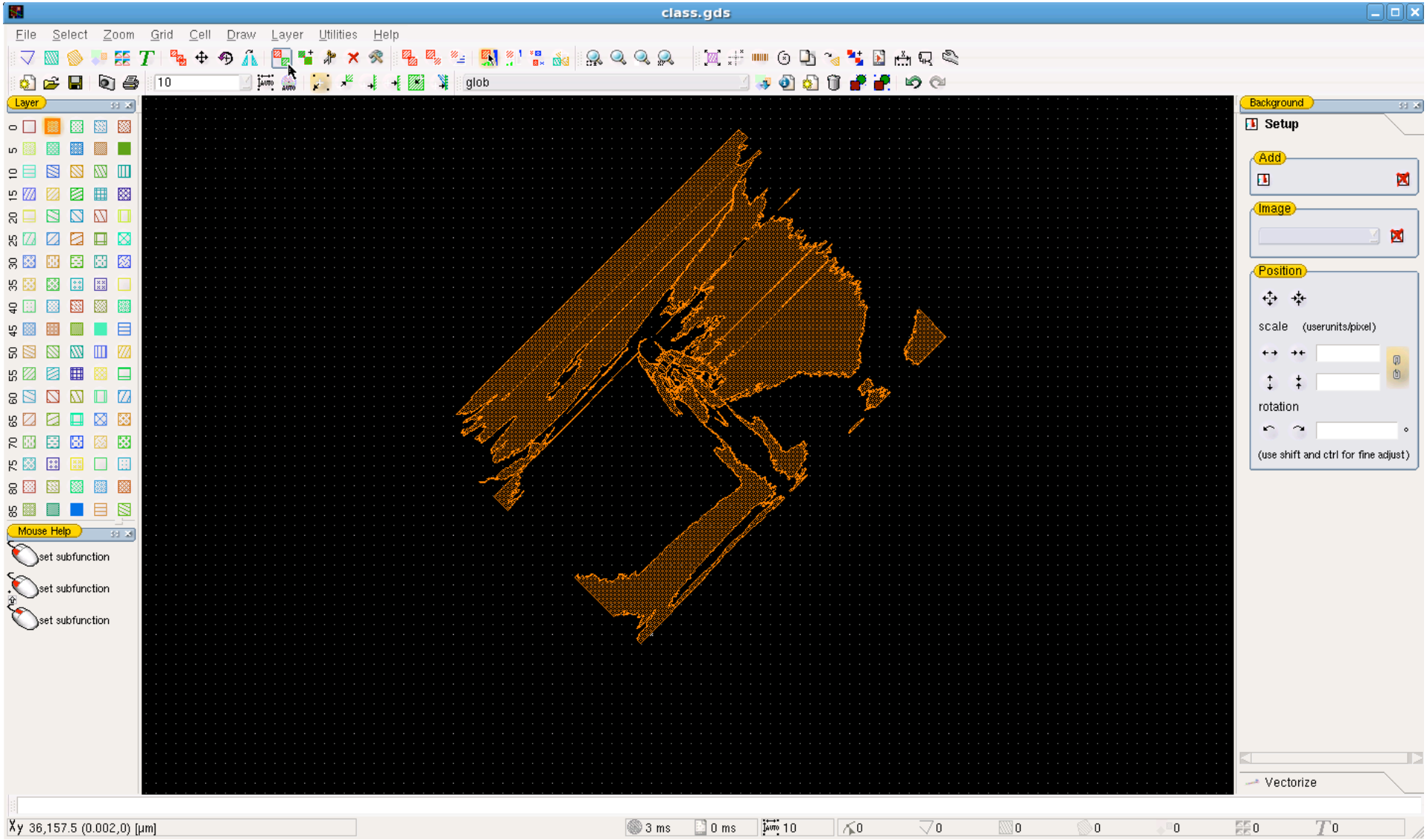
The image can be moved around in the background, but it is not part of the design and it is not inside any particular cell. If you need the image in a cell then use “vectorize”.



In the “vectorize” tab, choose “preview” and adjust the parameters. The chosen threshold will be used to turn the image into polygons. The “pixel” method seems to work better than the “threshold” method. Click on the Vectorize button and wait.



Go back to the Setup tab and delete the background image.
The resulting polygons are in the currently active layer.
Now the image is in a cell which can be scaled, rotated, or even exposed.



Create a new cell, then place the image cell inside. Select the cell (Page Up key) then right-click to change its properties. This is the best way to do rotation.