Playing minesweeper

1	1	1		2		3		3
1		1						
1	1	1		4	4	3		
								2
				7				
5		6				3		1
				8				1
							3	
	5		4			3		2

c	n	n	n	n	n	n	n	c
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
e	i	i	i	i	i	i	i	w
c	s	s	s	s	s	s	s	c

- What domain size you would choose? (number of mines vs. grid size) no multi-domain logic in Mace4
- `assign(domain_size,9)`
- Functions or predicates? (e.g. $mine(x, y)$)
- Functions $f(x, y)$ and $mine(x, y)$ have the same domain size (plotted on the same grid)

```
formulas(rules_minesweeper).
  s(0)=1. s(1)=2. s(2)=3. s(3)=4. s(4)=5. s(5)=6. s(6)=7. s(7)=8. s(8)=7.
  p(0)=1. p(1)=0. p(2)=1. p(3)=2. p(4)=3. p(5)=4. p(6)=5. p(7)=6. p(8)=7.
  mine(x,y)=1 | mine(x,y)=0.  %mine is a function to support computations
  f(x,y)!=0  -> mine(x,y)=0.  %cells with numbers do not contain mines

  %corner has only 3 neighbours
  f(x,y)!=0 & ((x=0 & y=0) | (x=8 & y=0) | (x=0 & y=8) | (x=8 & y=8))
      -> mine(x,s(y)) + mine(s(x),y) + mine(s(x),s(y)) = f(x,y).

   f(x,y)!=0  & ((x=0 | x=8) & (y>0 & y<8))                %margin up-down
  -> mine(x,p(y)) + mine(p(x),p(y)) + mine(s(x),y) +
     mine(s(x),s(y)) + mine(x,s(y))=f(x,y).

  f(x,y)!=0  & ((y=0 | y=8) & (x>0 & x<8))                %margin left-right
  -> mine(p(x),y) + mine(p(x),inc(y)) + mine(x,s(y)) +
     mine(s(x),s(y)) + mine(s(x),y)=f(x,y).

  f(x,y)!=0  & (y>0 & x>0 & x<8 & y<8)                    %middle
  -> mine(p(x),p(y)) + mine(p(x),y) + mine(p(x),s(y)) + mine(x,p(y)) +
   mine(x,s(y)) + mine(s(x),p(y)) + mine(s(x),y) + mine(s(x),p(y))=f(x,y).
end_of_list.

formulas(map_minesweeper).
   f(0,0)=1. f(0,1)=1. f(0,2)=1. f(0,3)=0. f(0,4)=2.   %line 1
   f(0,5)=0. f(0,6)=3. f(0,7)=0. f(0,8)=3.
```

- Note the usage of succesor $s(x)$ and predecessor $p(x)$ functions
- Since $f(x, y)$ is a function (not a predicate), it can be used arithmetic expressions