2012Sp CS10 Online Midterm Answers

```
Emit Sp12 Fractal L n= (n) len= (len) up? (up?) angle= (angle)

if (n = 0)
    turn ↺ (90) degrees
    move (len) steps
    turn ↻ (180) degrees
    DrawSp12L len= (len) Bold= <true>
    move (0 - (len) / (2)) steps
else
    turn ↺ (90) degrees
    if (up?)
        move (len) / (2) steps
        turn ↻ (90) degrees
        Emit Sp12 Fractal L n= (n - 1) len= (len) / (2) up? (up?) angle= (angle)
        turn ↻ (90) degrees
    else
        move (len) steps
        turn ↺ (90) degrees
        Emit Sp12 Fractal L n= (n - 1) len= (len) / (2) up? (up?) angle= (angle)
        turn ↺ (90) degrees
        move (len) / (2) steps
    DrawLine len= (len) / (2) Bold= <false>
    turn ↺ (90) degrees
    DrawLine len= (len) / (2) Bold= <false>
    turn ↻ (angle) degrees
    Emit Sp12 Fractal L n= (n - 1) len= (len) / (2) up? (up?) angle= (angle)
    turn ↺ (angle) degrees
    move (0 - (len) / (2)) steps
```

```
DrawLine len= (len) Bold= (bold?)
    pen down
    if (bold?)
        change pen size by (2)
    move (len) steps
    if (bold?)
        change pen size by (-2)
    pen up
```
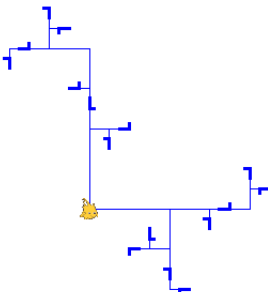
This if/else controls whether the top L faces up (when `up?` is true) or down (when `up?` is false).
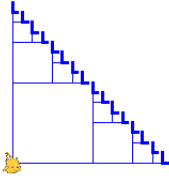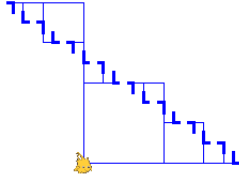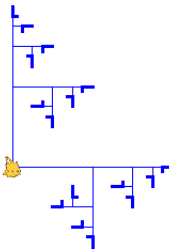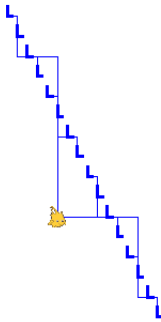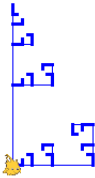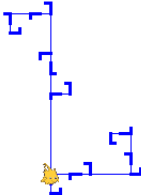
```
DrawSp12L len= (len) Bold= (bold?)
    DrawLine len= (len) Bold= (bold?)
    turn ↺ (90) degrees
    DrawLine len= (len) / (2) Bold= (bold?)
```

The `angle` is the amount to turn before emitting the lower L.

		up?	
		true	False
angle (measured clockwise using the left-hand-rule)	**0**		
	90		
	180		
	270		