Region Fill Algorithms

− Seed Fill Approaches

- Boundary Fill
- Flood Fill

Work at the pixel level. Suitable for interactive painting applications

− Scanline Fill Approaches

Work at the polygon level

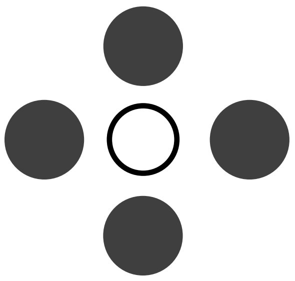
Better performance

Seed Fill Algorithms

− Connectedness

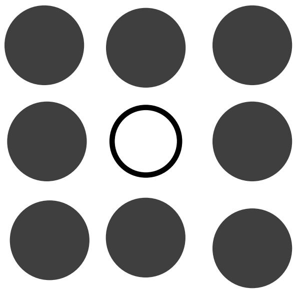
- 4−connected region:

  From a given pixel, the region that you can get to by a series of 4 way moves (north, south, east, west)



- 8−connected region:

  From a given pixel, the region that you can get to by a series of 8 way moves (north, south, east, west, NE, NW, SE, SW)



Boundary Fill Algorithm

− Start at a point inside a region

− Paint the interior outward toward the boundary

− The boundary is specified in a single color

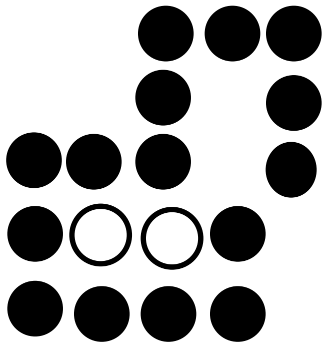
− Fill the 4−connected or 8−connected region

```
void boundaryFill4 (int x, int y, int fill, int boundary)
{
   int current;

   current = getPixel (x,y);
   if (current != boundary && current !=fill) {
         setColor(fill);
         setPixel(x,y);

         boundaryFill4 (x+1, y, fill, boundary);
         boundaryFill4 (x−1, y, fill, boundary);
         boundaryFill4(x, y+1, fill, boundary);
         bonddaryFill4(x, y−1, fill, boundary);
    }
}
```

4−connected fill is faster, but can have problems:



Flood Fill Algorithm

− Used when an area defined with multiple color boundaries

− Start at a point inside a region

− Replace a specified interior color (old color) with fill color

− Fill the 4−connected or 8−connected region until all interior points being replaced

```
void floodFill4 (int x, int y, int fill, int oldColor)
{
   if (getPixel(x,y) == oldColor) {
         setColor(fill);
         setPixel(x,y);

         floodFill4 (x+1, y, fill, oldColor);
         floodFill4 (x−1, y, fill, oldColor);
         floodFill4(x, y+1, fill, oldColor);
         floodFill4(x, y−1, fill, oldColor);
    }
}
```