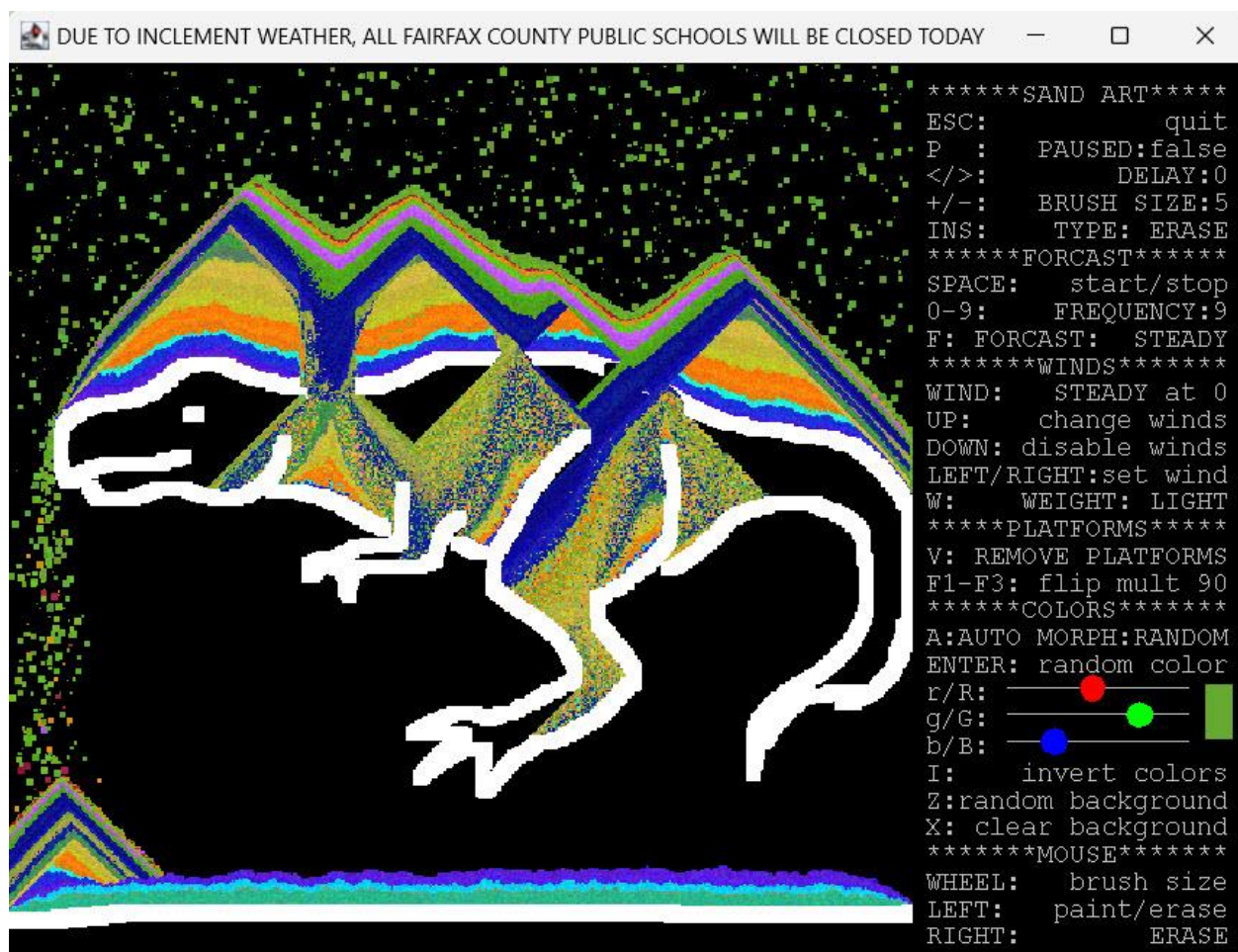


Sand Art Lab

The aim of this lab is to stretch your legs and take a break from building data structures to focus on algorithms. This lab will call back to the Pixoku lab, but with a twist (of exactly 90 degrees). Sand Art is a program that will allow the client to drop colored sand (or snow) from the top of the screen to land on platforms painted by the client. There are a variety of ways that the canvas can be manipulated, including turning the canvas upside-down, to the side or inverting the colors. Your task is to complete the unfinished methods in `SandUtilities.java`. While this class contains a main function for testing the methods, the real test will be from trying options in the main program, `SandArtDriver.java`.



There are four methods that need to be completed to allow the client to alter their canvas in interesting ways. They are found in `SandUtilities.java`:

```

//pre:  m!= null
//post:  for each non-null element of m, changes it to its inverted color
//       skips any color with the value skip1 and skip2
public static void invertColors(Color[][]m, Color skip1, Color skip2)

//pre:  m is a square 2-D array (m.length==m[0].length)
//post:  flips the array upside down
public static void flipUpsideDown(Object[][]m)

//pre:  m is a square 2-D array (m.length==m[0].length)
//post:  rotates the array 90 degrees to the left
public static void rotateLeft(Object[][] m)

//pre:  m is a square 2-D array (m.length==m[0].length)
//post:  rotates the array 90 degrees to the right
public static void rotateRight(Object[][] m)

```

After completing each method, test them by running `SandArtDriver.java`.

<, >	change the speed that the particles drop
+, -	change the brush size for drawing or erasing platforms
INSERT	toggle between paint, erase and faucet cursor
SPACE	start or stop the particles from falling
P	pause the pull of gravity
0 – 9	change the frequency of particles, from none (0) to full (9)
F	toggle the frequency forecast between <code>STEADY</code> , <code>VARIABLE</code> and <code>RANDOM</code>
UP ARROW	toggle the wind forecast between <code>STEADY</code> , <code>VARIABLE</code> and <code>RANDOM</code>
DOWN ARROW	disable the wind
LEFT, RIGHT	decrease or increase the wind
W	toggle the weight of the particles between <code>LIGHT</code> , <code>MEDIUM</code> and <code>HEAVY</code>
V	remove all drawn platforms
F1, F2, F3	flip the platform 90, 180 or 270 degrees
A	toggle how the particle colors change between <code>NONE</code> , <code>SUBTLE</code> and <code>RANDOM</code>
ENTER	do a random particle color change
r/R, g/G, b/B	add or remove red, green or blue from the current color
I	Invert the particle colors
Z	change to random background color
X	clear the background color
MOUSE WHEEL	change the brush size for drawing and erasing platforms
LEFT BUTTON	hold to paint or erase platforms, click to turn on/off faucet
RIGHT BUTTON	toggle between paint, erase and faucet cursor