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Paint 2D  
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<https://cs.iupui.edu/~achittic/games/graphicsDemo/graphicsDemo.html>  
<https://andrewchittick.github.io/graphicsDemo/graphicsDemo.html>

Paint 2D is program that allows you to draw various shapes on a HTML page. It uses a 600px by 600px HTML canvas tag. It uses JavaScript to allow you to draw free-hand, straight lines, circles, rectangles, and spirals. It also has a clear button to clear the canvas (drawing area). To free draw click and hold the mouse while moving it. To make a line, circle, or square hold the mouse and release when you have your desired size. To make a spiral click and hold mouse down and it will draw lines from the original click to where you move the cursor.

#### Global Variables/Constants

- canvas-the canvas element
- con-context of canvas
- xDown- initial x coordinate when mouse is down; set by catchMouse()
- yDown- initial y coordinate when mouse is down; set by catchMouse()
- xCoord- an x-axis coordinate; set by getCoords()
- yCoord- an y-axis coordinate; set by getCoords()
- radius- distance from (xDown, yDown) to (xCoord, yCoord); set by getCoords()
- width- xCoord – xDown; for Rectangle; set by getCoords()
- height- yCoord – yDown; for Rectangle; set by getCoords()
- mouseDown- setInterval event; set onmousedown; clear onmouseup
- shape- determines draw method to call onmousedown; set by setShape()
- image- canvas image; set in catchMouse
- offsetX- x-axis offset; constant(-100)
- offsetY- y-axis offset; constant(-25)

#### General methods:

- init()
  - gets the canvas element and context
  - checks for mouse down (calls catchMouse), and mouse up (calls release)
- catchMouse(e)
  - sets xDown, yDown with offset
  - if click was in canvas sets initial values for xCoord, yCoord, radius, width, height
  - saves the canvas image
  - sets the mouseDown interval (20)
  - sends to appropriate shape function at interval
- release(e)
  - clears the mouseDown interval
- getCoords(e)
  - sets xCoord, yCoord, radius, width, height
  - based on current position of cursor
- setShape()
  - sets shape, sends to set buttons
- setButtons()
  - makes currently selected shape button green and others red

- `clean()`
  - clears the canvas
  - puts previous image o canvas
- `checkBounds()`
  - returns true if click is within canvas
  - returns false otherwise
- `border()`
  - Draws a rainbow gradient border using `createLinearGradient()`, `fillStyle`, `fillRect()`.
  - Draws the title and author with `font`, `fillStyle`, `fillText()`.

#### Drawing methods:

- `freeDraw()`
  - Uses `beginPath`, `moveTo`, `lineTo`, `stroke`, `closePath` to draw a line segment
  - Uses `mousedown` coordinates as the starting point
  - Sends to `getCoords` to get ending point of line
  - Saves the ending point as `xDown`, `yDown` for beginning point of next segment
- `line()`
  - Uses `beginPath`, `moveTo`, `lineTo`, `stroke`, `closePath` to draw a line segment
  - Uses `mousedown` coordinates as the starting point
  - Uses `mouseup` coordinates as the ending point
- `circle()`
  - Uses `beginPath`, `arc`, `stroke`, `closePath` to draw a circle
  - `Mousedown` coordinates are center of circle
  - Radius of circle is distance from `mousedown` to `mouseup`
- `rectangle()`
  - Uses `beginPath`, `strokeRect`, `stroke`, `closePath`
  - `Mousedown` coordinates are a corner
  - Height is `mouseup Y – mousedown Y`
  - Width is `mouseupX – mousedown X`
- `spiral()`
  - Uses `beginPath`, `moveTo`, `lineTo`, `stroke`, `closePath` to draw a line segment
  - Uses `mousedown` coordinates as the starting point
  - Uses mouse location as the endpoint until `mouseup`
- `clearScreen()`
  - clears screen