

Kathmandu University

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Computer Graphics(COMP 342) – Lab 2

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Implement Digital Differential Analyzer(DDA) Line drawing algorithm and Bresenham Line Drawing algorithm(BLA) for both slopes ($|m| < 1$ and $|m| \geq 1$).

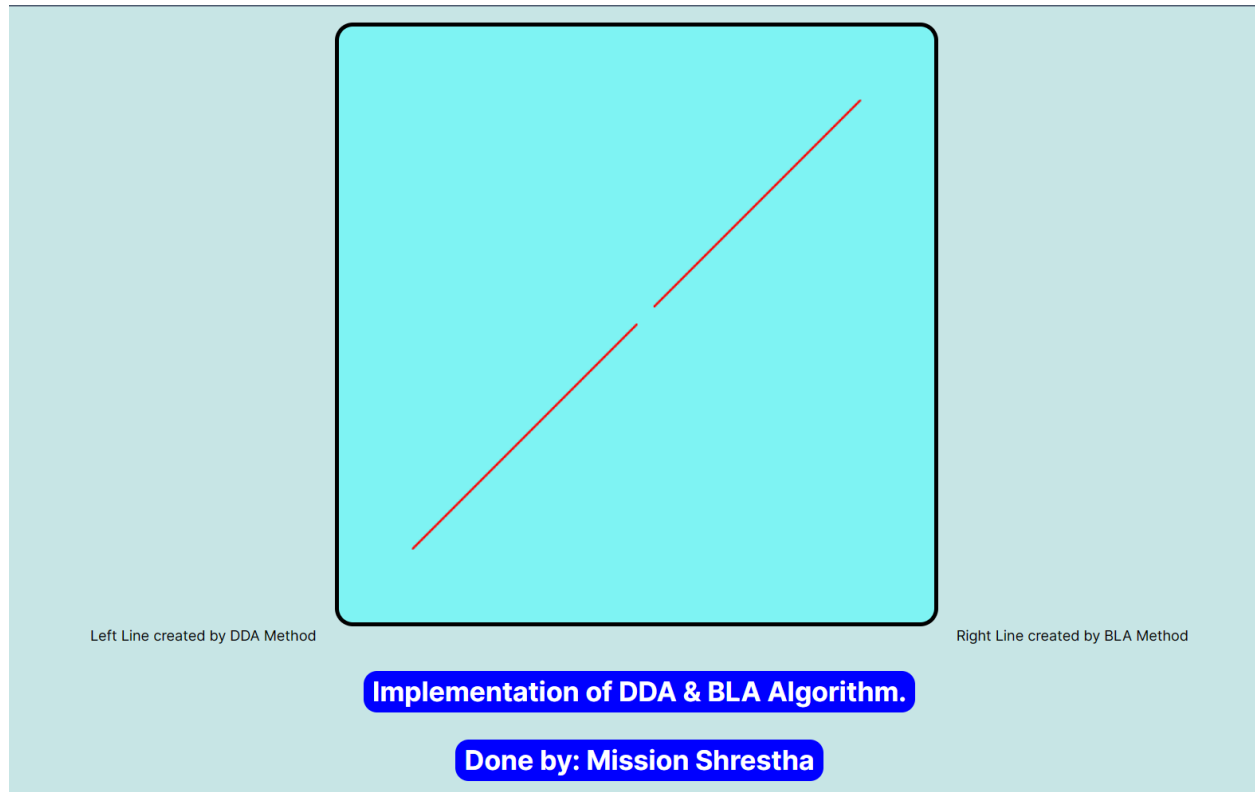
1. DDA

```
1  function DDALine(x1, y1, x2, y2){
2      let tempVertices = [];
3      let dx = x2 - x1;
4      let dy = y2 - y1;
5
6      X = x1;
7      Y = y1;
8
9      tempVertices.push(X / 600); // 600 * 600 - size of canvas
10     tempVertices.push(Y / 600);
11     // console.log(X, Y);
12
13     let stepSize;
14     if(Math.abs(dx) > Math.abs(dy)){
15         stepSize = Math.abs(dx);
16     }else{
17         stepSize = Math.abs(dy);
18     }
19
20     let xinc = dx/stepSize;
21     let yinc = dy/stepSize;
22
23     let count = 0;
24     while(count != stepSize){
25         X = X + xinc;
26         Y = Y + yinc;
27         tempVertices.push(X / 600);
28         tempVertices.push(Y / 600);
29         // console.log(X, Y);
30         count++;
31     }
32     return tempVertices;
33 }
34
35
```

2. BLA

```
1
2 function BLALine(x1, y1, x2, y2) {
3   let tempVertices = [];
4   let dx = Math.abs(x2 - x1);
5   let dy = Math.abs(y2 - y1);
6   let slope = dy / dx;
7
8   let X, Y, stepSize, p;
9   if (slope < 1) {
10    if (x1 > x2) {
11      // swap two endpoints
12      [temp1, temp2] = [x1, y1];
13      [x1, y1] = [x2, y2];
14      [x2, y2] = [temp1, temp2];
15    }
16    X = x1;
17    Y = y1;
18    tempVertices.push(X / 600);
19    tempVertices.push(Y / 600);
20    // console.log(X, Y);
21    p = 2 * dy - dx;
22    stepSize = x1 < x2 ? x2 - x1 : x1 - x2;
23    for (let i = 0; i < stepSize; i++) {
24      if (p < 0) {
25        p = p + 2 * dy;
26      } else {
27        Y++;
28        p = p + 2 * dy;
29      }
30      X++;
31      // console.log(X, Y);
32      tempVertices.push(X / 600);
33      tempVertices.push(Y / 600);
34    }
35  }
36
37  else {
38    // for slope >= 1
39    if (y1 > y2) {
40      // swap two endpoints
41      [temp1, temp2] = [x1, y1];
42      [x1, y1] = [x2, y2];
43      [x2, y2] = [temp1, temp2];
44    }
45    X = x1;
46    Y = y1;
47    // console.log(X, Y);
48    tempVertices.push(X / 600);
49    tempVertices.push(Y / 600);
50    stepSize = y1 < y2 ? y2 - y1 : y1 - y2;
51    // steps = y2 - y1;
52    p = 2 * dx - dy;
53    for (let i = 0; i < stepSize; i++) {
54      if (p < 0) {
55        p = p + 2 * dy;
56        p = p + 2 * dx - 2 * dy;
57      } else {
58        X++;
59        p = p + 2 * dx - 2 * dy;
60      }
61      Y++;
62      // console.log(X, Y);
63      tempVertices.push(X / 600);
64      tempVertices.push(Y / 600);
65    }
66  }
67  return tempVertices;
68 }
69
70
71
```

Output:



Conclusion:

Hence, the Digital Differential Analyzer (DDA) Line drawing algorithm and Bresenham Line Drawing algorithm (BLA) were used to draw the line.