Assignment No. B(5)

Problem Statement: Write C++ program to generate Hilbert curve using concept of fractals.

Learning objective:

1) To understand and learn concept of fractals.

2) To implement Hilbert curve using fractals

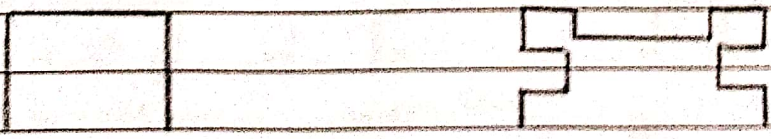
Learning outcomes: After completion of this assignment, students will be able to understand and implement various space filling curves to understand concept of fractals.

Requirements: Fedora 20, Qt Creator

Theory:

Fractals: The objective which are having smooth surface and regular shapes are generally described by using eq's. But natural object have irregular shape.

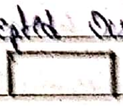
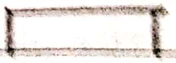
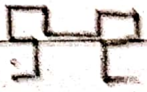
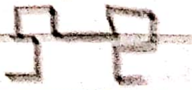
Hilbert curve: The curve also called as Peano curve and is easy to implement. The curve begins with an initial square. The generation of curve requires successive approximation. In the first approximation we are dividing the square into 4 quadrants and then drawing the curve which connects the centre points of each quadrant. The second approximation will be to further subdivide each of 4 quadrants and draw curves which connects the centre points of their subdivisions.



Algorithm:

```
Hilbert (int x, int r, int d, int l, int h, int i, int u, int y){
        if (i<=0)
            return;
        i--;
         Hilbert (u,r,u,l,d,h,i,x,y);
         move(u,h,x,y);
         Hilbert (u,r,d,l,h,i,x,y);
          move (r,h,x,y);
          Hilbert (u,u,d,l,h,i,x,y);
           move (d,h,x,y);
          Hilbert (l,d,r,u,h,i,x,y);
   }
   move (int j, int h, int &x, int &y)
   {   int x1=x;   y1=y;
        switch (j) {
          case 1:  y-=h;   break;
          case 2:  ~~y+~~ x+=h; break;
          case 3:  y+=h; break;
           case 4:  x-=h; break;
        DDA (x1, x2, x, y);
   }
```

Test Cases:-

Input	Expected Output	Actual O/P	Result
Level			
Level 2			

Conclusion: Thus, from this assignment, we have implemented hilbs curve using concept of fractals.