Assignment - B5

Problem statement - Write a C++/Java program to generate Hilbert curve using concept of fractals.

Objectives - ① To understand and learn the concept of fractals.
② To implement Hilbert curve using fractals

Outcomes - After completion of this assignment students will be able to understand and implement various space filling curves. To understand concept of fractals. Implement Hilbert curve using concept of fractals.

S/W and H/W requirements - Core i3 processor, Fedora Os, Qt creator.

Theory -

Fractals

The objective which are having smooth surface and regular shapes are generally described by using equations. But natural objects have irregular shapes.

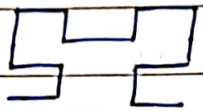
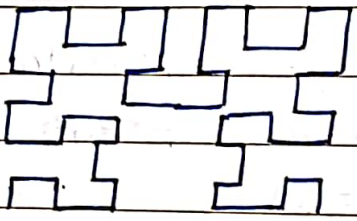
Hilbert curve - The curve also called as Peano curve and is easy to implement.
The curve begins with a initial curve.
The generation of curve requires successive approximations. In the first approximation we are dividing the square into 4 quadrants and then drawing the curve which connects the ~~curve~~ 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 fimer submissions before moving the next major quadrant

Algorithm -

```
Hilbert (int u, int r, int d, int l, int h, int i, int x, int y)
{   if (i<=0)
        return
    i--
    hilbert (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,r,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 : x += h; break;
     case 3 : y += h ; break ;
     case 4 : x -= h; break;
    }
    DDA (x1, x2, x, y);
}
```

Test case

Input	Output	status
level 1		
level 2		success
level 3		

Conclusion - These hilbert curve was implemented using concept of fractals.