Date ___ / ___ / ___

Q. 3) $Z = \frac{y}{\sqrt{x}}$

(assuming $\sqrt{x} < 1$, if not will convert it into $2^k \sqrt{x/2^k}$ such that $x/2^k < 1$)

Lets find $\sqrt{x}$ first -

Let $x = \cos^2\theta$

since, $|\cos\theta| \le 1$

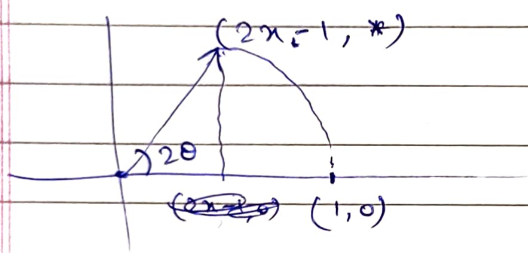
$\Rightarrow \cos^2\theta \le 1$

$\Rightarrow$ ~~$2\cos\theta$~~ $2\cos^2\theta \le 2$

$\Rightarrow 2\cos^2\theta - 1 \le 1$

$\Rightarrow 2x - 1 \le 1$

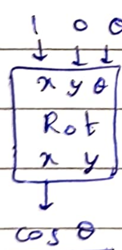
~~$\cos 2\theta = 2\cos^2\theta - 1$~~



$\Rightarrow \cos 2\theta = 2x - 1$

we will rotate (1,0) anti-clockwise such that x-axis is (2x - 1). The angle we get is 2θ (using vectoring mode cordic) Then right shift by 1 bit to get θ.

Then we will use Rotation CORDIC to find cos θ.



We will reuse these ~~modu~~ CORDIC after 32 - cycles.

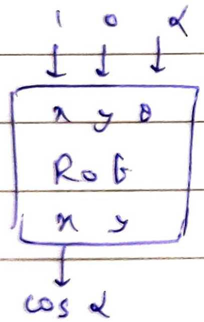
~~So~~ we will get $\sqrt{x}$ after 16 cycles.

Let $\cos\alpha = \frac{y}{\sqrt{x}}$ (here assumed that $y < \sqrt{x}$) if not we will convert it into

$\frac{y}{\sqrt{x}}$ = some integer + $\frac{y'}{\sqrt{x}}$

we will use vectoring CORDIC to find α.

After finding ~~..~~ α, we will use Rotation CORDIC



~~Hence, we~~

$\boxed{\text{flow}}$ → 1) Vectoring mode CORDIC - 16 cycles - find 2θ

2) Right shift by 1 to get θ

3) Rotation CORDIC - 16 cycles - find $\sqrt{x}$

4) Vectoring CORDIC - 16 cycles - find α.

5) Rotation CORDIC - 16 cycles - find $y/\sqrt{x}$.