

# DOSP Project1 README

## Group Members

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## Size of work unit

Giving the workers a range of 10000000 ( $10^7$ ) produced the best CPU/Real Time ratio.

Tested the ratio for ranges in power of 10 till  $10^9$ . Performance Improvement with increased work unit stopped after  $10^7$  units

CPU/Real Time ratio ( $10^9$ ) -> 4.43

```
22
23 let system = create "BitCoinGenerator" config // ActorSystem
24 let chars = Array.concat([['a' .. 'z']]) // []<char>
25 let size = Array.length chars - 1 // int
26 let ufID = "vkhilariwal" // string
27
28 let trailZeros = 5 // int
29 let workers = 6 // int
30
31 let zeros = String(Array.create trailZeros '0') // String
32 let range = 1000000000; // int
33
34 let processorNode (mailbox: Actor<_>) = // Actor<int> -> Cont<int,'a>
35
36     let rec loop () = actor {
37
38         let ranStr n =
39             let r = Random()
40             let chars = Array.concat([['a' .. 'z'];['A' .. 'Z'];['0' .. '9']])
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
[INFO][9/24/2021 6:59:27 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Starting remoting
[INFO][9/24/2021 6:59:27 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Remoting started; listening on addresses : [akka.tcp://BitCoinGenerator@127.0.0.1:9001]
[INFO][9/24/2021 6:59:27 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Remoting now listens on addresses: [akka.tcp://BitCoinGenerator@127.0.0.1:9001]
vkhilariwalB4r0b 000009BFA8D9875B08805FE81162114C5D8C11E8A06CCBE132203142B11B4ACE
vkhilariwalrBZIE 000002B30CFB732D4EC2994ACB3ECEA6F3A737B3DCA77BAC1F7CDD998D62E229
vkhilariwalJDVBC 0000066319063F18121788672AD1180675805FE24DFE2C2118D81C188CFAAACF
vkhilariwal032ka 000000057A33F279811A68509A3D1C0E9558F67211C1BAD083824F965726AE29
vkhilariwal6rxqu 000007AD8E46A37DEEB196D90B79784E188DC44F4EB9D8F22CCF0E3CFD8D589B
vkhilariwal4oZ1b 000004730DFE4A71F9A4E43994D720927FC938D6078DD84540073665705B8FBF

Real: 00:00:25.728, CPU: 00:01:54.015, GC gen0: 2383, gen1: 5, gen2: 1
Press any key to continue
```

CPU/Real Time ratio ( $10^7$ ) -> 4.46

```

22
23 let system = create "BitCoinGenerator" config // ActorSystem
24 let chars = Array.concat([['a' .. 'z']]) // []<char>
25 let size = Array.length chars - 1 // int
26 let ufID = "vkhilariwal" // string
27
28 let trailZeros = 5 // int
29 let workers = 6 // int
30
31 let zeros = String(Array.create trailZeros '0') // String
32 let range = 10000000; // int
33
34 let processorNode (mailbox: Actor<_>) = // Actor<int> -> Cont<int,'a>
35
36     let rec loop () = actor {
37
38         let ranStr n =
39             let r = Random()
40             let chars = Array.concat([['a' .. 'z']; ['A' .. 'Z']; ['0' .. '9']])

```

PROBLEMS OUTPUT **TERMINAL** DEBUG CONSOLE

```

Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
[INFO][9/24/2021 6:57:36 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Starting remoting
[INFO][9/24/2021 6:57:36 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Remoting started; listening on add
:9001]
[INFO][9/24/2021 6:57:36 PM][Thread 0001][remoting (akka://BitCoinGenerator)] Remoting now listens on addresses:
vkhilariwalYd9Ad 000008FBEE2853E2C0D9C5CBD068DDAF043D72C8A3319F695D66D48C079FD903
vkhilariwal0x91R 0000012345C4259B194D668CD4129208EFE1391216C03C7084113BFB802F606D
vkhilariwalZM2q4 0000011BE325520B317FC33F8F99D450618FB35BDDAE77157F94C56908AB7F56
vkhilariwalnGf99 00000E14457BB5D97636F4F7703D25C0E3DEFFFA96E0E2B21D53857CE47894DE

Real: 00:00:32.859, CPU: 00:02:22.468, GC gen0: 3042, gen1: 5, gen2: 0
Press any key to continue . . . █

```

Also increasing the number of total actors helps improve the CPU/Real time ratio since increasing the number of actors effectively helps in parallelizing the computation

## Output for size 4

Few of the size 4 bitcoins found

```

vkhilariwalFVFcAnU 00006DC7EF673EE61FC7A3B3DED50C40C0EBE321DD235491791F69757388DEEA
vkhilariwalMFivPIM 0000DC61CF14FE2D0C514349B4B4AE57A86D4AF446A7F528C4F0DEA1B71E14CC
vkhilariwal2oN8jKc 0000A46A38116B395BA4955B50996872DB9B24CE947A5A037842A88E6C494CB8
vkhilariwalSYuybba 000041D7123B86815AD1218026EA7E4326478D89DE1548706482799F9144F0C4
vkhilariwalDO34i9b 0000F81F782D576CD06F856BDED60EBC7C8E511C1F5F8476A47E7022584C0A1A

```

## Running Time Analysis

For Single System

CPU time/Real Time : 2:54.921/40.686 = 4.301

