

Part1:

```

amir47@ubuntu:~/Desktop/$ make clean
amir47@ubuntu:~/Desktop/$ make serial
amir47@ubuntu:~/Desktop/$ time ./serial.out 5000
real    0m0.002s
user    0m0.002s
sys     0m0.000s
amir47@ubuntu:~/Desktop/$ time ./serial.out 50000
real    0m0.011s
user    0m0.011s
sys     0m0.000s
amir47@ubuntu:~/Desktop/$ time ./serial.out 500000
real    0m0.093s
user    0m0.093s
sys     0m0.000s
amir47@ubuntu:~/Desktop/$
  
```

۵۰۰۰۰	۵۰۰۰	۵۰۰	تعداد نمونه
93ms	11ms	2ms	زمان اجرا

Part2:

```

amir47@ubuntu:~/Desktop/5$ make clean
amir47@ubuntu:~/Desktop/5$ make concurrent
amir47@ubuntu:~/Desktop/5$ time ./concurrent.out 5000
real    0m0.003s
user    0m0.002s
sys     0m0.001s
amir47@ubuntu:~/Desktop/5$ time ./concurrent.out 50000
real    0m0.007s
user    0m0.007s
sys     0m0.004s
amir47@ubuntu:~/Desktop/5$ time ./concurrent.out 500000
real    0m0.053s
user    0m0.076s
sys     0m0.015s
amir47@ubuntu:~/Desktop/5$

```

5.....	5....	5...	تعداد نمونه
53ms	7ms	3ms	زمان اجرا

Part3:

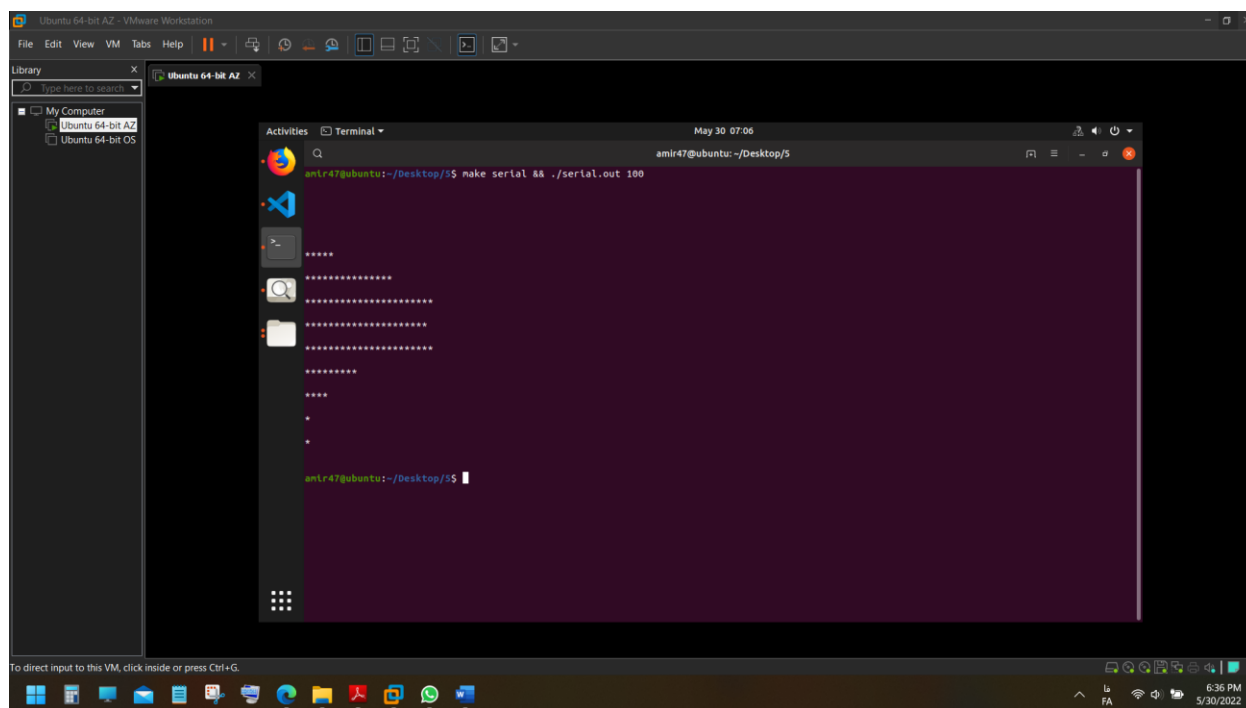
بله، عبارت ++data[counter + 12]hist->می تواند باعث ایجاد race condition شود.

برای جلوگیری از آن می توان از semaphore استفاده کرد.

Part4:

۵۰۰۰۰۰	۵۰۰۰۰	۵۰۰۰	تعداد نمونه
75.5%	57.1%	-33.3%	زمان اجرا

نمودار توزیع نرمال:



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May 30 07:06

amir47@ubuntu: ~/Desktop/5

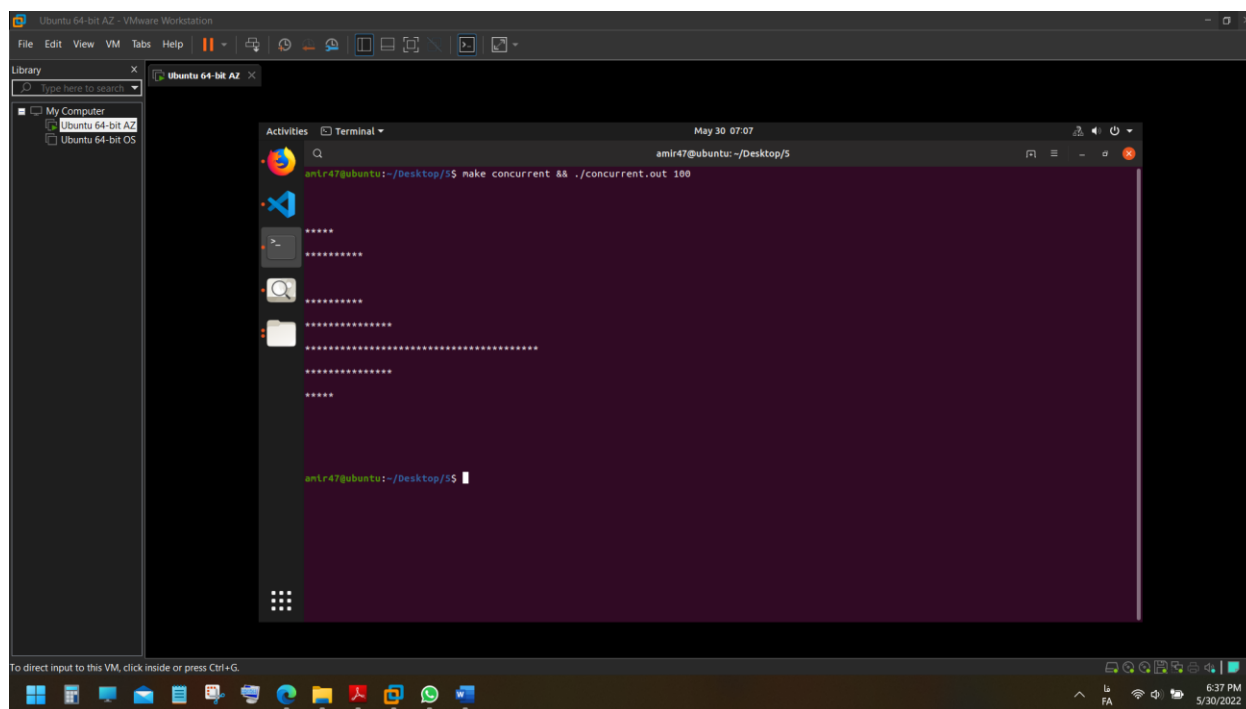
```
amir47@ubuntu:~/Desktop/5$ make serial && ./serial.out 100
```

```
*****
*****
*****
*****
*****
****
*
*
```

amir47@ubuntu:~/Desktop/5\$

To direct input to this VM, click inside or press Ctrl+G.

6:36 PM 5/30/2022



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Ubuntu 64-bit OS

Activities Terminal

May 30 07:07

amir47@ubuntu: ~/Desktop/5

```
amir47@ubuntu:~/Desktop/5$ make concurrent && ./concurrent.out 100
```

```
*****
*****
*****
*****
*****
****
```

amir47@ubuntu:~/Desktop/5\$

To direct input to this VM, click inside or press Ctrl+G.

6:37 PM 5/30/2022