Homework Wan Huzaifah bin Wan Azhar

Answer:



* -a 0 = 175 rotation + 30 transfer = 165 + 30 = 195 unit
* -a 6 = 345 Rotation + 30 transfer = 375 unit
* -a 30 = (345 – 80) Rotation + 30 transfer + 80 seek = 375 unit
* -a 10, 18 =
  + 10 = 135 unit
  + 8 = (210 rotation without seek – 40 seek) + 30 Transfer + 40 seek = 240 unit
  + 10 -> 8 = 375 unit
* -a 7, 30, 8 =
  + 7 = 15 Rotation + 30 Transfer = 45 unit
  + 30 = (300 Rotation – 80 seek) + 30 Transfer + 80 seek = 330 unit
  + 8 = (390 rotation – 80 seek) + 30 Transfer + 80 seek = 420 unit
  + 45 + 330 + 420 = 795 unit
* -a 10,11,12,13
  + 10 = 105 Rotation + 30 Transfer + 0 seek = 135
  + 11 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 12 = (360 Rotation – 40 seek) + 30 transfer + 40 seek = 390
  + 13 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 135 + 30 + 390 + 30 = 585 unit



-S 2

* -a 0 = 175 rotation + 30 transfer = 165 + 30 = 195 unit
* -a 6 = 345 Rotation + 30 transfer = 375 unit
* -a 30 = (345 – 40) Rotation + 30 transfer + 40 seek = 375 unit
* -a 7,30,8
  + 7 = 15 Rotation + 30 Transfer = 45 unit
  + 30 = (300 Rotation – 40 seek) + 30 Transfer + 40 seek = 330 unit
  + 8 = (390 Rotation – 40 seek) + 30 Transfer + 40 seek = 420 unit
  + 45 + 330 + 390 = 795 unit
* -a 10,11,12,13
  + 10 = 105 Rotation + 30 Transfer + 0 seek = 135
  + 11 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 12 = (360 Rotation – 20 seek) + 30 transfer + 20 seek = 390
  + 13 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 135 + 30 + 390 + 30 = 585 unit

-S 4

* -a 0 = 175 rotation + 30 transfer = 165 + 30 = 195 unit
* -a 6 = 345 Rotation + 30 transfer = 375 unit
* -a 30 = (345 – 20) Rotation + 30 transfer + 20 seek = 375 unit
* -a 7,30,8
  + 7 = 15 Rotation + 30 Transfer = 45 unit
  + 30 = (300 Rotation – 20 seek) + 30 Transfer + 20 seek = 330 unit
  + 8 = (30 Rotation – 20 seek) + 30 Transfer + 20 seek = 60 unit
  + 45 + 330 + 60 = 435 unit
* -a 10,11,12,13
  + 10 = 105 Rotation + 30 Transfer + 0 seek = 135
  + 11 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 12 = (360 Rotation – 10 seek) + 30 transfer + 10 seek = 390
  + 13 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 135 + 30 + 390 + 30 = 585 unit

-S 10

* -a 0 = 175 rotation + 30 transfer = 165 + 30 = 195 unit
* -a 6 = 345 Rotation + 30 transfer = 375 unit
* -a 30 = (345 – 8) Rotation + 30 transfer + 8 seek = 375 unit
* -a 7,30,8
  + 7 = 15 Rotation + 30 Transfer = 45 unit
  + 30 = (300 Rotation – 8 seek) + 30 Transfer + 8 seek = 330 unit
  + 8 = (30 Rotation – 8 seek) + 30 Transfer + 8 seek = 60 unit
  + 45 + 330 + 60 = 435 unit
* -a 10,11,12,13
  + 10 = 105 Rotation + 30 Transfer + 0 seek = 135
  + 11 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 12 = (360 Rotation – 4 seek) + 30 transfer + 10 seek = 390
  + 13 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 135 + 30 + 390 + 30 = 585 unit

-S 40

* -a 0 = 175 rotation + 30 transfer = 165 + 30 = 195 unit
* -a 6 = 345 Rotation + 30 transfer = 375 unit
* -a 30 = (345 – 1) Rotation + 30 transfer + 1 seek = 375 unit
* -a 7,30,8
  + 7 = 15 Rotation + 30 Transfer = 45 unit
  + 30 = (300 Rotation – 2 seek) + 30 Transfer + 2 seek = 330 unit
  + 8 = (30 Rotation – 2 seek) + 30 Transfer + 2 seek = 60 unit
  + 45 + 330 + 60 = 435 unit
* -a 10,11,12,13
  + 10 = 105 Rotation + 30 Transfer + 0 seek = 135
  + 11 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 12 = (360 Rotation – 1 seek) + 30 transfer + 1 seek = 390
  + 13 = 0 Rotation + 30 Transfer + 0 seek = 30
  + 135 + 30 + 390 + 30 = 585 unit



-R 0.1

* -a 0 = 1750 rotation + 300 transfer = 1650 + 300 = 1950 unit
* -a 6 = 3450 Rotation + 300 transfer = 3750 unit
* -a 30 = (3450 – 80) Rotation + 300 transfer + 80 seek = 3750 unit
* -a 7,30,8
  + 7 = 150 Rotation + 300 Transfer = 450 unit
  + 30 = (3000 Rotation – 80 seek) + 300 Transfer + 80 seek = 3300 unit
  + 8 = (300 Rotation – 80 seek) + 300 Transfer + 80 seek = 600 unit
  + 450 + 3300 + 600 = 4350 unit
* -a 10,11,12,13
  + 10 = 1050 Rotation + 300 Transfer + 0 seek = 1350
  + 11 = 0 Rotation + 300 Transfer + 0 seek = 300
  + 12 = (3600 Rotation – 80 seek) + 300 transfer + 80 seek = 3900
  + 13 = 0 Rotation + 300 Transfer + 0 seek = 300
  + 1350 + 300 + 3900 + 300 = 5850 unit



* All order produced the same time, so no order is the best for the request
* Running SSTF
  + 7 = 15 rotation + 30 transfer = 45 unit
  + 8 = 30 transfer = 30 unit
  + 30 = (270 – 80) + 80 + 30 = 300 unit
  + Total 375 unit



* No, SATF produced the same time as SSTF for the request.
* Example SATF outperform SSTF: -a 7,35,18
* SATF is better SSTF when rotation to next request is nearer to the head.



* -o 2 is the best given -a 10,11,12,13 with default seek rate
* With seek rate -S 4, the best skew is -o 1
* Skew = track-distance / seek-speed / (rotation-speed \* rotation-space-degrees)



* Running -z 10,20,30 with randomizer
  + -a 45, 40, 22, 13, 27
    - 45 = (350 – 40) + 20 + 40 = 370
    - 40 = 240 + 20 = 260
    - 22 = (125 – 40) + 10 + 40 = 135
    - 13 = 250 + 10 = 260
    - 27 = 130 + 10 = 140
    - = 1165 unit
  + Outer track: 36/10 = 0.36 sector per unit
  + Middle track: 18/20 = 0.9 sector per unit
  + Inner track: 10/30 = 0.334 sector per unit



* Increasing scheduling windows will decrease total time up to n.
* Using -A 1000,-1,0 and SATF, -w of 167 is the maximum that can be set that will reduce the total time.
* Is it generally about 18% scheduling windows of the request that can maximize the performance.
* More than that will not change anything.



* python .\disk.py -a 7,8,9,10,33,34,0,1,2,3,4 -p SATF -G will starve SATF
* It will also starve under BSATF without scheduling windows.
* Using -w 4 on BSATF will solve the problem at the cost of increasing total time.
* Disk should prioritize avoiding starvation first before thinking about performance.



* Python .\disk.py -a 0,21 will not produce the optimal time as FIFO will leads to 0 first before 21 although 21 is closer from the starting head.
* Python .\disk.py -a 0,21 will be more optimal as it considers that 21 is closer to starting head than 0.