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1.

void swtch(struct thread \*t1, struct thread \*t2)

{

push\_register(RBP);

push\_register(R0);

push\_register(R1);

push\_register(R2)

push\_register(R3);

t1->stack = read\_register(RSP);

write\_register(RSP, t2->stack);

pop\_register(R3);

pop\_register(R2);

pop\_register(R1);

pop\_register(R0);

pop\_register(RSP);

}

2.1

10 platters (4096 tracks / platter) (1024 sectors / track) (512 bytes / sector) = 21474836480 bytes 2^34 bytes = 16 gigabytes

2.2

12000 rotations / minute = 200 rotations / second

1 rotation / (1/200 second) = 1 rotation / 0.005 second

rotational delay = 1/2 (0.005 second) = 0.0025 second = 2.5 millisecond = 2.5 ms

Total throughput = bytes / time = bytes / (rotational delay + average seek time + transfer time)

2^34 bytes / (2.5 ms + 15 ms + 0) 2^40 bytes / second

2.3

let k be an integer that represents the number of requests

transfer rate = limit\_{k approaches infinity} (2^34 bytes / k\*(2.5 ms + 15 ms + 0)) (2^40 / k) bytes / second

3.

(a)

Shortest Seek Time First (SSTF) scheduling approach picks requests on closest track to finish first

Order of tracks: 10 -> 6 -> 2 -> 20 -> 22 -> 38 -> 40

Total track moved = (10 - 6) + (6 - 2) + (20 - 2) + (22 - 20) + (38 - 22) + (40 - 38)

= 4 + 4 + 18 + 2 + 16 + 18 = 62 tracks

Total seek time = (6 msec / track)(62 tracks) = 372 msec

(b)

Elevator (SCAN) algorithm just sweeps back and forth across the disk to complete requests.

Order of tracks: 10 -> 22 -> 20 -> 2 -> 40 -> 6 -> 38

Total track moved = (22 - 10) + (22 - 20) + (20 - 2) + (40 - 2) + (40 - 6) + (38 - 6)

= 12 + 2 + 18 + 38 + 36 + 32 = 138 tracks

Total seek time = (6 msec / track)(138 tracks) = 828 msec