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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