Solution

NDBI007: Practical class 1

Exercise 1.1 (Solution)

$$MTR = \frac{TC}{2 \bullet r}$$

$$TC = MTR \bullet 2 \bullet r$$

$$TC = \frac{448}{8} \bullet 0.00417 \bullet 2$$

$$TC = 0.46 \; MB$$

❖ Note that transfer speed on outer edge is maximal, hence the result is the upper bound

Exercise 1.2 (Solution)

$$SDR = \frac{data\_heads \bullet TC}{2 \bullet r \bullet data\_heads + (data\_heads - 1) \bullet head\_switch\_time + track\_to\_track\_time}$$

$$TC = \frac{SDR \bullet (2 \bullet r \bullet data\_heads + (data\_heads - 1) \bullet head\_switch\_time + track\_to\_track\_time)}{data\_heads}$$

$$TC = \frac{37 \bullet (2 \bullet 0.00417 \bullet 10 + (10 - 1) \bullet 0.001 + 0.0012)}{10}$$

$$TC = 0.35 \ MB$$

Exercise 1.4 (Solution)

$$MTR = \frac{TC}{2 \bullet r}$$

$$\frac{1}{MTR} = \frac{2 \bullet r}{TC}$$

$$btt = \frac{2 \bullet r}{TC} \bullet block\_size$$

$$btt = \frac{block\_size}{MTR}$$

$$btt = \frac{2 \bullet 0.00417}{0.46} \bullet 0.004$$

$$btt = \frac{0.004}{448 \div 8}$$

$$btt = 0.072 \ ms$$

$$btt = 0.072 \ ms$$

TC	0.28 MB	0.30 MB	0.35 MB	0.46 MB
btt	0.119 ms	0.111 ms	0.095 ms	0.072 ms

$$read\_time = BC \bullet (s + r + btt)$$

$$read\_time = BC \bullet (s + r + btt)$$

$$read\_time = 250{,}000 \bullet (8.5 + 4.17 + 0.111)$$

$$read\_time = 250{,}000 \bullet (8.5 + 4.17 + 0.072)$$

$$read\_time \approx 3{,}195 \ s \approx 53 \ m$$

$$read\_time \approx 3{,}186 \ s \approx 53 \ m$$

*   Note that btt is marginal compared to seek time, hence the reading and the writing is most affected by the movement of read-write head