

Entregable Discs Magnetics

Exercici 1º

3.145.728 bytes.

Prefixes decimals:

$$\frac{3.145.728}{10^3} = 3145,728 \text{ KB}$$

$$\frac{3.145.728}{10^6} = 3'145728 \text{ MB}$$

$$\frac{3.145.728}{10^9} = 3'145728 \cdot 10^{-3} GB$$

$$\frac{3.145.728}{10^{12}} = 3'145\,728 \cdot 10^6 \text{ TB}$$

Prefixes binaris

$$\frac{3.145.728}{7^{10}} = 3072 \text{ KB}$$

$$\frac{3.145.728}{2^{20}} = 3 \text{ MiB}$$

$$\frac{3.145.728}{2^{30}} = 2^{19} 9296875 \cdot 10^3 \text{ GiB}$$

$$\frac{3.145.728}{2^{40}} = 2^{1861022949} \cdot 10^6 \text{ TiB}$$

Exercici 2:

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① Area útil per cara = $\pi \cdot \frac{3'5^2 - 0'5^2}{4} = 3\pi \approx 9'42 \text{ sq im}$

$$\text{Area total} = \text{nº cores} \cdot \text{área útil per core} = 8 \cdot 3\pi = 24\pi \approx 75.4 \text{ sqm}$$

$$\textcircled{2} \quad \text{Nº cilindres} = 3 \text{ pulgadas} \cdot 18000 \text{ cilindros/pulgada} = 54000 \text{ cilindros.}$$

Nº total de pistes = 8 carros · 54000 cilindros = 432.000 pistas.

$$\text{Pulgadas} = 3'5 - 0'5 = 3$$

Exercici 3:

800 sectors pista amb sectors de 512 byte

$$\text{Capacitat de una cara} = 54000 \frac{\text{pistes}}{\text{cara}} \cdot 800 \frac{\text{sectors}}{\text{pista}} \cdot 512 \frac{\text{bytes}}{\text{sector}} = \\ = 22.118400.000 \text{ bytes.} = 2211'84MB$$

$$\text{Capacitat total} = 8 \text{ cares} \cdot 22118400.0000 \frac{\text{bytes}}{\text{cara}} = 176947.200.000 \text{ bytes}$$

$$= 176947.2 \text{ MB}$$

$$\text{Densität Areal} = \frac{176947'2}{754 \text{ sq. m}} = 2346'78 \text{ MB/sq.m}$$

Exercici 4 :

$$\text{Capacitat d'una cara} = 18000 \frac{\text{pistes}}{\text{Zona}} \cdot (200 + 1450 + 2150 + 2800) \frac{\text{sectors}}{\text{pista}} \cdot 512 \frac{\text{bytes}}{\text{sector}} = 66355200000 \text{ bytes} = 6635512 \frac{\text{MB}}{\text{cara}}$$

$$\text{Capacitat total} = 8 \text{ cares} \cdot 66355200000 \frac{\text{bytes}}{\text{cara}} = 5308416 \text{ MB} = 5308416 \text{ KB}$$

$$\text{Densitat Areal} = \frac{5308416 \text{ MB}}{754 \text{ sq in}} = 7040.34 \text{ MB/sq in}$$

Exercici 5 :

① Temps mitjà d'accés en cadascuna de les zones del disc.

$$\text{Temps de rotació} = \frac{60 \text{ s/min}}{9000 \text{ rpm}} = 6.67 \text{ ms}$$

$$\text{Latència rotacional mitjana} = 6.67/2 = 3.34 \text{ ms}$$

$$\text{Temps mitjà d'accés} = 12 + 3.34 = 15.34 \text{ ms}$$

② La velocitat de transferència interna en cadascuna de les zones.

$$\text{Zona 0: } 800 \frac{\text{sectors}}{\text{pista}} \text{ capacitat} = 800 \cdot 512 = 4096 \text{ KB/pista}$$

$$\text{temp} = 6.67/800 = 8.33 \mu\text{s} \quad \text{V. transferència} = 512/8.33 = 61.46 \text{ MB/s}$$

$$\text{Zona 1: } 1450 \frac{\text{sectors}}{\text{pista}} \text{ capacitat} = 1450 \cdot 512 = 7424 \text{ KB}$$

$$\text{temp} = 6.67/1450 = 4.6 \mu\text{s} \quad \text{V. transferència} = 512/4.6 = 111.3 \text{ MB/s}$$

$$\text{Zona 2: } 2150 \frac{\text{sectors}}{\text{pista}} \text{ capacitat} = 2150 \cdot 512 = 11008 \text{ KB/pista}$$

$$\text{temp} = 6.67/2150 = 3.1 \mu\text{s} \quad \text{V. transferència} = 512/3.1 = 165.16 \text{ MB/s}$$

$$\text{Zona 3: } 2800 \frac{\text{sectors}}{\text{pista}} \text{ capacitat} = 2800 \cdot 512 = 14336 \text{ KB/pista}$$

$$\text{temp} = 6.67/2800 = 2.38 \mu\text{s} \quad \text{V. transferència} = 512/2.38 = 215.13 \text{ MB/s}$$

③ T. amany = $6000 \text{ bytes} / 512 \frac{\text{bytes}}{\text{sector}} = 117.2 \approx 118 \text{ sectors}$

$$\text{Zona 0: temps lectura} = 15.34 + 118 \cdot 61.46 = 7267.62 \text{ ms}$$

$$\text{Zona 3: temps lectura} = 15.34 + 118 \cdot 215.13 = 25400.68 \text{ ms}$$

④ Temps de lectura = $118 \text{ sectors} \cdot (15.34 \text{ ms} + 61.46) \approx 9062.4 \text{ ms} = 9.0624 \text{ s}$

⑤ t amany = $100 \cdot 10^6 \text{ bytes} / 512 \frac{\text{bytes}}{\text{sector}} = 195312.5 \approx 195313 \text{ sectors}$

$$\begin{aligned} \text{temps lectura} &= 15.34 \text{ ms} + (8 \cdot 1 \text{ ms}) + (195313 \text{ sectors} \cdot 61.46) = \\ &= 12003960.32 \text{ ms} \end{aligned}$$