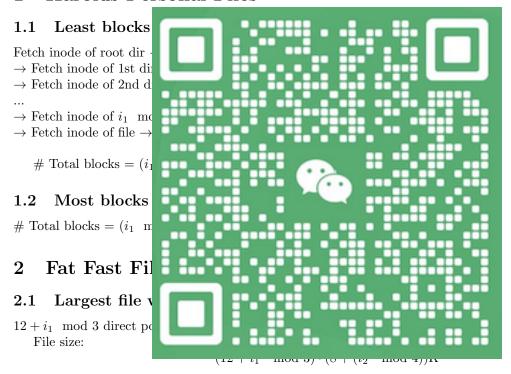
Feedback to HW8

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In this solution, denote Int1 with i_1 and Int2 with i_2 .

1 Harolds Personal Files



2.2Max file size supported

- $12 + i_1 \mod 3$ direct pointer: $12 + i_1 \mod 3$ blocks;

 - 2 indirect pointer: $2 \cdot (8 + (i_2 \mod 4)) \cdot 1024/8 = 2^8 \cdot (8 + (i_2 \mod 4))$ blocks 2 double indirect pointer: $2 \cdot ((8 + (i_2 \mod 4)) \cdot 1024/8)^2 = 2^{15} \cdot (8 + (i_2 \mod 4))^2$ blocks
 - 2 triple indirect pointer: $2 \cdot ((8 + (i_2 \mod 4)) \cdot 1024/8)^3 = 2^{22} \cdot (8 + (i_2 \mod 4))^3$ blocks
- 1 quadruple indirect pointer: $((8 + (i_2 \mod 4)) \cdot 1024/8)^4 = 2^{28} \cdot (8 + (i_2 \mod 4))^4$ blocks Total number of blocks:

$$12 + i_1 \mod 3 + 2^8 \cdot (8 + (i_2 \mod 4)) + 2^{15} \cdot (8 + (i_2 \mod 4))^2 + 2^{22} \cdot (8 + (i_2 \mod 4))^3 + 2^{28} \cdot (8 + (i_2 \mod 4))^4$$

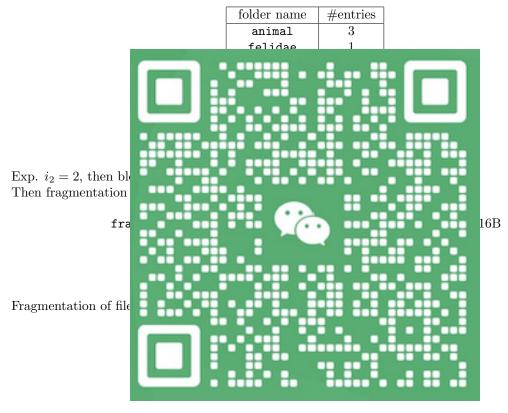
"within %1": $((8 + (i_2 \mod 4)) \cdot 1024/8)^4 = 2^{28} \cdot (8 + (i_2 \mod 4))^4$ blocks

Total size of file: $2^{28} \cdot (8 + (i_2 \mod 4))^5 \text{ KB} = 256 \cdot (8 + (i_2 \mod 4))^5 \text{ GB}$ Approximation:

 $i_2 \mod 4 = 0$: $2^8 \cdot 8^5 = 8 \text{ PB}$ $i_2 \mod 4 = 1$: $2^8 \cdot 9^5 = 14.4 \text{ PB}$ $i_2 \mod 4 = 2$: $2^8 \cdot 10^5 = 24.4 \text{ PB}$ $i_2 \mod 4 = 3$: $2^8 \cdot 11^5 = 39.3 \text{ PB}$

Wasted Space 3

Internal fragmentation 3.1



Total fragmentation: (bytes)

81712 + 8192 = 89904

3.2Internal fragmentation with double block size

Exp. $i_2 = 2$, then block size is 20K bytes.

Then fragmentation of folder:

$$\begin{split} \text{fragFolder} &= \sum_{\text{folders}} (10 \cdot 1024) B - \text{number of entries in folder} \cdot 16 B \\ &= 8 \cdot 20 \cdot 1024 - 16 \cdot (3 + 1 + 2 + 2 + 1 + 2 + 1 + 1) \\ &= 163632 B \end{split}$$

Fragmentation of file:

$$\begin{split} \text{fragFile} &= \sum_{\text{files}} \text{internal fragmentation of each file} \\ &= 8 \text{K} + 10 \text{K} + 0 + 10 \text{K} + 0 + 0 \\ &= 28672 \text{B} \end{split}$$

Total fragmentation: (bytes)

163632 + 28672 = 192304

