Ayça Avcı

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COMP 304

Project 3 Report

In the code files, everything is working without any errors.

**CONTIGUOUS DATA (times are in seconds):**

File name: input\_1024\_200\_9\_0\_9.txt

CREATED FILE NUMBER: 200

CREATE REJECTED FILE NUMBER: 0

create time: 0.00015643957536667585

ACCESSED FILE NUMBER: 1605

ACCESS REJECTED FILE NUMBER: 0

access time: 3.0387751195968542e-06

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 0

SHRUNK FILE NUMBER: 833

SHRINK REJECTED FILE NUMBER: 0

shrink time: 0.0029028474189147367

File name: input\_1024\_200\_9\_0\_0.txt

CREATED FILE NUMBER: 120

CREATE REJECTED FILE NUMBER: 80

create time: 0.001959059935543337

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 409113

access time: 4.7045009888836606e-06

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 0

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_2048\_600\_5\_5\_0.txt

CREATED FILE NUMBER: 528

CREATE REJECTED FILE NUMBER: 72

create time: 0.0021651057217241033

ACCESSED FILE NUMBER: 52

ACCESS REJECTED FILE NUMBER: 544

access time: 0.003245808386091329

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 535

extend time: 5.1811979414468685e-05

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_8\_600\_5\_5\_0.txt

CREATED FILE NUMBER: 528

CREATE REJECTED FILE NUMBER: 72

create time: 0.003526221214827577

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 582

access time: 0.0033394128456831784

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 555

extend time: 6.384401260203941e-05

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_1024\_200\_5\_9\_9.txt

CREATED FILE NUMBER: 133

CREATE REJECTED FILE NUMBER: 67

create time: 0.012211426019421196

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 170

access time: 0.011436955612289775

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 1396

extend time: 2.7975610972807095e-05

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 1574

shrink time: 0.0015404065659318802

Average create time: 0.004003650493376578

Average access time: 0.0036059840240345526

Average extend time: 2.8726320597863038e-05

Average shrink time: 0.0008886507969693234

**LINKED ALLOCATION DATA (times are in seconds):**

File name: input\_1024\_200\_9\_0\_9.txt

CREATED FILE NUMBER: 200

CREATE REJECTED FILE NUMBER: 0

create time: 0.026040367780224186

ACCESSED FILE NUMBER: 1605

ACCESS REJECTED FILE NUMBER: 0

access time: 5.731927256340689e-06

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 0

SHRUNK FILE NUMBER: 833

SHRINK REJECTED FILE NUMBER: 0

shrink time: 0.006325246628935953

File name: input\_1024\_200\_9\_0\_0.txt

CREATED FILE NUMBER: 123

CREATE REJECTED FILE NUMBER: 77

create time: 0.05944451167008083

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 409113

access time: 6.220619661746652e-06

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 0

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_2048\_600\_5\_5\_0.txt

CREATED FILE NUMBER: 506

CREATE REJECTED FILE NUMBER: 94

create time: 0.02582252339341115

ACCESSED FILE NUMBER: 58

ACCESS REJECTED FILE NUMBER: 538

access time: 0.0043023835245817555

EXTENDED FILE NUMBER: 39

EXTEND REJECTED FILE NUMBER: 496

extend time: 0.00025220523772230286

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_8\_600\_5\_5\_0.txt

CREATED FILE NUMBER: 364

CREATE REJECTED FILE NUMBER: 236

create time: 0.034978501303339724

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 582

access time: 0.00443567514369149

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 555

extend time: 0.0002592256434024773

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 0

File name: input\_1024\_200\_5\_9\_9.txt

CREATED FILE NUMBER: 134

CREATE REJECTED FILE NUMBER: 66

create time: 0.12521872397468542

ACCESSED FILE NUMBER: 0

ACCESS REJECTED FILE NUMBER: 170

access time: 0.015194085815763923

EXTENDED FILE NUMBER: 0

EXTEND REJECTED FILE NUMBER: 1396

extend time: 0.00010646402302428608

SHRUNK FILE NUMBER: 0

SHRINK REJECTED FILE NUMBER: 1574

shrink time: 0.0033529427565615463

Average create time: 0.05430092562434826

Average access time: 0.004788819406191051

Average extend time: 0.00012357898082981323

Average shrink time: 0.0019356378770994998

**Question 1:**

**Data can be taken above for time comparison.**

Contiguous allocation is faster when there is enough sequential space to allocate files for create and extend operations. Access is also faster when a file is allocated contiguously. Since the starting address is given, further blocks can be obtained by just simply adding the desired block number to the starting block. However, if there is no sequential space, the file system needs a defragmentation for a new file to be allocated. In this case, using linked allocation is more advantageous, it allocates files without the need of defragmentation. This method is free from external fragmentation and regarding memory utilization it is better since it is able to use every bit of the memory (excluding the pointer sizes). However, since it does not support direct access, access operates slower.

**Question 2:**

When block size is 8, rejection is most likely to happen because FAT size is 4 bytes. In this case, FAT allocates more blocks.

2048 block size: reject ratio is 0.156

8 block size: reject ratio is 0.393

**Question 3:**

FAT file systems are still commonly found on floppy disks, flash and other solid-state memory cards and modules (including USB flash drives), as well as many portable and embedded devices. FAT is the standard file system for digital cameras per the DCF specification.

The File Allocation Table, FAT, used by DOS is a variation of linked allocation, where all the links are stored in a separate table at the beginning of the disk. The benefit of this approach is that the FAT table can be cached in memory, greatly improving random access speeds.

**Question 4:**

There can be more space just before and after the file consecutively, so we need to shift less files in that case. Performance will increase this way and fragmentation happens faster.

**Question 5:**

We need an extra memory block that should be at least a number of rejected extensions.