



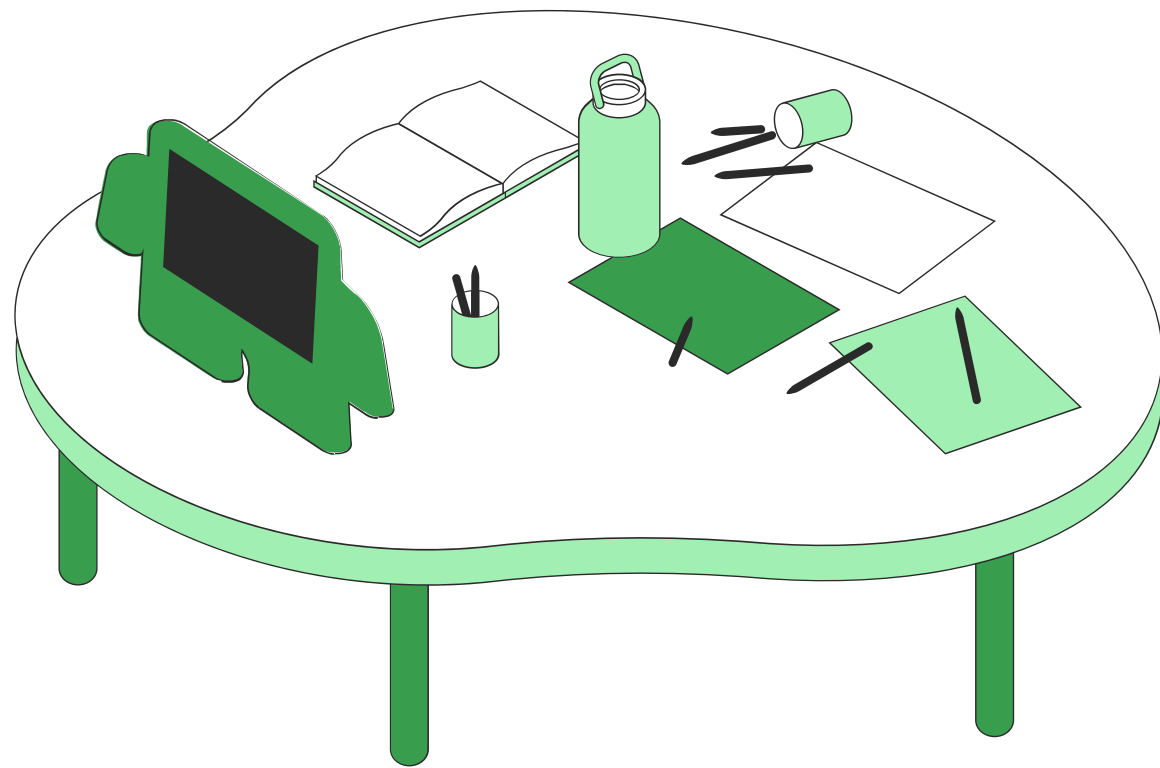
Flip Classroom

Students Database Using Binary Files in Java

Database of Name, Roll No., Average Marks



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What are Binary Files?

A **binary file** is a computer file that stores data in two data types, unlike text files.

eg:- a1234 is stored in text files as all characters.

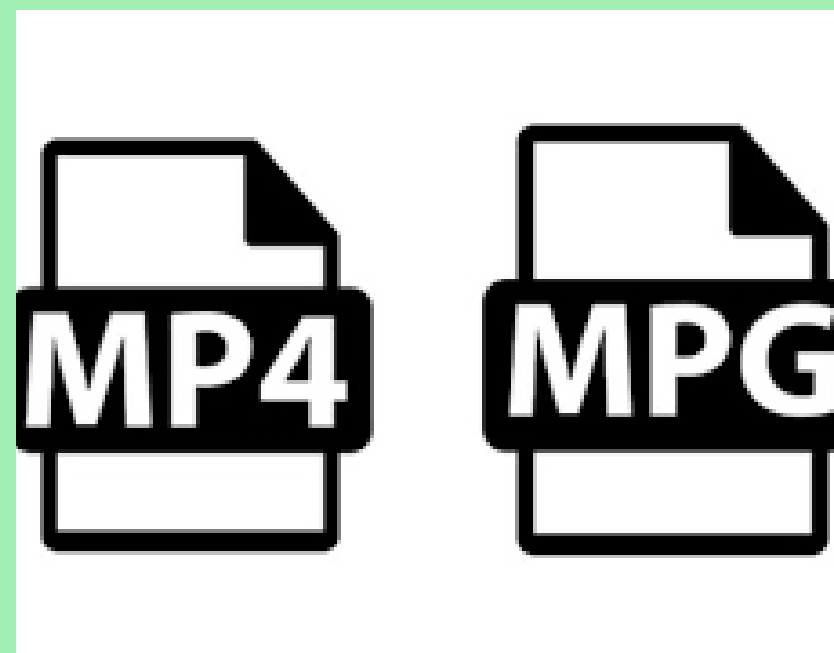
Whereas in a binary file, 'a' is one type of data type, and (1234) is stored as one type of data type.

a -> stored as a character.

1234-> stored as integers.



Binary files store data in the form of bits/groups of bits (bytes) in sequence. These bits' combinations can refer to custom data. Binary files can store multiple types of data, such as images, audio, text, etc.



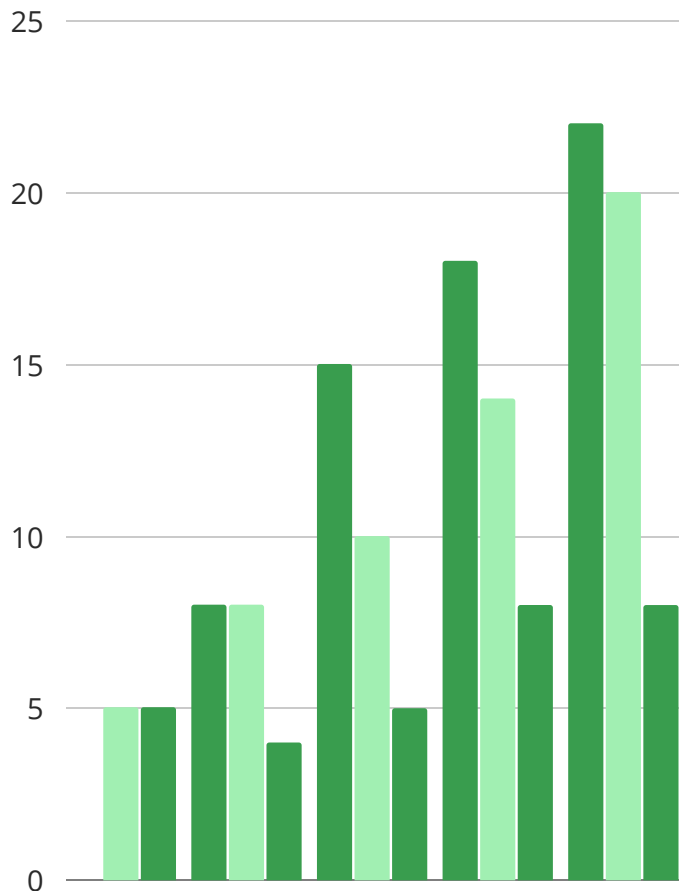
Characteristics

of Binary files:

- Binary Files Contain Information Coded Mostly in Binary Format.
- Binary Files are difficult to read for humans.
- Binary Files can be processed by certain applications or processors.
- Only Binary File Processors can understand Complex Formatting Information Stored in Binary Format.
- Humans can read binary files only after processing.
- All Executable Files are Binary Files.

Comparison between Text files and Binary files:-

| | <u>Text File</u> | <u>Binary File</u> |
|-----------|------------------|--------------------|
| Stores | Characters | Binary Values |
| Extention | .txt, .bak, .c | .dat, .mpg, .jpg |
| Reading | .Direct possible | Only programatic |
| EOF | Required | No EOF |
| Space | More Space | Comp. Less |
| Speed | Slower | Comp. Faster |



Code:-

We implemented code that creates a file with an extension of ".dat" in a specific file on our PC.

File Path:-

C://BinaryReadWrite/sample.dat




```
1 package com.Javacode;
2 import java.io.*;
3 import java.io.File;
4 import java.io.FileOutputStream;
5 import java.io.IOException;
6 import java.nio.charset.StandardCharsets;
7 import java.util.Scanner;
8
9 class Main {
10     public static void main(String[] args) throws IOException{
11
12         FileOutputStream fw = new FileOutputStream("C://BinaryReadWrite/sample.dat");
13         DataOutputStream dw = new DataOutputStream(fw);
14         BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
15
16         int Rno=0; String name=""; double avgMarks=0.0;
17
18         for(int i=1; i<4;i++){
19             System.out.println("Enter Rno: ");
20             Rno= Integer.parseInt(br.readLine());
21             System.out.println("Enter name");
22             name=br.readLine();
23             System.out.println("Enter Avarage Marks: ");
24             avgMarks= Double.parseDouble(br.readLine());
25             dw.writeInt(Rno);
26             dw.writeUTF(name);
```



```

18     for(int i=1; i<4;i++){
19         System.out.println("Enter Rno: ");
20         Rno= Integer.parseInt(br.readLine());
21         System.out.println("Enter name");
22         name=br.readLine();
23         System.out.println("Enter Avarage Marks: ");
24         avgMarks= Double.parseDouble(br.readLine());
25         dw.writeInt(Rno);
26         dw.writeUTF(name);
27         dw.writeDouble(avgMarks);
28     }
29 }
30 }
31

```

Input We give for
student databases like
Name, Roll Number
and Average Marks

```

C:\Program Files\Java\jdk-16.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.2.1\lib\idea_rt.jar=50063:C:\Program Files\JetBrains\IntelliJ IDEA Communit
er Rno:
061
er name
dhant
er Avarage Marks:

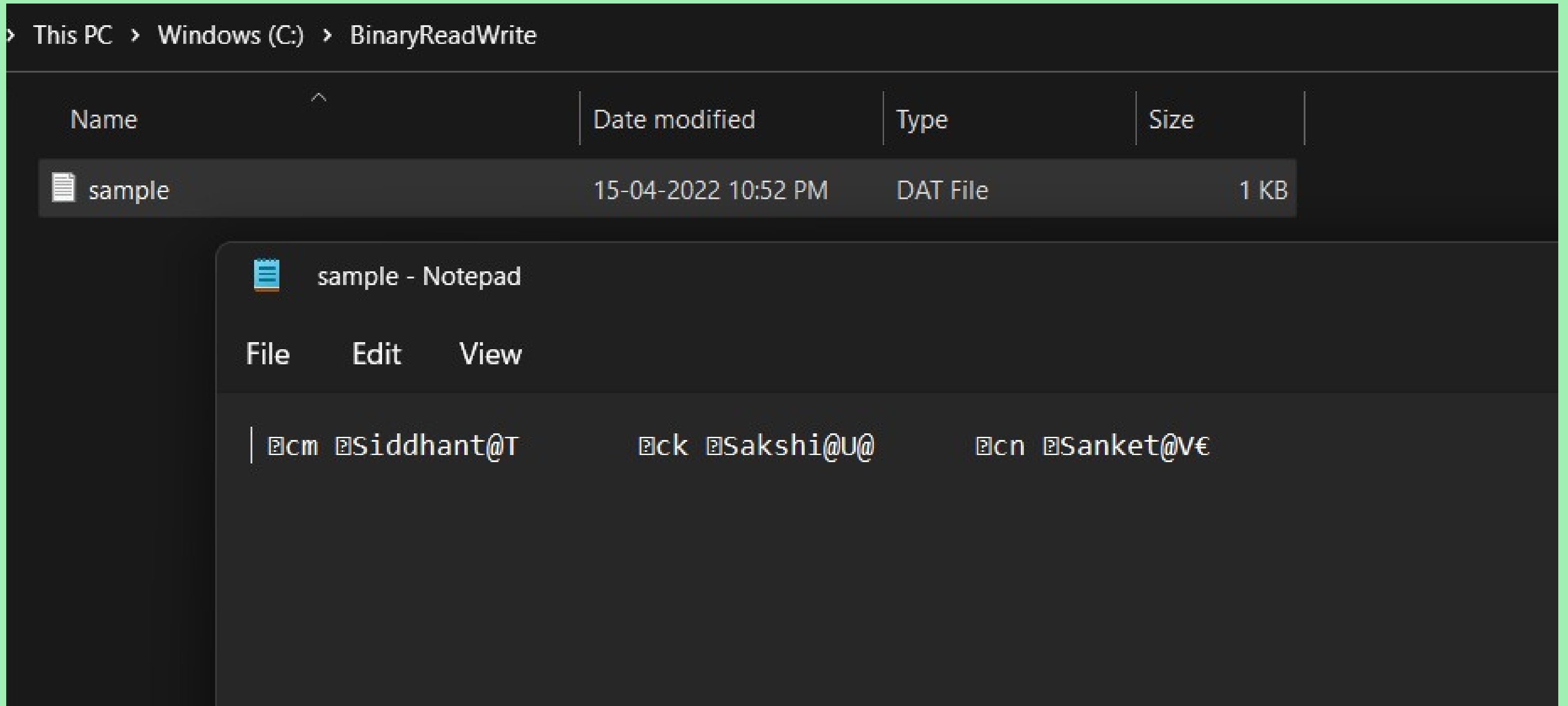
er Rno:
059
er name
shi
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er Rno:
062
er name
ket
er Avarage Marks:

cess finished with exit code 0

```

Output:-





Why Binary Files?

Why we prefer them over

Most digital data is stored in binary files. Pure text files are somewhat rare (probably less than 2% of the data in the world).

I. Input and output are much faster using binary data.

II. A binary file is usually very much smaller than a text file that contains an equivalent amount of data. For image, video, and audio data this is important. Small files save storage space, can be transmitted faster, and are processed faster. I/O with smaller files is faster, too, since there are fewer bytes to move.

III. Some kinds of data can't easily be represented as characters. For example, the bytecodes of a Java class file or the machine language of an executable file.

IV. And almost never is a human going to look at the individual data samples, so there is no reason to make it human-readable.

Advantages of Binary Files:

The advantages of saving data in binary form:

- Stores the data in binary form.
- Files can be either processed sequentially or randomly, No delimiters are used for a line.
- No internal translation takes place.
- It takes less space to store data.

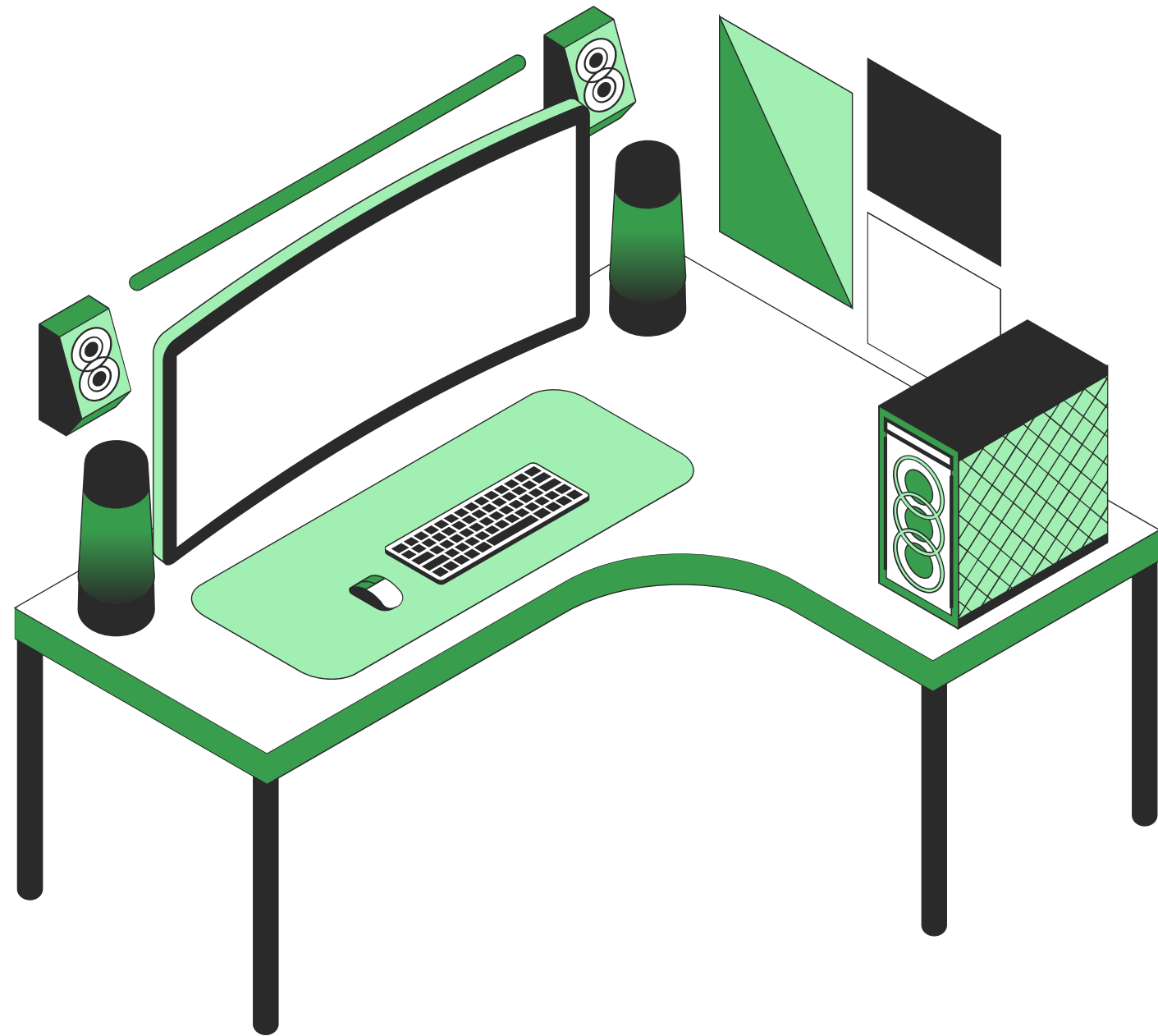
For example, the integer 4564 occupies 2 bytes in memory.

Advantages of Binary Files:

- Binary files are faster and easier for a program to read and write than are text files. As long as the file doesn't need to be read by people or need to be ported to a different type of system, binary files are the best way to store program information

What is the advantage of binary mode files over text files?

- One of the advantages of binary files is that they are more efficient. In terms of memory, storing values using numeric formats rather than as text characters, tends to use less memory.
- In addition, binary formats also offer advantages in terms of speed of access.



Thank-You

We hope you learned something new.