🔹 Section A — Binary & Representation (DAT-1.A, DAT-1.C)

1️⃣ Convert each decimal number to 8-bit binary (using 128, 64, 32, 16, 8, 4, 2, 1):

Decimal	Binary
7	00111
18	10010
64	1000000
255	100000000

2️⃣ Convert each binary number to decimal:

Binary	Decimal
00001111	15
10101010	170
11110000	240

01010101	85

3️⃣ Why do computers use binary (1 and 0)?

Computers use binary because it's simple and reliable to show two states: on (1) and off (0).

4️⃣ RGB color to binary (1 byte per color):

Color	RGB	Binary
Red	(255, 0, 0)	11111111, 00000000, 00000000
Cyan	(0, 255, 255)	00000000, 11111111, 11111111
Black	(0, 0, 0)	00000000, 00000000, 00000000
Magenta	(255, 0, 255)	11111111, 00000000, 11111111

5️⃣ What happens when we use fewer bits (e.g., 4-bit instead of 8-bit color)?

The colors become less detailed and look less smooth.

🔹 Section B — Data Compression (DAT-1.D)

1️⃣ Define in your own words:

- Lossless compression = _compression without losing any quality _____
- Lossy compression = ___compression with losing quality or data_____

2️⃣ Compare file types:

File Type	Compression Type	What might be lost?
PNG	Lossless	Nothing
JPEG	Lossy	Some quality losses
MP3	Lossy	Some quality losses
ZIP	Lossless	Nothing

3️⃣ You compress a 10 MB photo to 4 MB using a lossy method.

You get a smaller file but the photo quality becomes worse.

4️⃣ Try it yourself — use an online tool (e.g., compressjpeg.com or tinyjpg.com):

File Name	Before (MB)	After (MB)	Compression Type	Loss Type
MyPhoto	10	4	lossy	quality

5️⃣ Text “AAAAABBBBCCCC” → Which compression (lossless or lossy) works better, and why?

Lossless works better because it keeps all the letters and compresses repeated ones.

- 🔹 Section C — Extracting Information from Data (DAT-2.A, DAT-2.B)

1️⃣ A dataset contains information about student clubs in your school:

Club Name	Members	Budget ($)	Projects	Category
Robotics	15	1200	3	STEM

Art	10	800	5	Creative
Debate	12	1000	4	Academic
Music	20	1500	6	Creative

a) Which club has the highest number of projects per member?

robotics

b) Which category (STEM, Creative, Academic) has the largest total budget?

creative

c) If the school adds $200 to each club’s budget, what is the new total budget?

6100

2️⃣ What is metadata? Give one example (e.g., photo date or file size).

Metadata is extra information about a file.
Example: photo date.

3️⃣ How can metadata help organize or filter data? (e.g., sorting photos by date).

Metadata helps by giving details like date or size, so you can sort or find files easily.

🧠 Reflection

What concept did you understand best today — binary, compression, or data organization?

✏️ Write 2–3 sentences.

The best concept that ı understood is binary. Because ı personally think that I'm better at counting numbers such as binary.

Upload to GitHub as:

apcsp-part1-data-practice

> *“This exercise is inspired by the AP CSP learning objectives (Big Idea 2), but all data and examples are original classroom material created for practice purposes.”*