REVIEW · PRELIM · UNIT 6 · SESSION 6

Everything so far, and then the paper

Two hours of review. Two hours of examination. Then we open Unit 6 and keep going.

2ND SEMESTER · SCHOOL YEAR 2026-2027

Introduction to Computing · Prof. Ryan V. Labrador

Saturday, 19 September 2026 · review + Prelim Examination

TODAY

Three blocks, five hours

Block 1	**Review — two hours**	Units 1 to 5, structured. Not a re-lecture: the parts people actually lose marks on.
Block 2	**PRELIM EXAM — two hours**	Units 1 to 5. Rules, seating and timing are on slides 18 to 20 and will be read aloud.
Block 3	**Unit 6 opens — one hour**	Bits and bytes. New material, low stakes, straight after the paper.
Milestone	**Portfolio Checkpoint 1**	Three pages live and linked on every group site. Verified today, on the projector.

Nothing on the exam comes from Unit 6. It is taught after the paper on purpose.

REVIEW OBJECTIVES

By the end of the review block you will be able to...

1. Recall the core content of Units 1 to 5 without notes.
2. Separate the three things students most often confuse in this material.
3. Convert between binary, decimal and hexadecimal under time pressure.
4. Read an exam question's verb and answer the shape it is asking for.
5. Say what a bit is, and why a byte is eight of them.
6. State whether your group has met Portfolio Checkpoint 1, and prove it.

PART 1

Units 1 to 5, in two hours

Five recap slides, three confusion slides, one technique slide, and a self-test.

Overview of computing

Definition	**What a computer is**	A device that accepts data, processes it by stored rules, stores it, and outputs information.
Characteristics	**Speed, accuracy, storage**	Plus diligence, versatility, automation. It never gets bored and never improves on its own.
Generations	**Valves → transistors → ICs → microprocessors**	Know the order and one defining component for each.
Types	**Super, mainframe, mini, micro**	Plus embedded and mobile. Classified by capacity and purpose, not by age.
Applications	**Where computing already sits**	Education, business, government, health, agriculture. Have one Philippine example ready.

Most-missed: the four characteristics beyond speed. Write them out once, now.

Components of a computer system

Input	**Keyboard, mouse, scanner, sensor**	Anything that gets data into the machine.
Processing	**CPU: control unit, ALU, registers**	The cycle is fetch, decode, execute, store. In that order.
Memory	**RAM, ROM, cache**	Primary memory. Cache is smaller and faster than RAM; registers are faster still.
Storage	**HDD, SSD, optical, flash**	Secondary storage. It survives the power being cut. Memory does not.
Output	**Monitor, printer, speaker**	Anything that gets information back out to a person.
Connections	**Buses and ports**	Data, address and control lines inside; the ports you can see outside.

System and application software

System software	**Runs the machine**	Operating systems, utilities, device drivers. Windows, Linux, Android.
Application software	**Does your job**	General purpose or bespoke. A browser, a spreadsheet, an LGU's own records system.
OS functions	**Five to remember**	Process, memory, file, device and user-interface management.
Firmware	**The in-between**	Software stored inside hardware. BIOS/UEFI. Not the OS, not an application.
Licensing	**Proprietary, open source, freeware**	Free to use is not the same as free to modify. The EULA is a contract you signed.

Most-missed: firmware. It is neither hardware nor an application, and it is examinable.

Data and information processing

Three words	**Data → information → knowledge**	Raw, then processed and in context, then combined with experience to change a decision.
Data types	**Numeric, text, date, boolean, media**	The type decides what operations are valid on the value.
The cycle	**Six stages**	Collect, verify, process, store, retrieve, present. In that order, every time.
Structure	**Table, record, field, key**	A record is a row, a field is a column, a key identifies exactly one row.
Quality	**Garbage in, garbage out**	Verification at collection is the only cheap place to fix data. Ask your own survey.

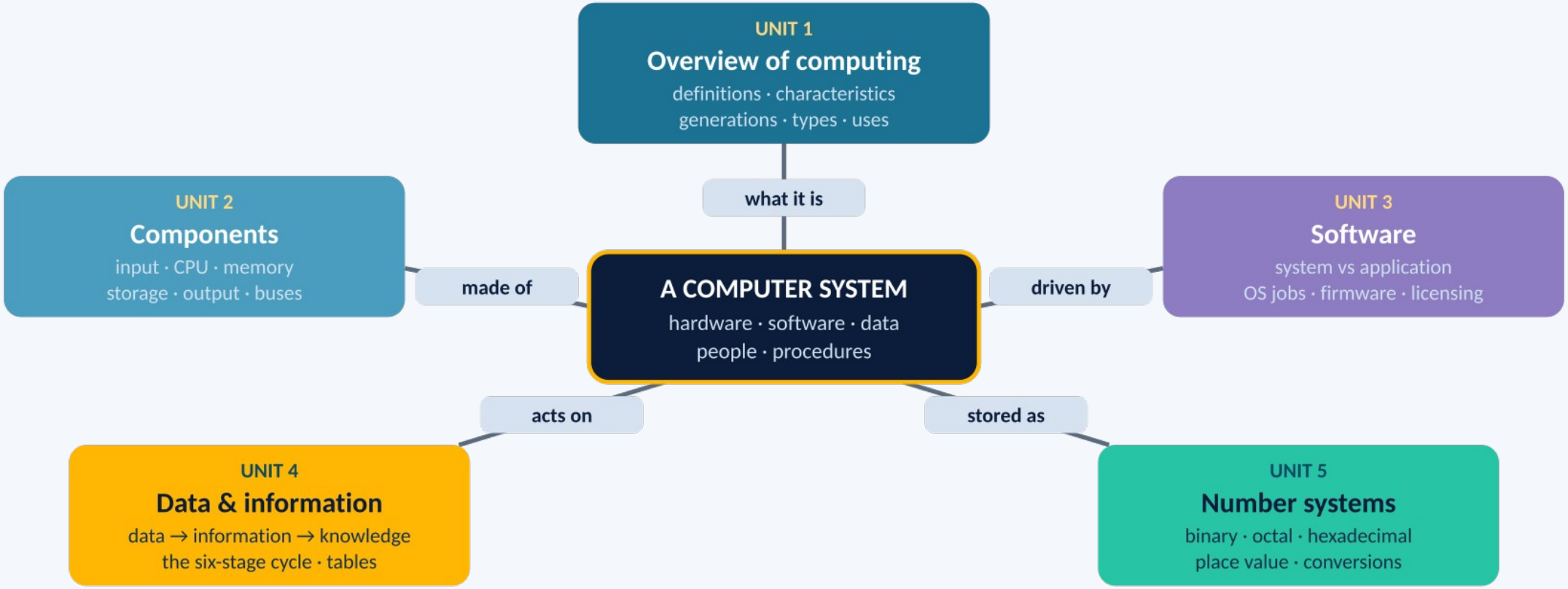
You ran all six stages yourselves two weeks ago. Use your own survey as the example in the exam.

Binary, decimal, hexadecimal

Why binary	**Two states survive noise**	Voltage present or absent. Ten reliable voltage levels are not affordable.
Place value	**One rule, any base**	Each place is worth the base times the place on its right.
Conversions	**All six directions**	Plus the four-bit rule: one hex digit is exactly four bits.
Hex in use	**Colours, memory, MAC, IPv6**	Six hex digits is three bytes: red, green, blue.
Addition	**Four rules and a carry**	Overflow is what happens when the answer needs more bits than you have.

This is the most practisable unit on the paper. You can check your own answers — so do.

How Units 1 to 5 fit together



Unit 5 sits underneath all of it — every instruction, every file, every colour is finally a pattern of bits.

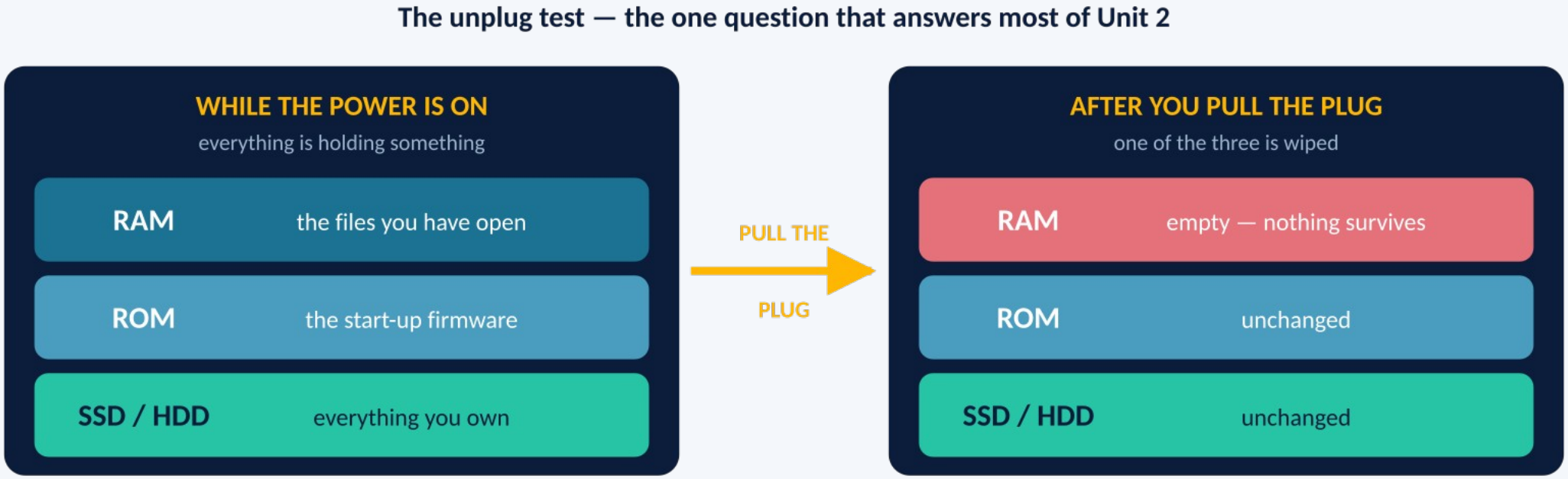
COMMONLY CONFUSED · 1

RAM, ROM and storage

	RAM	ROM	STORAGE — SSD OR HDD
Loses data on power off?	Yes	No	No
Can the CPU use it directly?	Yes	Reads from it at start-up	No — it must be copied into RAM
What is in it right now?	What you have open	Start-up firmware	Everything you own
Typical size, lab PC	4 to 8 GB	A few megabytes	256 GB to 1 TB
The trap	"RAM stores my files"	"ROM can never change"	"More storage = faster PC"

All three traps are false. Flash ROM can be updated — that is what a BIOS update is.

The unplug test



Volatile means the contents need power to survive. Only one of the three boxes on this slide is volatile.

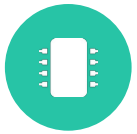
COMMONLY CONFUSED · 2

Three pairs people swap



Data vs information

"8" is data. "8 students in Group Hopper attended on 15 August" is information. If it does not answer a question somebody asked, it is still data.



Hardware, software, firmware

Hardware you can drop on your foot. Software is instructions on storage. Firmware is software living inside a device, changed rarely and deliberately.



System vs application

System software runs the machine. Application software does your job. The OS is system software; your browser is an application.

In an exam, define both halves of the pair before you compare them. Definitions carry marks.

COMMONLY CONFUSED · 3

Number system traps

STATEMENT	VERDICT	WHY
"10 in binary is ten"	FALSE	It is two. Always say which base you mean.
"One byte stores 256"	CAREFUL	256 different values — but the largest is 255, because 0 is one of them.
"0010 is the same as 10"	DEPENDS	As a value, yes. Inside a group of four for hex, absolutely not.
"Hex D is 13"	TRUE	But you must write D. Writing 13 is a different answer.
"Group hex from the left"	FALSE	Always from the right. This is the single most common error in Unit 5.

Row two costs marks every year. 256 values, 0 to 255. Say the whole sentence.

TECHNIQUE

Six habits that earn marks you already deserve

Read the verb

Define, explain, compare, convert, justify. Each wants a different shape of answer.

Marks tell you length

One mark is one point. Four marks wants four points, not one long paragraph.

Show your working

Conversions carry method marks. Correct working with a slipped final answer still scores.

Never leave a blank

A blank scores zero with total certainty. A reasoned guess does not.

Check the clock twice

Once at the halfway point, once with twenty minutes left. Nowhere else.

Move on and come back

Three minutes stuck on one question is three minutes stolen from four others.

None of this is about knowing more. All of it is about not losing what you already know.

SELF TEST

Ten questions. Two minutes. No notes.

Questions 1 to 5

- 1. Name the four stages of the CPU cycle, in order.
- 2. Which memory loses its contents when power is cut?
- 3. Convert 11010110 to decimal.
- 4. Give one difference between data and information.
- 5. What does an OS do when it manages memory?

Questions 6 to 10

- 6. Convert 202 to hexadecimal.
- 7. Name two examples of system software.
- 8. What is a primary key?
- 9. What is the largest value one byte can hold?
- 10. Why is hexadecimal used for colour codes?

Write your answers down. Do not discuss them yet. Answers on the next slide.

The answers

1 to 5

- 1. Fetch, decode, execute, store.
- 2. RAM. It is volatile.
- 3. 214. (128 + 64 + 16 + 4 + 2)
- 4. Data is raw; information is processed and in context.
- 5. Allocates and reclaims RAM between running programs.

6 to 10

- 6. CA. (11001010 → 1100 1010 → C A)
- 7. An operating system, a device driver, a disk utility.
- 8. A field whose value identifies exactly one record.
- 9. 255. Two hundred and fifty six values, 0 to 255.
- 10. One hex digit is four bits; three bytes give R, G, B.

Score yourself honestly. Anything below seven means you revise tonight, not tomorrow.

PART 2

The Prelim Examination

Two hours. Units 1 to 5. Everything you need to know about how it runs is on the next four slides.

SCOPE

What is on the paper

Unit 1	**Overview of computing**	Definitions, characteristics, generations, types, applications.
Unit 2	**Components of a computer system**	Input, CPU, memory, storage, output, and how they connect.
Unit 3	**System and application software**	OS functions, software categories, firmware, licensing.
Unit 4	**Data and information processing**	The three words, data types, the six-stage cycle, structure and quality.
Unit 5	**Binary, decimal, hexadecimal**	Place value, conversions in every direction, binary addition, overflow.

Nothing outside Units 1 to 5 appears. Nothing inside Units 1 to 5 is excluded.

RULES

What to bring, and what not to

Bring

Two pens — black or blue. A pencil. Your student ID on the desk, face up. That is the whole list.

Do not bring

Phones, smartwatches, earbuds, notes, calculators. No calculator is needed and none is allowed.

Bags to the front

Closed, at the front of the hall, before any paper is handed out. Phones inside them, switched off.

Silence

From the moment the papers are face down until the last paper is collected. No exceptions.

Questions

Raise your hand. The only questions answered are about a misprint or a page you cannot read.

Leaving the room

Nobody leaves in the first 30 or the last 10 minutes. Toilet breaks are escorted, one at a time.

A phone on your person during the paper is an academic integrity matter, not a warning. Put it in the bag.

THE PLAN

Seating and timing

Seating	Alphabetical, not by group	Your name is on the door list. You will not sit with your group today.
Spacing	One empty seat between	Eighty people spread across the hall. Sit where you are placed.
First 10 min	Settle, bags, ID check	Late arrivals are admitted for fifteen minutes and receive no extra time.
Next 5 min	Papers face down	Write your name and group on the front cover while the paper is still face down.
Then	Two hours, from my word	Times go on the board. I call the halfway mark and the last ten minutes. Pens down means pens down, and you stay seated until every paper is counted.

Alphabetical seating is not distrust. It is the standard everywhere, and it protects you as much as it protects the paper.

THE LAST PART

If you finish early, and what happens after

Finished early?	**You have not finished**	Go back to the conversions and redo them on scrap. Method marks are the cheapest marks on the paper.
Still finished?	**Sit quietly, paper closed**	You may not leave, read, sleep on the desk, or talk. Reread your longest answer instead.
Handing in	**Stay seated**	Papers are collected row by row and counted to eighty before anyone stands up.
Straight after	**We keep going**	Ten minutes to breathe, then Unit 6 opens. New material, nothing examined today.
Next Saturday	**Papers come back**	You get the paper, the mark, and an hour of error analysis. That hour is where the learning is.

Nobody has ever regretted rechecking a conversion. Plenty of people have regretted finishing twenty minutes early.

PART 3

Unit 6 begins

Bits and bytes. Nothing here was on the paper you just sat.

THE SMALLEST THING

A bit

1	2	4	8
bit	possible values	bits = a nibble	bits = a byte
one on-or-off answer	0 or 1. Nothing else.	exactly one hex digit	the unit storage is sold in

The word	**Binary digit → bit**	The name is a contraction. It was coined in the 1940s and it stuck.
What it holds	**One decision**	Yes or no. On or off. Present or absent. That is the entire capacity of one bit.

THE OBVIOUS QUESTION

Why eight bits and not seven, or ten?

1 It was not always eight

Early machines used six-bit and nine-bit groupings. Eight won because a widely adopted family of business computers standardised on it, and everything since has followed.

2 Eight is enough for text

256 patterns covers the Latin alphabet in both cases, the digits, punctuation and control codes with room to spare. Seven bits — 128 — was tight.

3 Eight is a power of two

It halves cleanly into two hex digits and quarters into pairs of bits. Address arithmetic in hardware becomes shifting, which is nearly free.

So: convention, then convenience, then everything in the world was built on top of it.

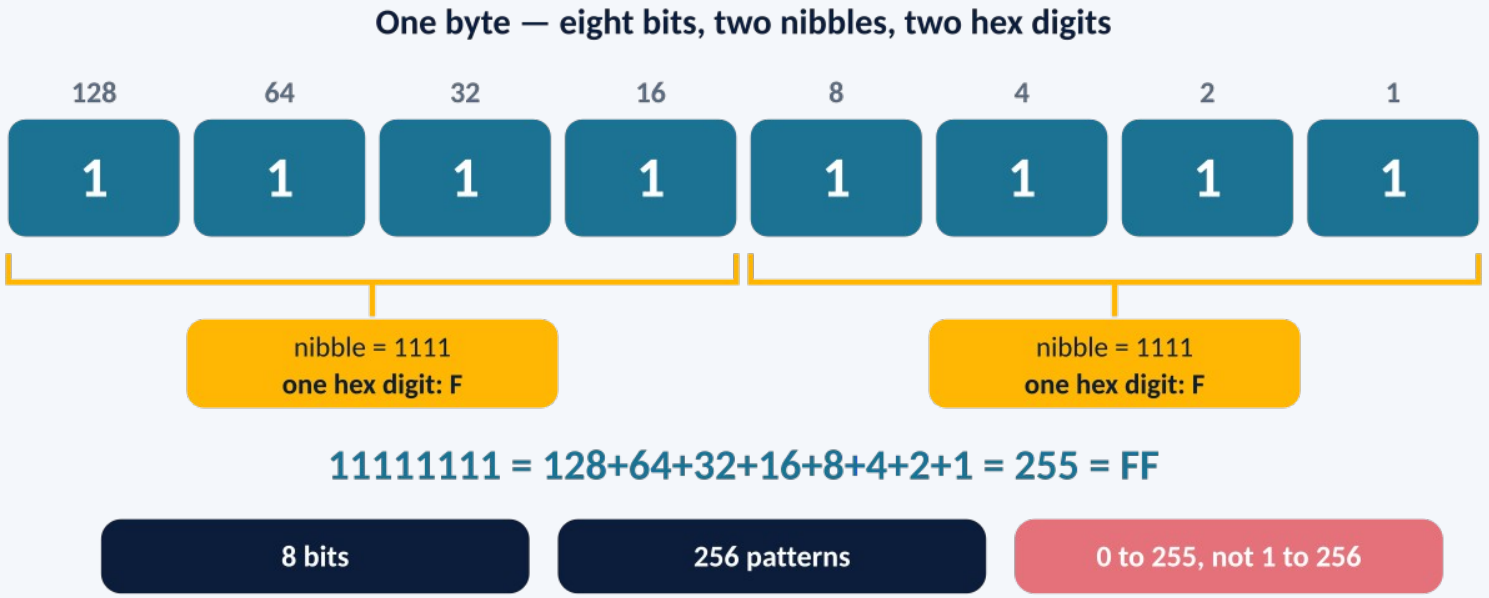
ONE BYTE

Two hundred and fifty six patterns

The range	**0 to 255**	256 different patterns. Zero is one of them, so the largest is 255, not 256.
As a character	**One letter, in ASCII**	The letter A is 65. The letter a is 97. We do this properly next Saturday.
As a colour	**One channel**	Red, green or blue, from 00 to FF. Three bytes make one colour.
As hex	**Exactly two digits**	00 to FF. That is why hex dumps read two characters at a time.
Full	**11111111 + 1**	Nine bits. The byte holds eight. It wraps to zero — that is overflow.

Next Saturday: kilobytes to terabytes, why a 1 TB drive shows as 931 GB, and how ñ and emoji are stored.

Eight bits, all switched on



Two hundred and fifty six patterns. The largest is 255, because 00000000 is one of them.

GRADED MILESTONE

Portfolio Checkpoint 1

	1	**Three pages live**	Minimum: homepage, one content page, one more. Most of you have four already.
	2	**Linked both ways**	Every page reaches the homepage. The homepage reaches every page.
	3	**Named correctly**	Your real group name at the top of every page. No placeholder text anywhere.
	4	**No personal data**	No names, student numbers or photographs of classmates without their agreement.
	5	**It loads for a stranger**	Checked on the projector, from my machine, on the college connection.

Verified live at the end of today, one group at a time, on the projector. Ten sites, back to back.

BEFORE YOU GO

Four things

One	The paper is not the course	It measures five weeks. It does not measure you, and it is a quarter of the semester.
Two	Read the verb	Whatever you remember from the technique slide, remember that one.
Three	Unit 6 has started	Bits and bytes. Next Saturday it becomes kilobytes, encoding, ñ and emoji.
Four	Checkpoint 1 is graded	Three pages, live, linked, named. Verified on the projector today.

Papers come back next Saturday with an hour set aside to work through the mistakes. That hour matters more than the mark.

A mark is a measurement.

It tells you what you have learned so far and nothing whatsoever about what you are capable of learning next. Ten weeks remain, and the most interesting parts of this course have not started yet.

See you Saturday