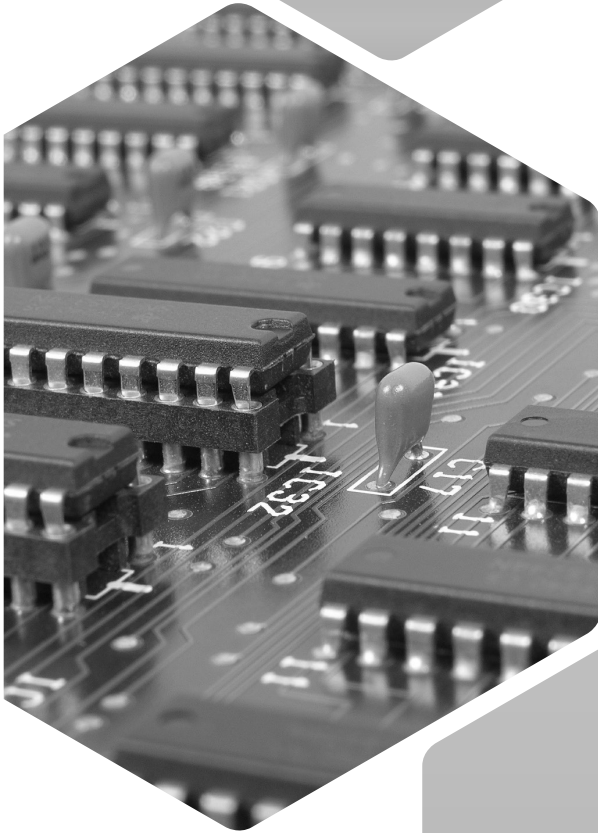


3

Computer Architecture



Themes

von Neumann model, stored-program concept, machine language, machine instruction, CPU, arithmetic/logic unit, control unit, registers, system buses, address bus, data bus, control bus, main memory, integrated circuits, the 'chip', RAM, ROM, cache memory, principle of locality, the machine cycle, RISC, CISC, pipelining, latency, throughput

Academic vocabulary skills

How synonyms work

Academic note-taking skills

Finding research papers

Academic writing skills

Paragraph structure
Topic sentences

Academic communication

Conciseness: How to sound like an expert
Reporting verbs

Academic communication Conciseness: How to sound like an expert

Discussion

Vigorous writing means concise writing. When writing longer sentences, make sure that you do not lose the strength of the intended message. You are advised to practice frequent revisions so as to delete redundant words. Less is more.

Examine the following guidelines in order to reduce wordiness:

- Avoid repetitive pairs: *each and every, always and forever, true and accurate*. Choose only one of the two.
- Remove unnecessary quantifiers: *really, actually, basically, kind of, sort of*.
- Shrink prepositional phrases: *The reason for the failure of the team* → *The team's failure*
- Delete words or phrases that are implied previously in the same sentence: *The definition aims to define* → *The term means*
- Replace a phrase with a word: *in the event that* → *if*
- Change negatives to affirmatives: *You cannot claim that this is an illegal act* → *This is a legal act*.

Note: Contractions are not appropriate for an academic style. Use the full form.

Task 1 Revise the sentences in two ways:

A Remove unnecessary words and expressions

B Consider replacing the underlined sections with the following: *demonstrate, prove, distinguish, summarize, discuss*.

- a** In a paper published by Jones et al., experiments described the difference between similar results.
- b** This research makes it apparent that the candidates were expert writers.

- c We attempt to give the main points of the report.
- d In our judgment, the study actually considers the issue of data redundancy from different points of view.
- e The results, as illustrated in Table 3, provide strong evidence that there was a breach in security.

Task 2 Match the wordy expressions with the appropriate *reporting verbs*. Accuracy is crucial in the academic context.

Wordy expressions	Reporting Verbs
(b) 1 discuss and point out faults	a elucidate
(g) 2 explain the importance of	b criticize
(h) 3 arrange into groups	c justify
(e) 4 describe similarities	d enumerate
(a) 5 explain and make clear	e compare
(i) 6 state precisely the meaning of	f evaluate
(m) 7 calculate and judge	g comment on
(c) 8 give good reasons for	h classify
(j) 9 attempt a suggestion without having complete knowledge	i define
(n) 10 give a short description of the main points	j speculate
(d) 11 name and list	k explain
(k) 12 make clear	l illustrate
(f) 13 assess and explain	m estimate
(l) 14 give examples that support your answer	n outline

Reading

Computer Hardware

Historically, the realization that a program must be stored in memory along with data, is credited to Hungarian-American mathematician John von Neumann. Modern computers are designed according to the von *Neumann model*, which essentially involves the **stored-program concept**. Instead of rewiring the control unit whenever a new task had to be performed, the program would reside in memory in the form of bit patterns, and the contents could easily be changed to suit the requirements of different tasks. The instructions written in a program had to be encoded as bit patterns so that the control unit could identify and retrieve them. The collection of encoded instructions came to be known as **machine language**. An instruction expressed in machine-level language was named a **machine instruction**.

A computer is made up of three broad sub-systems: the CPU, main memory, and input/output (I/O) devices. The **CPU**, or **central processing unit** includes the circuitry that manipulates data. It carries out the instructions of a computer program by performing the operations that are specified by the instructions. It consists of three parts: the **arithmetic/logic unit**, which performs arithmetic and logical operations on data, the **control unit**, which coordinates the machine's activities, and **registers**, which hold data temporarily.