

Programme Codes: TU856, TU858
Module Code: CPMU 1006
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TECHNOLOGICAL UNIVERSITY DUBLIN
CITY CAMPUS

TU856 – BSc. (Honours) in Computer Science
TU858 – BSc. (Honours) in Computer Science
(International)

Year 1

SEMESTER 2 EXAMINATIONS 2021/22

Computer Architecture and Technology

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Instructions

Answer QUESTION 1 and ANY TWO questions of the remaining three available.

Question 1 carries 40 marks while all further questions each carry 30 marks

1.

NOTE: This question is compulsory

- (a) What aspects of a 'general purpose computing machine' can be attributed to von Neumann Architecture?
(10 marks)
- (b) Outline characteristics of the Central Processing Unit (CPU) subcomponents known as the Arithmetic Logic Unit (ALU) and the Control Unit (CU).
(10 marks)
- (c) At their lowest physical level, how are data (or information) represented on a computer? List five *types* of information that might be represented on a computer.
(10 marks)
- (d) What is the basic architecture of the 'bus' of a personal computer? List four bus types that might be found on a motherboard.
(10 marks)
2. (a) Give a brief account of the principles of an electrical circuit. How do the features and characteristics of such a circuit relate to the practicality of power supply in digital circuits?
(10 marks)
- (b) Compare Base 10 numbers to Base 2 numbers and describe the principles of the binary number system.
(10 marks)
- (c) In your own words, describe the way that **Two's Complement** is used to represent negative numbers and effect mathematical formulae in computing systems.
(10 marks)
3. (a) What are the logical processes and notations of Boolean Algebra? You should also make one brief statement on how the algebra relates to computer architecture.
(10 marks)
- (b) Describe the functional principles of logic gates as 'internal' switching devices.
(10 marks)
- (c) Compare the main purposes of **latches** and **flip-flops** in data storage and instruction execution.
(10 marks)
4. (a) List four typical functions of systems software such as the operating system. Compare general-purpose and special-purpose software applications.
(10 marks)
- (b) What is the main principle and purpose of a computer network? List four typical Local Area network (LAN) topologies.
(10 marks)
- (c) What are the architectural principles of the developing technology called atomic switches?
(10 marks)