CIE AS Level CS'24 Notes — Chapters 1 & 2

Information Representation and Communication

Raufoon

1 Information Representation

1.1 Data Representation

Candidates should be able to:

- Show understanding of binary magnitudes and the difference between binary prefixes and decimal prefixes.
- Show understanding of different number systems.
- Perform binary addition and subtraction.
- Describe practical applications where Binary Coded Decimal (BCD) and Hexadecimal are used.
- Show understanding of and be able to represent character data in its internal binary form, depending on the character set used.

Notes and guidance:

- Understand the difference between and use: kibi and kilo, mebi and mega, gibi and giga, tebi and tera.
- Use the binary, denary, hexadecimal number bases and Binary Coded Decimal (BCD) and one's and two's complement representation for binary numbers.
- Convert an integer value from one number base/representation to another.
- Using positive and negative binary integers.
- Show understanding of how overflow can occur.

Students are expected to be familiar with ASCII, extended ASCII, and Unicode.

1.2 Multimedia Graphics

Candidates should be able to:

- Show understanding of how data for a bitmapped image are encoded.
- Show understanding of the effects of changing elements of a bitmap image on the image quality and file size.
- Show understanding of how data for a vector graphic are encoded.
- Justify the use of a bitmap image or a vector graphic for a given task.

1.2.1 Sound

Candidates should be able to:

- Show understanding of how sound is represented and encoded.
- Show understanding of the impact of changing the sampling rate and resolution.

1.3 Compression

Candidates should be able to:

- Show understanding of the need for and examples of the use of compression.
- Show understanding of lossy and lossless compression and justify the use of a method in a given situation.
- Show understanding of how a text file, bitmap image, vector graphic, and sound file can be compressed, including the use of run-length encoding (RLE).

2 Communication

2.1 Networks including the internet

Candidates should be able to:

- Show understanding of the purpose and benefits of networking devices.
- Show understanding of the characteristics of a LAN (local area network) and a WAN (wide area network).
- Explain the client-server and peer-to-peer models of networked computers.
- Show understanding of thin-client and thick-client and the differences between them.
- Show understanding of the bus, star, mesh, and hybrid topologies.
- Show understanding of cloud computing.
- Show understanding of the differences between and implications of the use of wireless and wired networks.
- Describe the hardware that is used to support a LAN.
- Describe the role and function of a router in a network.
- Show understanding of Ethernet and how collisions are detected and avoided.
- Show understanding of bit streaming.
- Show understanding of the differences between the World Wide Web (WWW) and the internet.
- Describe the hardware that is used to support the internet.