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It's Important to Know!

BP205T — Computer Applications in Pharmacy

B.Pharm Semester 2 · Unit 1 — Number Systems and Information Systems

Unit I: Number Systems and Information Systems

Number systems

Computers represent information using bits. A bit has two possible values, commonly written as 0 and 1. A group of eight bits is a byte. Decimal uses base 10, binary uses base 2, octal uses base 8 and hexadecimal uses base 16.

To convert a binary number to decimal, multiply each bit by its positional power of two and add the results. To convert decimal to binary, repeatedly divide by two and read the remainders from bottom to top. Binary addition follows the rules 0 plus 0 equals 0, 0 plus 1 equals 1, 1 plus 0 equals 1 and 1 plus 1 equals 10.

One's complement changes every 0 to 1 and every 1 to 0. Two's complement is formed by taking the one's complement and adding one. Two's complement permits signed subtraction using binary addition. Overflow occurs when a result cannot be represented in the available number of bits.

Information systems and software

An information system combines people, procedures, hardware, software and data. Requirement analysis identifies what users need. Feasibility analysis checks whether a proposed system is technically, economically and operationally practical.

A data-flow diagram shows how data moves between processes, data stores and external entities. Input design decides how data is entered and validated. Output design decides how information is presented. A process specification describes the logic of a process in enough detail for implementation and testing.

The software life cycle includes planning, analysis, design, development, testing, implementation, maintenance and review. Documentation, access control, backups and change management help preserve data quality.

Unit I: Frequently asked questions

Q: Why are binary and hexadecimal systems used together?

A: Computers use binary internally, while hexadecimal provides a shorter human-readable representation because one hexadecimal digit represents four binary bits.

Q: What is a data-flow diagram?

A: It is a model showing how data enters a system, is processed, stored and transferred to outputs or other entities.

Q: What is feasibility analysis?

A: It is an early assessment of whether a proposed information system is practical from technical, economic and operational viewpoints.

Unit I: Key takeaways

- Binary is base 2, octal is base 8, decimal is base 10 and hexadecimal is base 16.
- One's complement inverts bits, while two's complement adds one after inversion.
- Information systems combine people, processes, technology and data.
- Data-flow diagrams show movement and processing of data.
- Software development follows a life cycle from planning to maintenance.

Unit I: Practical correlation

Practical correlation: dose conversion. A pharmacy information system may store quantities as integers, decimals or coded fields. A conversion error can change a calculated quantity, so input validation, unit labels and independent checking are essential.