Introduction to Systems

Short Questions

Q1. What is Systems Theory?
Systems Theory is a branch of science that deals with complicated structures in living organisms that relate the human with society and science.

Q2. What is a system?
A5. A system is a set of components that work together and communicate with each other to achieve an objective in a specific environment.

Q3. What is the objective of a system?
The objective of a system is a purpose or goal that it aims to achieve or fulfill.

Q4. What is meant by components of system?
Components are the building blocks of any system. Each components play a specific role and contribute to overall functionality of the system.

Q5. What is meant by environment of system?
The environment of system includes all external factors that affect the system operations.

Q6. How system interact with the environment?
All systems constantly interact with their environment through inputs and outputs. e.g, in a computing system, computer can interact and communicate with peripheral devices.

Q7. What is knowledge?
Knowledge is our understanding of various systems in the universe around and within us.

Q8. What is science?
Science is a systematic way to validate our understanding of systems.

Q9. What is natural science?
Natural science focuses on studying existing natural systems to understand their workings.

Q10. What is Design Science?
Design Science is focused on designing and creating new artificial systems or tool to achieve specific goals.

Q11. What is the nature of natural science?
The nature of natural science is descriptive, as it aims to understand and describe natural phenomena.

Q12. What is the nature of Design Science?
The nature of Design Science is prescriptive, meaning it aims to create and prescribe artificial systems.

Q13. What are the main steps in the Regulative Cycle?
The main steps are:
1. Problem Investigation/Identification
2. Solution Design
3. Solution Implementation
4. Solution Evaluation

Q14. What is Computer Science?
Computer Science is the study of how computers work and their limitations.

Q15. What are the two types of Computer Science?
1. Natural Science of Computer Science
2. Design Science of Computer Science

Q16. What does the Natural Science of Computer Science focus on?
It focuses on finding the basic rules that control how computer systems work.

Q17. What is studied in the Natural Science of Computer Science?
It involves studying algorithms and their characteristics.

Q18. What is meant by the Study of Algorithms?
It means analyzing existing algorithms to understand their efficiency and limitations.

Q19. What is the focus of Design Science of Computer Science?
It focuses on creating and improving computer tools and systems.

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Q20. What is the Von Neumann architecture?

It is a computer model that describes how a computer's hardware works together by using four specific components.

Q21. What are the four main components of the Von Neumann architecture?

The four components are the CPU, memory, input mechanisms, and output mechanisms.

Q22. What does the memory contain?

Memory contains both input data and instructions (programs) required for CPU processing.

Q23. What is meant by CPU?

CPU stands for central processing unit execute all commands provided by memory and control all activities of computer system.

Q24. What are the two main components of the CPU?

Arithmetic Logic Unit (ALU) and the Control Unit (CU).

Q25. What is the difference between Arithmetic Logic Unit (ALU) & Control Unit (CU)?

ALU	CU
The ALU performs mathematical computations and logical operations.	The CU controls the activities of the CPU and supervises the execution of program instructions.

Q26. What are input devices? Give example.

Input devices are used to enter data and instructions into the computer. e.g. keyboard and mouse.

Q27. What are output devices? Give example.

Output devices display or communicate the results of processed data. e.g. monitor and printer.

Q28. What is a system bus?

A system bus is a communication path or lines used to transfer data between computer components. A system bus has three types. Data Bus, Address Bus, and Control Bus.

Q29. What does the Data Bus do?

It transports data between components.

Q30. What does the Address Bus do?

It carries address of destination information.

Q31. What does the Control Bus do?

It transports control electrical signals.

Q32. What are the three main stages of the Von Neumann cycle?

Fetching, Decoding, and Execution.

Q33. What happens during the Fetching stage?

The CPU retrieves an instruction from the computer's memory.

Q34. Which components are involved in Fetching?

Memory, CPU, Program Counter (PC), and Instruction Register (IR).

Q35. What is the function of the Program Counter (PC)?

It stores the memory address of the next instruction to be executed.

Q36. What happens during the decoding stage?

Control unit (CU) decodes the operation code of instruction and determines what action is needed.

Q37. What happens during the Execution stage?

The CPU performs the instruction using the Arithmetic Logic Unit (ALU) and transferring data between several components are managed by CU.

Q39. What happens in the Storing stage?

The result of the computation is sent to memory or an output device.

Q40. What are the key Characteristics of the Von Neumann Architecture?

Key characteristics are Single Memory Store, Sequential Execution and Stored program concept.

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Short Questions

Q41. What is the means of single memory store?

Both program instructions and data are stored in the same memory. e.g. in a computer game, both the game code and data (like scores) are stored in the same RAM.

Q42. What is the means of Sequential Execution in Von Neumann Architecture?

Instructions are executed one after another in order written in computer program.

Q43. What is the means of Sequential Execution in Von Neumann Architecture?

Programs are stored in memory and can be changed by the computer.

Q44. What are the advantages of Von Neumann Architecture?

1. By combining instructions and data into single memory become simplified architecture.
2. Program can be easily changed by changing memory contents.

Q45. What are the disadvantages of Von Neumann Architecture?

1. Von Neumann bottleneck occurs when single memory area limits the CPU's ability.
2. Same area of memory are used for both data and instructions so one program instruction can alter another program instruction.