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**AN AUTONOMOUS INSTITUTION**



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**Serial Communication**

**1. What is the primary purpose of serial communication in the context of a 5x5 sliding puzzle embedded system?**

- a) To display the puzzle on an LCD
- b) To send puzzle data between the embedded system and a host computer
- c) To control the movement of tiles in the puzzle
- d) To generate random puzzle configurations

**Answer:** b) To send puzzle data between the embedded system and a host computer

**2. Which serial communication protocol is commonly used in embedded systems to communicate with other devices?**

- a) I2C
- b) SPI
- c) UART
- d) CAN

**Answer:** c) UART

**3. What type of data format is typically used to represent the state of the 5x5 sliding puzzle over a serial connection?**

- a) CSV (Comma-Separated Values)
- b) JSON (JavaScript Object Notation)
- c) Binary format
- d) XML (eXtensible Markup Language)

**Answer:** c) Binary format

**4. Which of the following is a common configuration parameter for UART serial communication?**

- a) Baud rate
- b) Frame rate
- c) Packet size
- d) Bit depth

**Answer:** a) Baud rate

**5. How does serial communication handle the transmission of the 5x5 puzzle state from an embedded system to a PC?**

- a) By sending the entire puzzle state as a single block of data
- b) By sending individual tiles one at a time
- c) By sending data in packets with a predefined structure
- d) By using a wireless protocol

**Answer:** c) By sending data in packets with a predefined structure

**6. In serial communication, what does the term "baud rate" refer to?**

- a) The maximum number of bytes that can be transmitted per second
- b) The speed at which data is transmitted over the serial line
- c) The size of the data packets
- d) The error-checking mechanism used

**Answer:** b) The speed at which data is transmitted over the serial line

**7. What is a common method for ensuring data integrity during serial communication of the puzzle state?**

- a) Using error correction codes
- b) Increasing the baud rate

- c) Reducing the packet size
- d) Using compression algorithms

**Answer:** a) Using error correction codes

**8. Which part of the serial communication process would you configure to match the baud rate of a 5x5 sliding puzzle embedded system with a PC?**

- a) The serial port settings on both devices
- b) The data encoding scheme
- c) The error-checking algorithm
- d) The puzzle-solving algorithm

**Answer:** a) The serial port settings on both devices

**9. What does the “handshake” process in serial communication ensure?**

- a) The data is transmitted without errors
- b) The devices are ready to send and receive data
- c) The data is compressed before transmission
- d) The devices are synchronized to the same clock

**Answer:** b) The devices are ready to send and receive data

**10. In the context of serial communication, what is the function of "start" and "stop" bits?**

- a) To delimit the beginning and end of a data packet
- b) To indicate the start and stop of the data transmission session
- c) To provide error correction for the transmitted data
- d) To synchronize the baud rate between devices

**Answer:** a) To delimit the beginning and end of a data packet

**11. How can you implement a command to shuffle the tiles in the 5x5 sliding puzzle via serial communication?**

- a) Send a specific command code to the embedded system
- b) Send the entire state of the puzzle to the host system
- c) Modify the baud rate settings
- d) Send the puzzle-solving algorithm over the serial line

**Answer:** a) Send a specific command code to the embedded system

**12. What is the role of the parity bit in serial communication?**

- a) To check for errors in the transmitted data
- b) To determine the baud rate
- c) To compress the data for faster transmission
- d) To synchronize the clock between devices

**Answer:** a) To check for errors in the transmitted data

**13. How can you handle data loss or corruption during serial transmission of the puzzle state?**

- a) Implement data retransmission protocols
- b) Increase the baud rate
- c) Use a different serial communication protocol
- d) Avoid sending large amounts of data

**Answer:** a) Implement data retransmission protocols

**14. What is a typical method to synchronize the start and end of data frames in serial communication?**

- a) Use specific start and stop bits
- b) Implement a header and footer for each data frame
- c) Adjust the baud rate dynamically
- d) Use a checksum for error detection

**Answer:** b) Implement a header and footer for each data frame

**15. How do you typically indicate the end of a data transmission session in serial communication?**

- a) Sending a specific end-of-transmission character
- b) Adjusting the parity bit
- c) Reconfiguring the baud rate
- d) Sending a start bit

**Answer:** a) Sending a specific end-of-transmission character

**16. What is a common approach to control tile movements in a 5x5 sliding puzzle via serial communication?**

- a) Send movement commands to the embedded system
- b) Transmit the entire puzzle state to be updated
- c) Adjust the system's internal clock
- d) Use a graphical user interface (GUI) for control

**Answer:** a) Send movement commands to the embedded system

**17. What is the benefit of using a checksum in serial communication for the 5x5 sliding puzzle?**

- a) To verify the integrity of the transmitted data
- b) To increase the transmission speed
- c) To compress the data for efficiency
- d) To handle high-resolution graphics

**Answer:** a) To verify the integrity of the transmitted data

**18. Which serial communication setting would you adjust to troubleshoot data transmission issues?**

- a) Baud rate

- b) Data frame size
- c) Start bit length
- d) End bit length

**Answer:** a) Baud rate

**19. How can you verify that the embedded system correctly received and processed a command sent over serial communication?**

- a) Implement an acknowledgment response from the embedded system
- b) Increase the data transmission rate
- c) Use a different serial communication protocol
- d) Ensure the command is formatted correctly

**Answer:** a) Implement an acknowledgment response from the embedded system

**20. What kind of data might be included in a command packet sent to the embedded system to manipulate the puzzle?**

- a) Command code, tile position, and movement direction
- b) Puzzle-solving algorithm and display settings
- c) Baud rate and parity settings
- d) Memory address and configuration data

**Answer:** a) Command code, tile position, and movement direction

**21. When implementing serial communication for a 5x5 sliding puzzle, what is a key consideration for data synchronization?**

- a) Consistent baud rate across devices
- b) Size of the puzzle display
- c) Color depth of the display
- d) Frequency of screen refreshes

**Answer:** a) Consistent baud rate across devices

**22. In serial communication, what is the significance of data framing?**

- a) It allows for the organization and interpretation of data packets
- b) It increases the data transmission speed
- c) It manages the synchronization of the clock
- d) It compresses the data for efficient transmission

**Answer:** a) It allows for the organization and interpretation of data packets

**23. What type of serial communication error can occur if the baud rates are mismatched between devices?**

- a) Data corruption or loss
- b) Increased power consumption
- c) Hardware damage
- d) Display flickering

**Answer:** a) Data corruption or loss

**24. Which device component is responsible for converting parallel data to serial data in a serial communication setup?**

- a) UART (Universal Asynchronous Receiver/Transmitter)
- b) Microcontroller
- c) EEPROM
- d) Display controller

**Answer:** a) UART (Universal Asynchronous Receiver/Transmitter)

**25. How can you ensure that the puzzle state data sent over serial communication is both reliable and efficient?**

- a) Use a well-defined data packet structure with error checking
- b) Increase the baud rate to the maximum
- c) Compress the data excessively

d) Reduce the frequency of data transmission

**Answer:** a) Use a well-defined data packet structure with error checking