EXPERIMENT – 10

IMPLEMENTATION OF INFORMATION TRANSMISSION SYSTEM

Aim: To design a simplex 4- bit common bus system and verify the operation using Logisim.

Tools Required: Logisim

Components/devices can be used: Registers, Multiplexer, Demultiplexer, D- Flip flops.

Need and purpose:

A system bus can transfer data using both parallel and bit serial connections, between components inside a computer and also, between computers. Serial buses can be operated at higher speed in comparison with parallel buses. Examples of serial buses include USB, Fire wire, serial ATA etc., whereas parallel buses constitute high performance parallel interface (HIPPI), general purpose Interface bus (GPIB) and Hewlett-Packard Instrumentation bus (HPIB).

The bus which connects all the internal components of a computer such a CPU, memory to the motherboard is called internal bus. For faster transfer of data within the system to perform computer operations internal buses will be used. The bus which is used to connect external devices such as printer, monitor, data card etc., which consists of electronic pathways in between interconnects is called as external bus.

Pre-Lab:

1. What is the purpose of a simplex 4-bit common bus system?

The purpose of a simplex 4-bit common bus system is to facilitate communication between different components within a computer system or between multiple computer systems. It serves as a means of transferring data, allowing these components to exchange information efficiently.

2. Differentiate between parallel and serial buses.

Parallel buses transfer multiple bits simultaneously, typically using multiple data lines. Serial buses transmit data sequentially, one bit at a time, over a single data line. Serial buses are often preferred for their higher speed and efficiency over longer distances.

3. Provide examples of serial and parallel buses used in computing.

Examples of serial buses include USB (Universal Serial Bus), FireWire, and SATA (Serial ATA). Parallel buses include HIPPI (High-Performance Parallel Interface), GPIB (General Purpose Interface Bus), and HPIB (Hewlett-Packard Instrumentation Bus).

4. What is the function of an internal bus in a computer system?

The internal bus connects various components within a computer system, such as the CPU, memory, and peripherals, to the motherboard. It facilitates the exchange of data between these components, enabling the execution of computer operations.

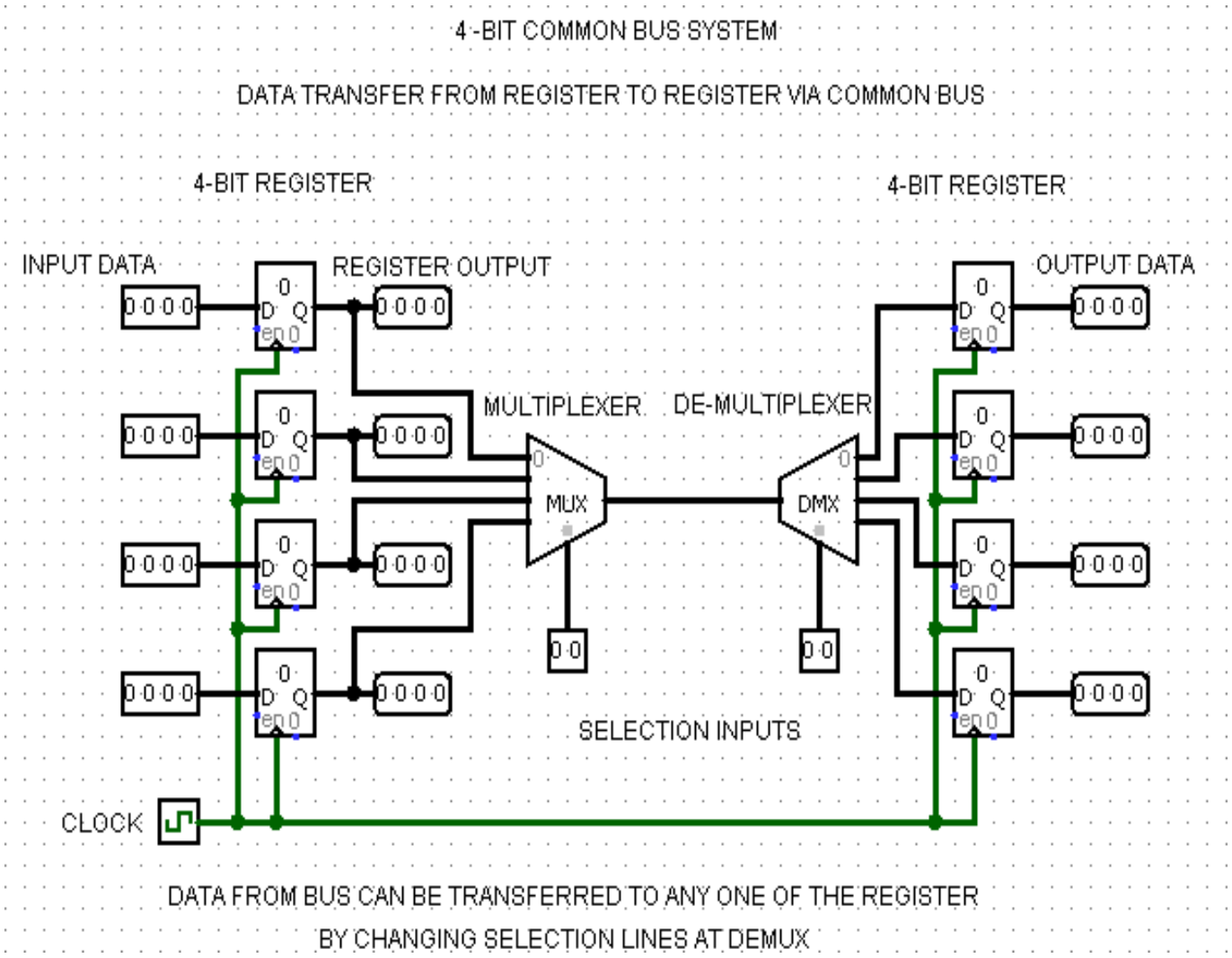
5. Explain the significance of using internal buses for data transfer within a computer system.

Internal buses enable faster data transfer within a computer system, which is essential for the efficient performance of computational tasks. By providing electronic pathways for data transmission, internal buses help optimize the flow of information between different hardware components.

6. Describe the role of an external bus in a computer system.

External buses connect external devices, such as printers, monitors, and data cards, to the computer system. These buses facilitate communication between the computer and peripheral devices, allowing for data exchange and interaction with the external environment.

Circuit Diagram:



Procedure:

1. Analyze the given model diagram and use the required modules/units in logisim.
2. Connect them accordingly to implement the data transfer action between the connected modules.

3. Verify the data transmitted to the required unit through the implemented bus structure.

Viva Questions and answers:

1. Can you explain what a simplex 4-bit common bus system is and how it differs from other types of bus systems?
2. What are the advantages of using a simplex 4-bit common bus system over other configurations for data transmission within a computer system?
3. How does the design of a simplex 4-bit common bus system facilitate communication between different components in a computer system?
4. What is the significance of verifying the operation of the simplex 4-bit common bus system using Logisim?
5. Describe the role of parallel and serial buses in data transmission. How do they differ in terms of speed and efficiency?

Result: The experiment successfully demonstrated the construction and operation of a simplex 4- bit common bus system using Logisim.