Practical No. 8

Title: Finding the Largest of Two 8-bit Numbers

Objective: To compare two 8-bit numbers and determine the largest among them using a microprocessor/microcontroller.

Theory:

Comparison of two 8-bit numbers is a fundamental operation in digital systems and microprocessors. The process involves:

- **Subtracting** one number from the other.
- **Checking the flags** (such as the Carry Flag and Zero Flag) to determine the result.

Flag-Based Decision Making:

- If **A - B results in a positive value**, A is greater than B.
- If **A - B results in zero**, both numbers are equal.
- If **A - B results in a negative value**, B is greater than A.

Example:

If **A = 11010110 (214 in decimal)** and **B = 01101100 (108 in decimal)**, Since **A > B**, A is the largest number.

Materials/Tools Required:

- Microprocessor/microcontroller (e.g., 8085/8051)
- Assembler/Simulator
- Computer system with programming software
- Binary calculator (optional)

Procedure:

1. **Initialize Registers**: Load the first 8-bit number into the A register.
2. **Load the Second Number**: Store the second 8-bit number in another register (e.g., B register).
3. **Perform Subtraction**: Subtract the second number (B) from the first (A).
4. **Check the Carry Flag (CY)**:
   o If **CY = 0**, A is greater than or equal to B.
   o If **CY = 1**, B is greater than A.
5. **Store the Largest Number**: Store the larger number in a register or display it on an output device.

Observations:

- The largest number is identified based on flag status after subtraction.
- If both numbers are equal, the Zero Flag (Z) is set.

- The Carry Flag helps determine whether the second number is greater.

Conclusion:

The largest of two 8-bit numbers is successfully determined using subtraction and flag checking. This method is useful for decision-making operations in microprocessors.

Applications:

1. Used in sorting and comparison algorithms in digital systems.

2. Essential in arithmetic and logical decision-making in microprocessors.

3. Applied in real-time embedded systems for data comparison.