An air conditioner works by transferring heat from the inside of a room to the outside, thereby cooling the indoor environment. The process involves several key components and steps:

1. **Evaporator Coil**: Located inside the indoor unit, the evaporator coil absorbs heat from the indoor air. The air passes over the coil, and the refrigerant inside the coil absorbs the heat, causing the refrigerant to evaporate and turn into a low-pressure gas.

2. **Compressor**: The compressor, located in the outdoor unit, receives the low-pressure gas from the evaporator coil. It compresses this gas, increasing its pressure and temperature. The high-pressure, high-temperature gas is then sent to the condenser coil.

3. **Condenser Coil**: The condenser coil, also in the outdoor unit, releases the heat absorbed from the indoor air to the outside. The high-pressure gas passes through the coil, and as it cools, it condenses back into a liquid state, releasing heat in the process. The condenser coil is cooled by a fan that blows air over the coil.

4. **Expansion Valve**: After the refrigerant has condensed into a liquid, it passes through an expansion valve. This valve reduces the pressure of the refrigerant, causing it to cool down rapidly before it returns to the evaporator coil.

5. **Fan (Ventilator)**: There are fans in both the indoor and outdoor units. The indoor fan circulates air over the evaporator coil, cooling the indoor air. The outdoor fan blows air over the condenser coil to dissipate the absorbed heat to the outside environment.

6. **Thermostat and Control System**: The thermostat measures the room temperature and controls the operation of the air conditioner. When the room temperature reaches the desired level, the thermostat signals the air conditioner to stop cooling. When the temperature rises above the set point, the thermostat triggers the air conditioner to start cooling again.

The process involves a continuous cycle of refrigerant flowing through the system, absorbing heat from inside the room and releasing it outside, thereby cooling the indoor air. The control logic ensures that the air conditioner operates efficiently and maintains the desired temperature.

Control Logic in an Air Conditioner

1. **Reading the Current Temperature**: A sensor (thermistor or thermostat) measures the room temperature.
2. **Comparing the Temperature**: The measured temperature is compared with the set temperature.
3. **Activating Components**: Based on the comparison:
   - If the room temperature is higher than the set temperature, the compressor and indoor fan are activated to start the cooling process.
   - If the room temperature is lower than the set temperature, the system might go into standby mode, and the compressor is turned off.
4. **Fan Control**: The fan (ventilator) can be controlled independently to circulate air even when the cooling is not active, ensuring air movement and maintaining consistent room temperature.
5. **Safety and Efficiency**: The control system includes safety features to prevent overheating and ensures efficient operation by cycling the compressor and fan as needed.

In an assembly language simulation, these operations can be represented by reading user input (simulated temperature), comparing it with thresholds, and activating or deactivating components accordingly.