

# 45 Lecture - CS302

## Important Subjective

### 1. What is an analog-to-digital converter?

An analog-to-digital converter is a device that converts analog signals into digital signals.

### What is successive-approximation ADC?

Successive-approximation ADC is a type of analog-to-digital converter that uses a binary search algorithm to convert analog signals to digital signals.

### What is the main advantage of successive-approximation ADC over other types of ADCs?

Successive-approximation ADC has high resolution, low power consumption, and fast conversion speed.

### How does a successive-approximation ADC work?

The successive-approximation ADC works by comparing the input analog signal with a reference voltage using a binary search algorithm. It starts by comparing the input signal with the midpoint of the reference voltage and then divides the reference voltage in half depending on whether the input signal is greater or less than the midpoint. This process is repeated until the digital output is obtained.

### What is the resolution of a successive-approximation ADC?

The resolution of a successive-approximation ADC is determined by the number of bits used in the conversion process. For example, an 8-bit successive-approximation ADC can represent 256 discrete levels.

### What is the maximum sampling rate of a successive-approximation ADC?

The maximum sampling rate of a successive-approximation ADC depends on the clock speed and the number of bits used in the conversion process.

### What is the advantage of using a capacitor array in a successive-approximation ADC?

A capacitor array can be used in a successive-approximation ADC to reduce the conversion time by allowing multiple samples to be taken simultaneously.

### What are the common applications of successive-approximation ADC?

Successive-approximation ADCs are commonly used in digital oscilloscopes, data acquisition systems, medical instruments, and other applications that require high-speed, high-resolution analog-to-digital conversion.

### What are the limitations of successive-approximation ADC?

Successive-approximation ADC has limited accuracy due to its inherent nonlinearity and may require calibration to achieve optimal performance.

### What are the main components of a successive-approximation ADC?

The main components of a successive-approximation ADC include a sample and hold circuit, a

comparator, a digital-to-analog converter, and a control logic circuit.