

<b>n-bit</b>	<b>Number of steps</b>	<b>Step Size</b>
<b>8-bit</b>	<b>256</b>	$5\text{v} / 256 = 19.53\text{mV}$
<b>10-bit</b>	<b>1024</b>	$5\text{v} / 1024 = 4.88\text{mV}$
<b>12-bit</b>	<b>4096</b>	$5\text{v} / 4096 = 1.2\text{mV}$
<b>16-bit</b>	<b>65,536</b>	$5\text{v} / 65,536 = 0.076\text{mV}$

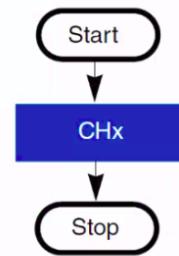
*Taking  $V_{ref}$  as 5V*

## ADC Independent Modes

- Single-channel, single conversion mode
- Multichannel(scan), single conversion mode
- Single-channel continuous conversion mode
- Multichannel continuous conversion mode
- Injected continuous conversion mode

## Single-channel, single conversion mode

- Simplest ADC mode
- ADC performs a single conversion of a single channel x and stops after conversion is complete



### Example use case

*Measurement of voltage level to determine if a system should be started on not*

## Multichannel, single conversion mode

- Used to convert multiple channels successively
- Up to 16 different channels with different sampling times can be converted on the stm32f4

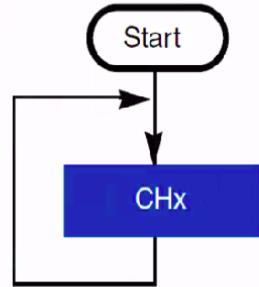


### Example use case

*Measurement of multiple sensors to determine whether a system should start or not.*

## Single-channel, continuous conversion mode

- Used to convert a single channel continuously
- Works in the background without intervention from the CPU

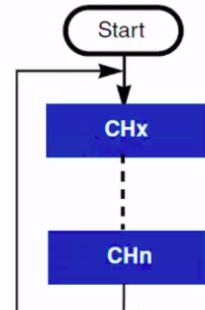


Example use case

*Measurement of room temperature continuous to adjust air-conditioner*

## Multichannel, continuous conversion mode

- Used to convert multiple channels continuously
- Up to 16 different channels with different sampling times can be converted on the stm32f4



Example use case

*Continuously measuring multiple accelerometers to adjust joints of a robotic arm.*

# Injected conversion mode

- Intended for use when conversion is triggered by an external event or by software.
- The injected group has priority over the regular channel group.
- Interrupts the conversion of the current channel in the regular channel group.

