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BY AMLENTRA ([HTTPS://ATICLEWORLD.COM/AUTHOR/PRITOSH/](https://ATICLEWORLD.COM/AUTHOR/PRITOSH/)) ON ([HTTPS://ATICLEWORLD.COM/%2Fwww.pluralsight.com%2Fcourses%2Fpython-%2FDIFFERENCE-BETWEEN-I2C-AND-SPI/](https://ATICLEWORLD.COM/%2Fwww.pluralsight.com%2Fcourses%2Fpython-%2FDIFFERENCE-BETWEEN-I2C-AND-SPI/))  
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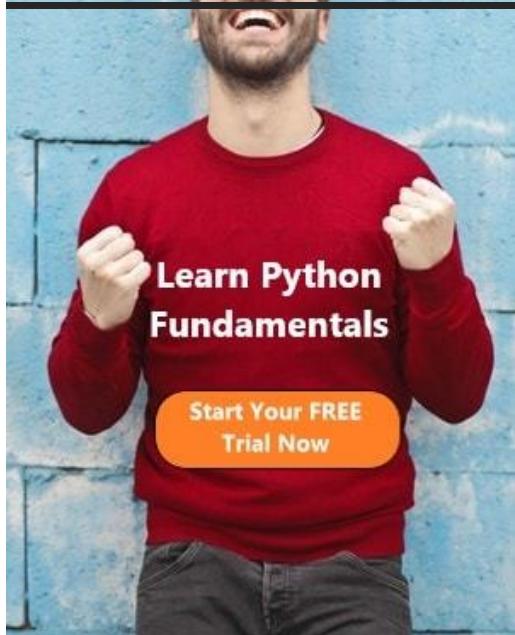
There is a lot of serial communication protocol but in which I2C and SPI are very famous, In this article, I will discuss the difference between I2C and SPI ( I2C vs SPI ).

I2C and SPI are both bus protocol to allow the user for short-distance serial data transfer. I2C is two wire communication which made by the Philips (Nowadays NXP)

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laptops to control the peripheral like power devices, input device etc.

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Additionally, an I2C bus is used in the various control architecture, for example, SMBus (%2Fwww.pluralsight.com%2Fcourses%2Fpython-fundamentals)  
(System Management Bus), PMBus (Power Management Bus), IPMI (Intelligent Platform Management Interface) etc.

tocol. It provides the good support to the slow ADC, and RTC etc. I2C are not only used with the single external components which have connected with

unication protocol. It uses only two wire for the e is used for the data (SDA) and other wire is used for

al, which means master able to send and receive the is controlled by the master but in some situations clock signal, but we will discuss it later.

To know the I2C in detail see this article: [Understanding of I2C Protocol.](https://aticleworld.com/i2c-bus-protocol-and-interface/)

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## What is SPI?

The serial peripheral interface is four wire-based full duplex communication protocol these wire generally known as MOSI (master out slave in), MISO (master in slave out), SCL (a serial clock which produces by the master) and SS (slave select line which use to select specific slave during the communication).

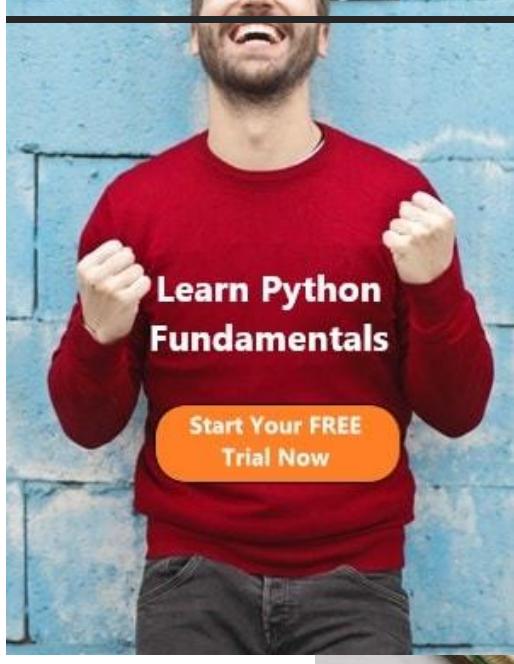
SPI follows the master and slave architecture and communication is always started by the master. It is also an asynchronous communication protocol because the clock is shared by master and slave.

SPI is supported only multi-slave does not support multi-master and slave are selected by the slave select signal. In SPI during the communication data is shifted through the slave select pin via a shift register.

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scratch, you should follow this course "[Mastering Driver Development](#) (<https://click.linksynergy.com/deeplink?id=UajS5soDmWY&mid=39197&murl=https%3A%2F%2Fwww.udemy.com%2Fmastering-microcontroller-with-peripheral-driver-development%2F>)



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In the embedded system, I2C and SPI both play an important role. Both communication protocols are the example of synchronous communication but still, both have some important difference. In below table, I have pointed some common difference between SPI and I2C ( SPI vs I2C ).

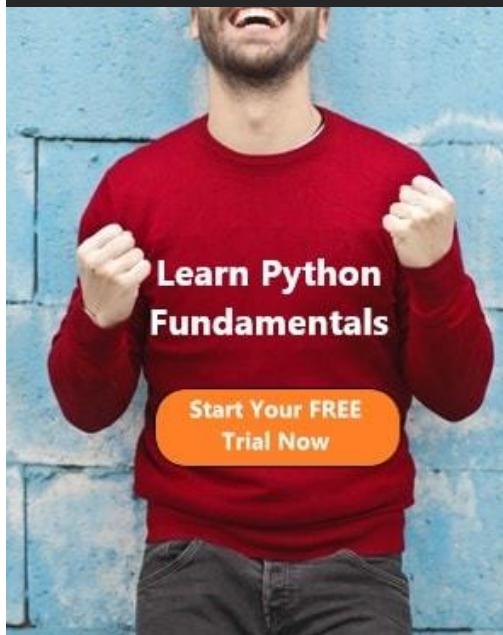
The important difference between I2C and SPI (I2C vs SPI) communication protocol.

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I2C has the feature of clock stretching, that means if the slave cannot able to send fast data as fast enough then it suppresses the clock to stop the communication.

SPI can be multi-slave but does not a multi-master serial protocol, that means there can be only one master attached to SPI bus.

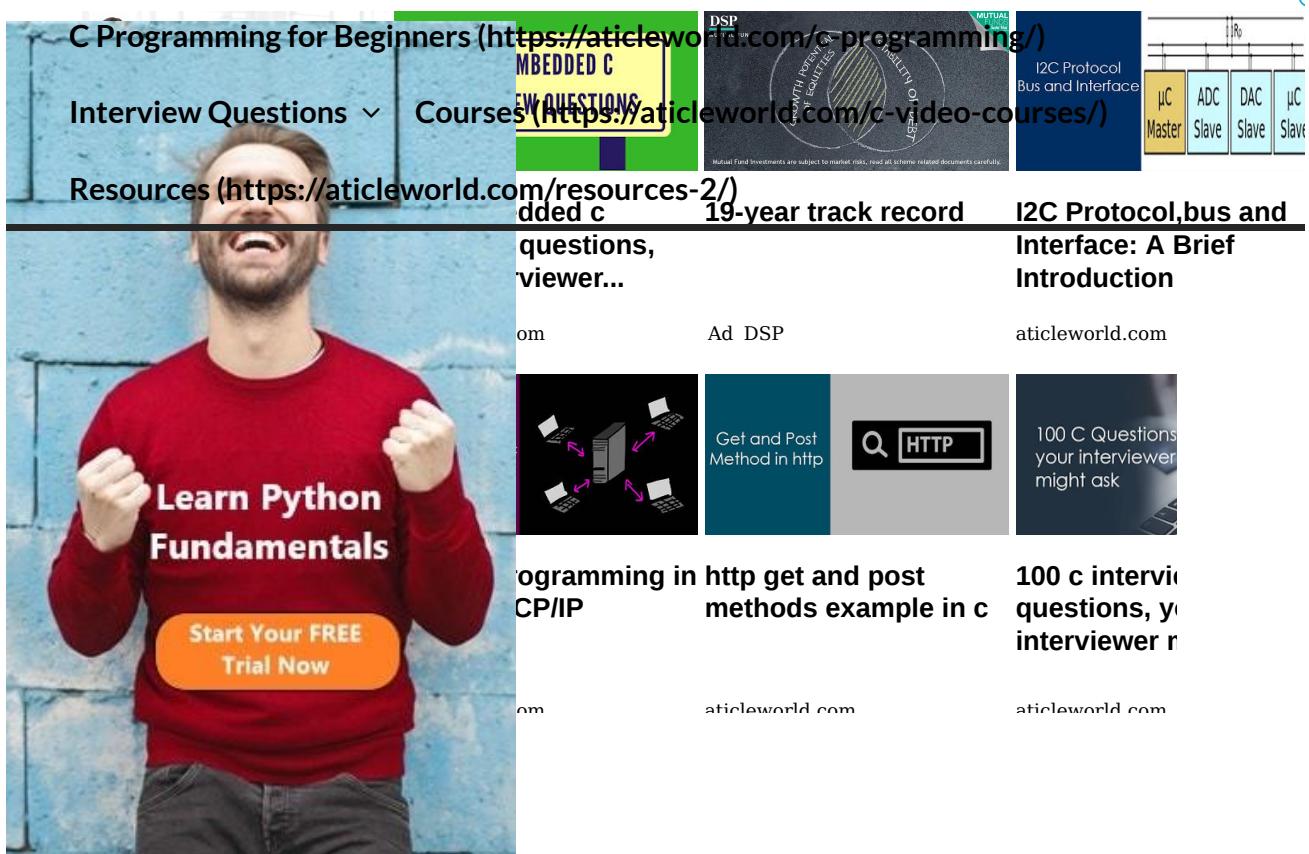
SPI is a full duplex communication protocol.

I2C is used only two wire for the communication, one wire is used for the data and the second wire is used for the clock.

Clock stretching is not the feature of SPI.

SPI needs three or four wire for communication ((depends on requirement), MOSI, MISO, SCL and Chip-select pin).

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About Amlendra (<https://aticleworld.com/author/pritosh/>)

I am an embedded c software engineer and a corporate trainer, currently, I am working as senior software engineer in a largest Software consulting company . I have working experience of different microcontrollers (stm32, LPC, PIC AVR and 8051), drivers (USB and virtual com-port), POS device (VeriFone) and payment gateway (global and first data).

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**Amlendra**

MARCH 19, 2018 AT 8:04 AM (HTTPS://ATICLEWORLD.COM/DIFFERENCE-BETWEEN-I2C-AND-SPI/#COMMENT-794)

I2C is quite involved, supporting multiple masters on the bus. Which causes significant overhead in the bus protocol, an ACK for every byte and intentional delays to arbitrate access to the bus. Also a set maximum bus rate, 100 kHz in the original spec, 400 kHz is common today, additional 10 kHz low-speed and 3.4 Mhz high-speed modes, the 2012 spec defines a 5 Mhz ultra-fast mode.

SPI is much simpler, a single master with no bus protocol beyond a chip select and no set maximum bus rate. If the distances are short then you can go as fast as you dare. Quite fast on an interconnect between chips that are less than an inch apart.

Ref:<https://stackoverflow.com/questions/21848629/what-makes-spi-faster-than-i2c-protocol>

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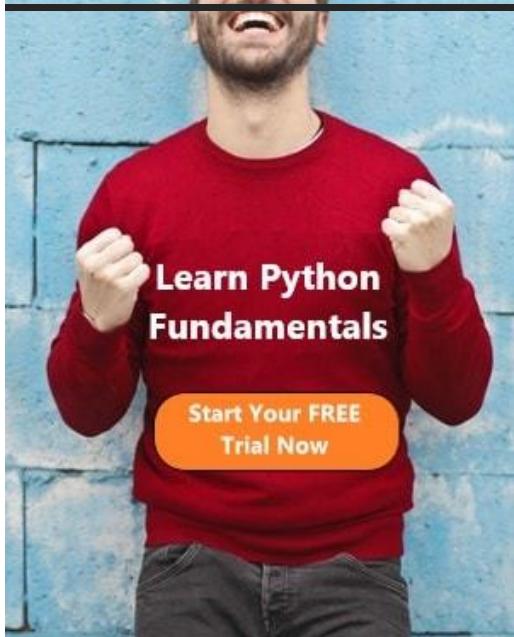
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JULY 29, 2018 AT 11:22 PM (HTTPS://ATICLEWORLD.COM/DIFFERENCE-BETWEEN-I2C-AND-SPI/#COMMENT-1047)

I will publish article related to SPI protocol.I had published some articles on I2C bus protocol. If you want, you can see:<https://aticleworld.com/i2c-bus-protocol-and-interface/>

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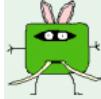
**Amlendra (<https://aticleworld.com/>)**

JULY 30, 2018 AT 11:46 PM (HTTPS://ATICLEWORLD.COM/DIFFERENCE-BETWEEN-I2C-AND-SPI/#COMMENT-1048)

Thanks, Raja.

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**Sam**

OCTOBER 2, 2018 AT 10:57 AM (HTTPS://ATICLEWORLD.COM/DIFFERENCE-BETWEEN-I2C-AND-SPI/#COMMENT-1186)

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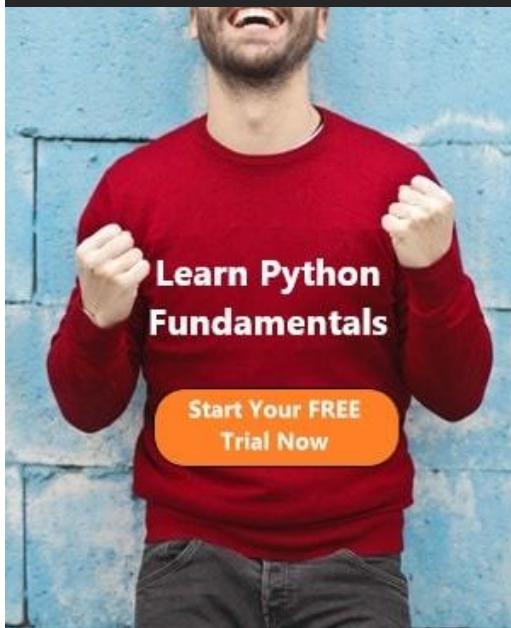
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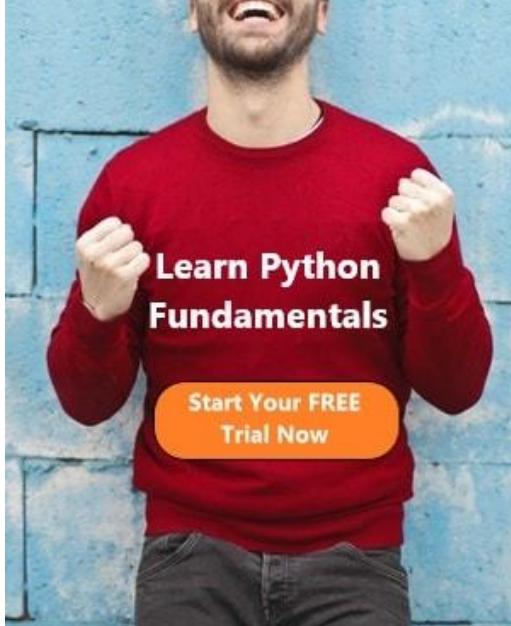
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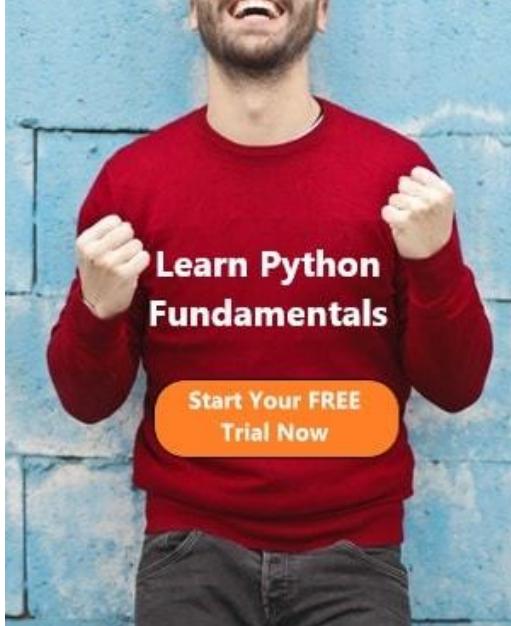
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