

3/2/2021

HNC/HND in electrical and electronic engineering
Micro peripherals and Interfaces

1a) ALU - Arithmetic logic unit performs arithmetic and logical functions on binary units

The program counter is a 13 bit register that is designed to keep track of the programs being run.

TAISA is a special function register that is used to control PORTA pins.

b) Some ASM commands take longer than others as a result of the file ^{size} ~~time~~ where larger files may take longer than others

c) They have a much lower ~~percentage~~ of power consumption than micro controllers, giving them an advantage. However as a disadvantage the program memory is inaccessible and only one accumulator is present.

d)

- 2) a) A stack is used to store and retrieve return addresses during function calls.
- b) Subroutines are ~~independent~~ ^{smaller} sections of code that are written within a larger program. They can be used to repeat functions if certain conditions aren't met. They can be used to test and ~~debug~~ ^{debug} programs and can be used to change the end result of a program depending on certain outcomes. For example, ~~yes~~ or No.
- c) An example of an external hardware interrupt is a keyboard, where if you press a key such as 'a' the program will be interrupted and will either display 'a' or carry out another program if you set 'a' to perform it.

- 3) a) If it's not connected properly it can cause a memory fail and if there is any fault in either the circuit or the chip itself it can cause a voltage drop.

b)

c) Since a mechanical switch physically reconnects the circuit ~~if~~ if it were to get damaged the circuit would either be ~~unable~~ unable to turn on or turn off. If it were unable to turn off it ~~may~~ may damage the microprocessor from overuse.

d)

4/a) The memory would be connected to the Address bus, data bus and ~~memory~~ control bus with a connection to the microprocessor

c) The von Architecture has program data and instruction data stored in the same memory, while the Harvard Architecture has separate storage and buses for instructions and data.

5) a) Direct memory access is the method that allows an input/output device to send and receive data via the use of buses. An address bus carries memory to components such as storage and input/output devices and is unidirectional.

The Data carries data between the processor and other components and unlike the address bus it's bidirectional. The control bus carries control signals by the use of clock pulses from the processor to the other components. The control bus is unidirectional, same as the address bus.

b) ~~The I²C can be multi-master and multi-slave allowing it to have more than one master and slave attached to the bus. It is a synchronous system where data is sent in blocks with no gaps between data. An Asynchronous transaction sends its~~

In a Synchronous system data is sent in the form of blocks with no gaps between data, while an Asynchronous system sends data in the form of bytes with gaps between data.

c) An I²C can be multi-master and multi-slave allowing it to have more than one master and slave attached to the bus while a SPI can be multi-slave but can only have one master attached to the SPI bus.

d) ~~At~~ At the start of the transfer the SDA line switches from a high voltage to a low voltage and the SCL line also switches from high to low. At the end of the transfer both lines switch back from low voltage to high.