

Boolean logic

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1. Why is Boolean algebra important in computing?

Es importante debido a su fácil utilización en circuitos electrónicos.

2. Complete the following truth tables of these two inputs AND, OR and XOR ports:

a) AND logical operation:

A B F

0 0 0

0 1 0

1 0 0

1 1 1

b) OR logical operation:

A B F

0 0 0

0 1 1

1 0 1

1 1 1

a) XOR logical operation:

A B F

0 0 0

0 1 1

1 0 1

1 1 0

3. How many bits are needed to encode the entire alphabet, numbers, and ASCII characters?

Se necesitan solamente 7 bits para codificar todo.

4. Use the ASCII–binary converter at this link to find out how “Hello” can be expressed in binary code using ASCII.

01001000 01100101 01101100 01101100 01101111

5. How can you express these decimal numbers in binary code?

5 → 00110101

22 → 00110010 00110010

192 → 00110001 00111001 00110010

2025 → 00110010 00110000 00110010 00110101

6. Express exercise five decimal numbers in Octal and Hexadecimal bases.

OCTAL:

5 → 5

22 → 26

192 → 300

2025 → 3751

HEXADECIMAL:

5 → 5

22 → 16

192 → C0

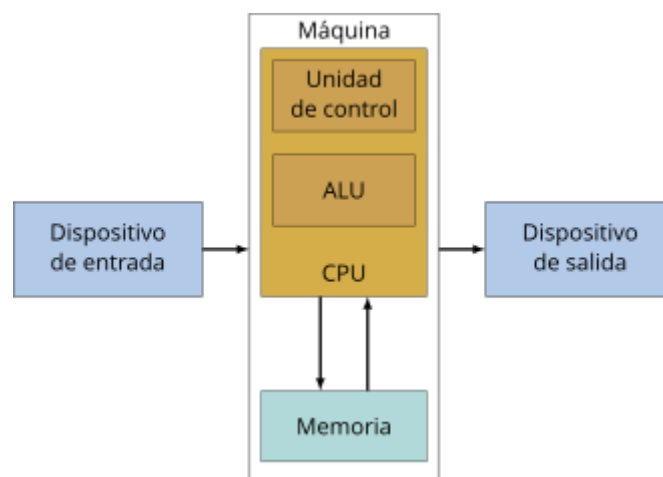
2025 → 7E9

7. What are the five fundamental components of the John von Neumann architecture?

La memoria, ALU, UC, Entrada y Salida y el bus del sistema.

Make a connected diagram of the different parts of it.

La UC recibe la instrucción y la decodifica, luego obtiene los datos necesarios de la memoria o lo recibe de la entrada y se la pasa a la ALU generando un resultado, después se almacena o da la salida y todo esto se realiza mediante bus que serían los conectores entre ellos.



8. What is a core in a microprocessor?

Un núcleo es una unidad de procesamiento independiente a la CPU que funciona de manera autónoma funcionando como un mini procesador dentro del chip de la CPU.

9. What is the main function of the Control Unit in a core processor?

La función principal del UC es coordinar y dirigir la ejecución de instrucciones en el núcleo, actuando como un cerebro que busca, decodifica y gestiona el flujo de datos.

10. What is an ALU and why is an ALU so important in a core processor?

Es un circuito fundamental de los núcleos porque sirve para realizar operaciones aritméticas y lógicas.

11. What are the registers in a microprocessor? Name at least two registers in the UC, three in the ALU and two located in the Main Memory

Son pequeñas unidades de memoria de alta velocidad y baja capacidad que sirve para almacenamiento temporal. Un registro de UC son el IR (Registro de Instrucciones) y PC (contador de programas), En la ALU hay registro de estado, registro de Acumulador y registro de Propósito general (GPRs) y en la memoria son el registro de acumulador AC y registro de estado.

12. What are the two phases a processor performs when executing an instruction?

Primero realiza la búsqueda (fetch) donde se recupera la instrucción de la memoria y después la fase de la ejecución que son las operaciones necesarias de datos.

13. Visit this link about this processor Intel Core i7 14700KF and answer these questions:

- a) Number of cores: 20
- b) Maximum operating frequency: 5.6 GHz
- c) Maximum working temperature the cores can support: 100 °C
- d) Maximum Power consumption of all cores when they are fully working: 253 W
- e) What is the maximum cache memory this processor has?

El caché 33MB y el cache L2 28MB

- f) What is the maximum of RAM memory can be installed with this processor?

192 GB

- g) What is the the lithography of this processor?

Usa tecnología intel 7 que aproximadamente sería de 10 nm reales de los transistores.

- h) What type of socket is necessary to fit this processor? Find a suitable motherboard for this processor in PC-Componentes. What is the chipset of this motherboard?

El Zócalo compatible del procesador seria de FCLGA1700, una placa base compatible seria la MSI MAG Z790 TOMAHAWK WIFI con un chipset de Z790