Explain the design of arithmetic and logic unit by taking on example ?

An Arithmetic and Logic Unit (ALU) is a digital circuit that performs arithmetic and logical operations on binary data. The design of an ALU can vary depending on its intended use and performance requirements, but in general, it consists of several key components such as registers, multiplexers, adders, and logic gates.

Let's take the example of an 8-bit ALU, which can perform operations on two 8-bit operands, and produce an 8-bit result. The ALU can perform several operations, such as addition, subtraction, logical AND, logical OR, bitwise complement, and shift operations.

The design of the ALU starts with the registers, which store the input operands and the output result. In this example, there are two input registers, A and B, and one output register, C. The A and B registers are connected to multiplexers, which select the desired operation based on control signals.

The selected operation is then performed by the appropriate circuitry. For addition and subtraction, an adder/subtractor circuit is used. For logical operations such as AND, OR, and complement, logic gates are used. For shift operations, a shift register circuit is used.

The output of the operation is then stored in the C register, and the result is made available for further processing or output.

In addition to the basic arithmetic and logical operations, an ALU may also include additional features such as overflow detection, zero detection, and sign detection. These features can be implemented using additional logic gates and registers.

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19. Write a short note on design of arithmetic unit ?
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28. What is Multiprocessor ? Explain inter process communication in detail ?
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32. Explain how addition and subtraction are performed in fixed point number ?
33. Explain different modes of data transfer between the central computer and I/O device ?
34. Differentiate between Serial and parallel data transfer ?
35. Explain signed magnitude, signed l's complement and signed 2's complement representation of numbers. Find the range of numbers in all three representations for 8 bit register.
36. If cache access time is lOOns, main memory access time is 1000 ns and the hit ratio is 0.9. Find the average access time and also define hit ratio.
37. Explain hardwired microprogrammed control unit ? What is address sequencer circuit ?
38. Explain how a stack organized computer executes instructions? What is Stack?
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44. Draw the functional and structural views of a computer system and explain in detail ?
45. Explain general register organization.
46. Compare and contrast DMA and I/O processors ?
47. Define the following: a) Flynn's taxonomy b) Replacement algorithm

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48. Explain the various pipeline vector processing methods ?
49. Describe the language features for parallelism ?
50. What are different addressing modes? Explain them.
51. Explain any page replacement algorithm with the help of example ?
52. What is mapping? Name all the types of cache mapping and explain anyone in detail.
53. Explain arithmetic pipeline ?
54. Write short notes on, a) SIMD, b) Matrix multiplication c) Instruction format
55. Differentiate: a) Maskable and non-maskable interrupt b) RISC and CISC
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