Virtual Machine

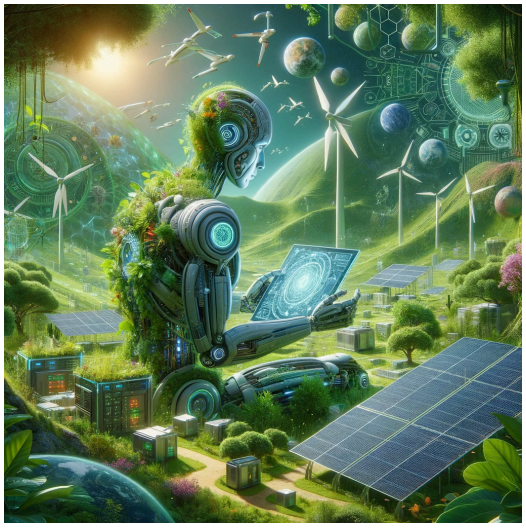

Image Generated by Dalle-E 2 from chat gpt

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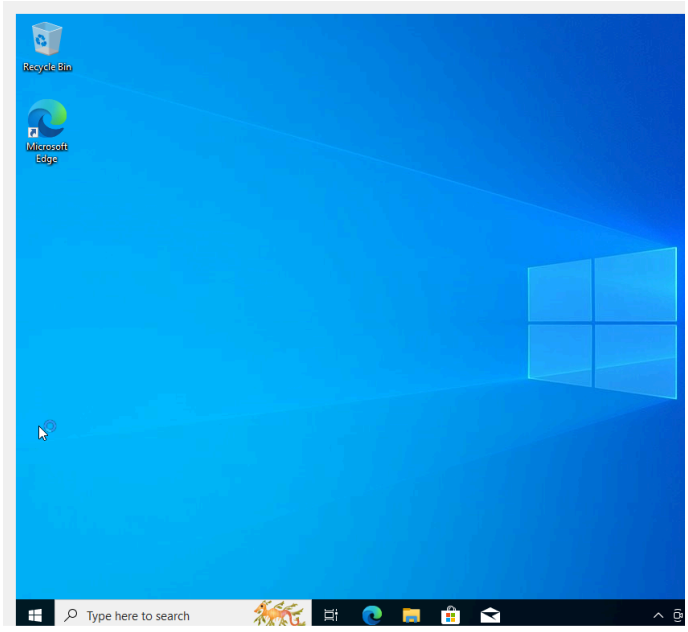
Part 1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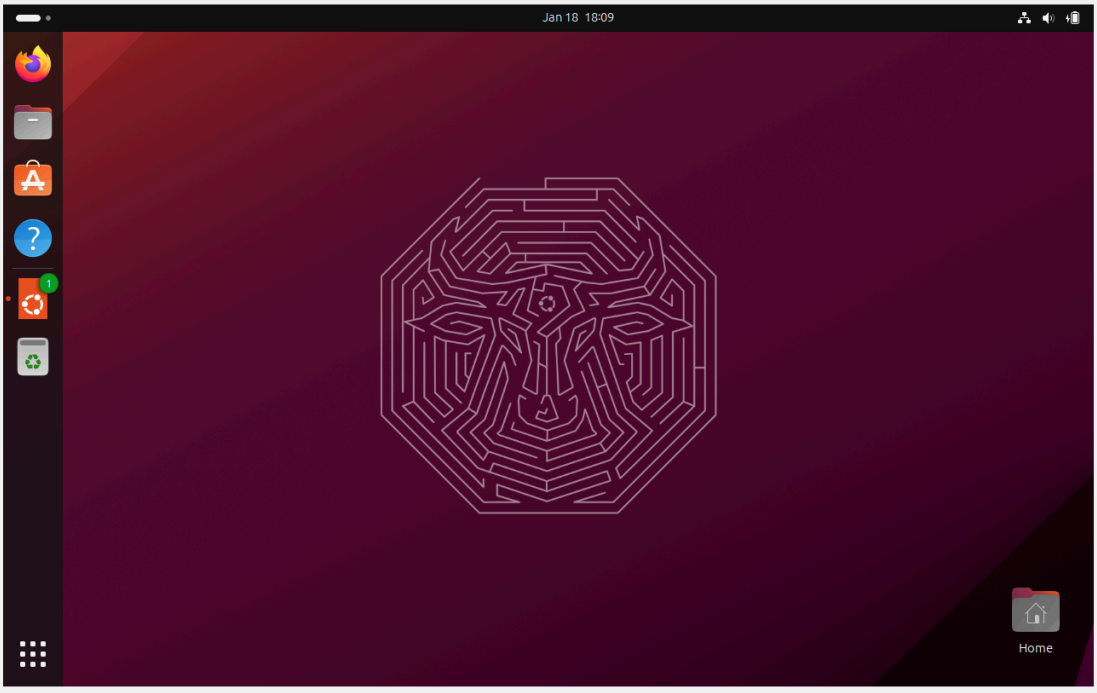
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Home

Part 2

a. What value is eventually stored into memory location 12? (1 mark)
Answer:

Final value = 5 [1]

b. What is the program counter? What is it used for? (1 mark)
Answer:

The program counter, also known as PC, holds the address of the next instruction to be executed. It keeps track of where the computer is in the sequence of instructions [1].

c. What happens to the PC after each instruction is fetched? (1mark)
Answer:

The PC increments by one, pointing to the address of the next instruction [1].

d. What would happen if the value of the PC were incorrect? (1 mark)
Answer:

If it were wrong, it would fetch the wrong instructions, leading to incorrect program execution [1].

e. What is the current instruction register? What is it used for? (1 mark)
Answer:

The current instruction register holds the current instructions being executed. It is used for storing the results of arithmetic operations [1].

f. What is the accumulator? What is it used for? (1 mark)
Answer:

The accumulator is a register used to store intermediate results of calculations. In the video, it's used for storing the results of arithmetic operations [1].

g. What would happen if the value in the ACC wasn’t saved to another register or
memory location? (1 mark)
Answer:

If the value in the ACC isn't saved to another register or memory location, it will be lost or overwritten by the next operation [1].

h. What is the arithmetic logic unit? What type of tasks does it perform? (1 mark)
Answer:

The ALU performs arithmetic and logical operations. It's responsible for carrying out calculations and making decisions based on comparisons [1].

i. What is the control unit? What tasks is it responsible for? (1 mark)
Answer:

The control unit directs operations within the CPU, managing and coordinating the activities of the other components. It interprets instructions and initiates the appropriate actions [1].

j. What information is carried by the control bus? Which component is responsible for
this control information? (1 mark)
Answer:

The control bus carries control signals from the CPU, particularly from the control unit. These signals manage and regulate the operations of the computer and its peripheral devices [1].

k. Although not shown in the video, there is also a data bus and an address bus. What
do you think the purpose of these buses are? (1 mark)
Answer:

The data bus transfers actual data between the components of the computer, while the address bus carries the addresses of the memory locations where data is stored or from which data is to be fetched [1].

l. Which step in the instruction cycle does NOT require memory access? (1 mark)
Answer:

The step of Decoding the Instruction [1].

[1]"Fetch Decode Execute Cycle in more detail," *YouTube*. Feb. 21, 2015. [YouTube Video]. Available: https://www.youtube.com/watch?v=jFDMZpkUWCw