https://www.geeksforgeeks.org/micro-instruction-sequencing/

Micro Instruction Sequencing

two basic tasks performed by a microprogrammed control

■ Microinstruction sequencing: Get the next microinstruction from the control memory.

■ Microinstruction execution: Generate the control signals needed to execute the microinstruction.

**Need for designing the micro-instruction sequencing technique :**  
The first purpose is to minimize the size of control memory because control memory is present inside the processor.  
The second purpose is to execute the micro-instructions as fast as possible. Which means the address of the next micro-instruction can be calculated as fast as possible

in executing a microprogram, the address of the next microinstruction to be executed is in one of these categories:

■ Determined by instruction register

■ Next sequential address

■ Branch

**Sequencing Techniques**

three general categories

■ Two address fields

■ Single address field

■ Variable format

Single address filed

A common approach is to have a single address field

* In this approach, micro-instructions are executed in a sequential manner.
* Hence, every micro-instruction need not carry the address of the next one.
* For a conditional branch, the micro-instruction contains the branch address for true condition. If the condition is false, the current address in CMAR will be simply incremented.
* This means even in the worst case, the micro-instruction will carry only one address.
* Thus, there is some inefficiency in the microinstruction coding scheme.
* Hence, it is called single address field.

This method is commonly used. But the space provided in each micro-instruction in a single address field is not quite useful if the instructions are executed sequentially.

Variable format

* In this technique two formats are used One bit designates which format is being used. In one format, the remaining bits are used to activate control signals.
* In the first format, the microinstruction contains control signals, then the next microinstruction address is calculated either by using the op-code of the instruction register or it is the address of the next microinstruction in sequence.
* disadvantage of this approach is that one entire cycle is consumed with each branch microinstruction.