**Difference Between RISC and CISC**

RISC and CISC are two different types of computer architectures that are used to design the microprocessors that are found in computers. The fundamental difference between RISC and CISC is that **RISC (Reduced Instruction Set Computer)** includes simple instructions and takes one cycle, while the **CISC (Complex Instruction Set Computer)** includes complex instructions and takes multiple cycles.

Read this tutorial to find out more about RISC and CISC and how these two architectures are different from each other.

What is RISC?

In the [**RISC architecture**](https://www.tutorialspoint.com/what-is-risc-processor), the instruction set of the computer system is simplified to reduce the execution time. RISC architecture has a small set of instructions that generally includes register-to-register operations.

The RISC architecture uses comparatively a simple instruction format that is easy to decode. The instruction length can be fixed and aligned to word boundaries. RISC processors can execute only one instruction per clock cycle.

The following are some important **characteristics** of a RISC Processor −

* A RISC processor has a few instructions.
* RISC processor has a few addressing modes.
* In the RISC processor, all operations are performed within the registers of the CPU.
* RISC processor can be of fixed-length.
* RISC can be hardwired rather than micro-programmed control.
* RISC is used for single-cycle instruction execution.
* RISC processor has easily decodable instruction format.

RISC architectures are characterized by a small, simple instruction set and a highly efficient execution pipeline. This allows RISC processors to execute instructions quickly, but it also means that they can only perform a limited number of tasks.

What is CISC?

The [**CISC architecture**](https://www.tutorialspoint.com/what-is-cisc-processor) comprises a complex instruction set. A CISC processor has a variable-length instruction format. In this processor architecture, the instructions that require register operands can take only two bytes.

In a CISC processor architecture, the instructions which require two memory addresses can take five bytes to comprise the complete instruction code. Therefore, in a CISC processor, the execution of instructions may take a varying number of clock cycles. The CISC processor also provides direct manipulation of operands that are stored in the memory.

The primary objective of the CISC processor architecture is to support a single machine instruction for each statement that is written in a high-level programming language.

The following are the important **characteristics** of a CISC processor architecture −

* CISC can have variable-length instruction formats.
* It supports a set of a large number of instructions, typically from 100 to 250 instructions.
* It has a large variety of addressing modes, typically from 5 to 20 different modes.
* CISC has some instructions which perform specialized tasks and are used infrequently.

CISC architectures have a large, complex instruction set and a less efficient execution pipeline. This allows CISC processors to perform a wider range of tasks, but they are not as fast as RISC processors when executing instructions.

Difference between RISC and CISC

The following table highlights all the important differences between RISC and CISC architectures −

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| --- | --- | --- |
| **S.No.** | **RISC** | **CISC** |
| 1. | It stands for Reduced Instruction Set Computer. | It stands for Complex Instruction Set Computer. |
| 2. | It is a microprocessor architecture that uses small instruction set of uniform length. | This offers hundreds of instructions of different sizes to the users. |
| 3. | These simple instructions are executed in one clock cycle. | This architecture has a set of special purpose circuits which help execute the instructions at a high speed. |
| 4. | These chips are relatively simple to design. | These chips are complex to design. |
| 5. | They are inexpensive. | They are relatively expensive. |
| 6. | Examples of RISC chips include SPARC, POWER PC. | Examples of CISC include Intel architecture, AMD. |
| 7. | It has less number of instructions. | It has more number of instructions. |
| 8. | It has fixed-length encodings for instructions. | It has variable-length encodings of instructions. |
| 9. | Simple addressing formats are supported. | The instructions interact with memory using complex addressing modes. |
| 10. | It doesn't support arrays. | It has a large number of instructions. It supports arrays. |
| 11. | It doesn't use condition codes. | Condition codes are used. |
| 12. | Registers are used for procedure arguments and return addresses. | The stack is used for procedure arguments and return addresses. |

Conclusion

The most significant difference between RISC and CISC architectures is the size and complexity of the instruction set. RISC is a microprocessor architecture that uses a small instruction set of uniform length that allows fast execution, while the CISC architecture is one that offers hundreds of instructions of different sizes that allows the users to perform a wider range of tasks.