* **RISC:** Reduce the cycles per instruction at the cost of the number of instructions per program.
* **CISC:** The CISC approach attempts to minimize the number of instructions per program but at the cost of an increase in the number of cycles per instruction.

**Characteristic of RISC –**

1. Simpler instruction, hence simple instruction decoding.
2. Instruction comes undersize of one word.
3. Instruction takes a single clock cycle to get executed.
4. More general-purpose registers.
5. Simple Addressing Modes.
6. Fewer Data types.
7. A pipeline can be achieved.

**Characteristic of CISC –**

1. Complex instruction, hence complex instruction decoding.
2. Instructions are larger than one-word size.
3. Instruction may take more than a single clock cycle to get executed.
4. Less number of general-purpose registers as operations get performed in memory itself.
5. Complex Addressing Modes.
6. More Data types.

**Example –** Suppose we have to add two 8-bit numbers:

* **CISC approach:** There will be a single command or instruction for this like ADD which will perform the task.
* **RISC approach:** Here programmer will write the first load command to load data in registers then it will use a suitable operator and then it will store the result in the desired location.

| **RISC** | **CISC** |
| --- | --- |
| Focus on software | Focus on hardware |
| Uses only Hardwired control unit | Uses both hardwired and microprogrammed control unit |
| Transistors are used for more registers | Transistors are used for storing complex  Instructions |
| Fixed sized instructions | Variable sized instructions |
| Can perform only Register to Register Arithmetic operations | Can perform REG to REG or REG to MEM or MEM to MEM |
| Requires more number of registers | Requires less number of registers |
| Code size is large | Code size is small |
| An instruction executed in a single clock cycle | Instruction takes more than one clock cycle |
| An instruction fit in one word. | Instructions are larger than the size of one word |
| Simple and limited addressing modes. | Complex and more addressing modes. |
| RISC is Reduced Instruction Cycle. | CISC is Complex Instruction Cycle. |
| The number of instructions are less as compared to CISC. | The number of instructions are more as compared to RISC. |
| It consumes the low power. | It consumes more/high power. |
| RISC is highly pipelined. | CISC is less pipelined. |
| RISC required more RAM. | CISC required less RAM. |
| Here, Addressing modes are less. | Here, Addressing modes are more. |

**Advantages of RISC:**

**Simpler instructions:**RISC processors use a smaller set of simple instructions, which makes them easier to decode and execute quickly. This results in faster processing times.  
**Faster execution:**Because RISC processors have a simpler instruction set, they can execute instructions faster than CISC processors.  
**Lower power consumption:** RISC processors consume less power than CISC processors, making them ideal for portable devices.

**Disadvantages of RISC:**

**More instructions required:**RISC processors require more instructions to perform complex tasks than CISC processors.  
**Increased memory usage:**RISC processors require more memory to store the additional instructions needed to perform complex tasks.  
**Higher cost:** Developing and manufacturing RISC processors can be more expensive than CISC processors.

**Advantages of CISC:**

**Reduced code size:** CISC processors use complex instructions that can perform multiple operations, reducing the amount of code needed to perform a task.  
**More memory efficient:**Because CISC instructions are more complex, they require fewer instructions to perform complex tasks, which can result in more memory-efficient code.  
**Widely used:** CISC processors have been in use for a longer time than RISC processors, so they have a larger user base and more available software.

**Disadvantages of CISC:**

**Slower execution:**CISC processors take longer to execute instructions because they have more complex instructions and need more time to decode them.  
**More complex design:**CISC processors have more complex instruction sets, which makes them more difficult to design and manufacture.  
**Higher power consumption:**CISC processors consume more power than RISC processors because of their more complex instruction sets.