

Assembly & Verilog

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Chapter 1

Using RISC V

1.1 Start of Program

A typical RISC V or Assembly program starts with the following lines:

```
ORG      96                # declares init address
DD       42, 100, 19, 2000  # stores values in mem
addi     x1, x0, 96        # initializes init address
```

The first line contains the ORG command, which declares the initial address. The DD command stores its arguments in memory to be later used by the program. Lastly, the addi command with the x1, x0 arguments initializes the registers to the initial address in ORG.

1.2 Using Registers

There are two primary methods of loading values into registers;

```
addi     x4, x0, 42        # method 1
ld       x4, 8(x1)         # method 2
```

In the first method, the value 42 is directly loaded into x4. In the second method, the value must first be stored in memory via the DD command. To load the n th number of DD, $8n(x1)$ is used as $8n + 96$ is the address of the value.

Consequently, values are loaded from registers into memory via

```
sd       x19, 88(x1)       # stores reg in mem
```

which stores the value contained in x19 into memory address $88 + x1$, which in this example would be $88 + 96$.