

# Instruction Set Architecture

# Instruction Set Architecture

```
main()
```

```
{
```

```
int a = 5;
```

```
int b = 16;
```

```
int c;
```

```
c = a + b;
```

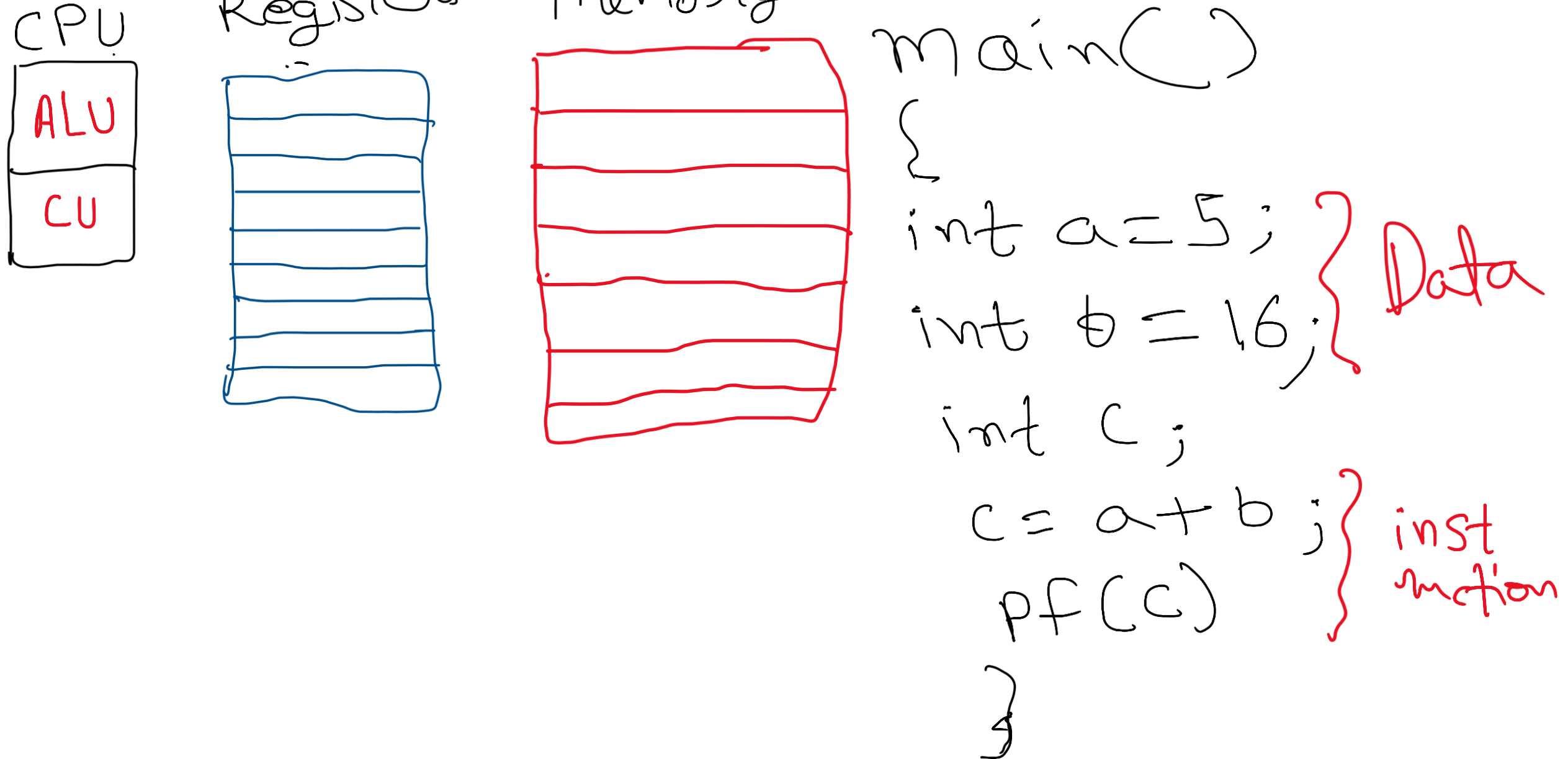
```
pf(c)
```

```
}
```

Data

inst  
ruction

# Instruction Set Architecture



# Instruction Set Architecture

- After compilation of the program, data and instruction are stored in the memory.
- This is as per Von-Neumann architecture which states that both data and instruction can be stored in memory i.e RAM.
- Inside CPU, there exists ALU and CU (Control unit)

# Instruction Set Architecture

- It is the task of ALU to perform the addition in the given example.
- CPU is directly connected with various kind of registers.
- First, Instruction from the memory is called and given to the ALU. This is known as instruction fetching.

# What is an instruction?

Format of an instruction

<b>Mode</b>	<b>opcode</b>	<b>operand</b>
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# What is an instruction?

<b>Mode</b>	<b>opcode</b>	<b>operand</b>
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**Mode** means addressing mode i.e to find out the address of the data that you are searching. This data may be in the memory or in a register.

Addressing mode tells us the address of memory or register.

# What is an instruction?

Mode	opcode	operand
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- **opcode** means operation – addition, subtraction, etc.
- **Operand** may be data, sometimes operand may be address of any memory location, sometimes operand may be address of any register. It can also be any memory location which contains address of another memory location.



# Instruction Set Architecture

How the processes occurs?

Instruction is fetched from the memory and given to a specialized register – Instruction register.

In Instruction Register, Instruction is decoded and the operand is taken from there and carried to **Accumulator** or **Data Register**.

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How the processes occurs?

There, the ALU performs the operation (addition in the example) and gives it to Output register.

The output register gives signal to monitor or printer accordingly.

# Instruction Set Architecture

- Instruction length depends on type of computer organization.
- In single accumulator system, there is single address. Hence there will be address one operand only.

# Instruction Set Architecture

- In General register organization, there can be two or three operands.
- In that case, instruction length will increase which increases size of Instruction register which in turn demands to increase the size of the bus.

*Thank you*