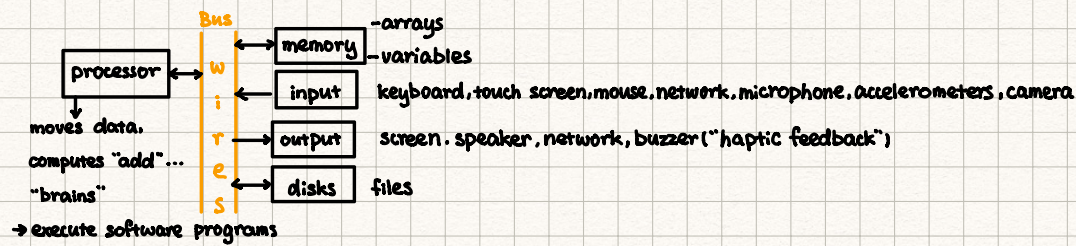


The High-level Organization of a Computer



- what is software?

```
int A,B,C;
```

```
B=5;
```

```
C=6;
```

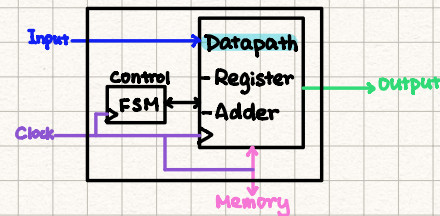
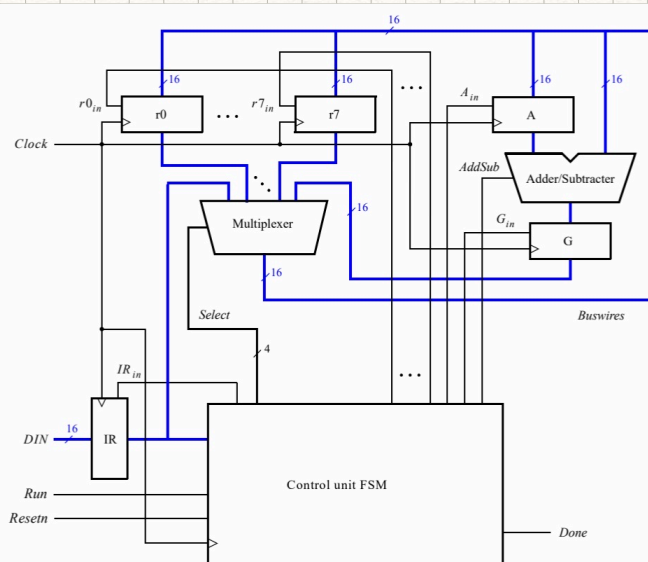
```
A=B+C; ...
```

- The processor "does" this — how?

It has two main parts ① Datapath ② Control.

① **Datapath**: contains registers & ALU for doing computation

② **Control**: FSM that says what transfers happen between registers & the outside memory & input/output possibly on every clock cycle.



- The processor executes programs that consist of a sequence of simple, small instructions.

These instructions are encoded as 16-bit numbers that come into the **DIN** input & captured in the **IR**.

The FSM "decodes" the instruction & makes it happen, i.e.: execute each instructions.

Example instruction, written in a human readable form.

```
assembly mv r1, r2      r1 ← r2 (copy what's in r2 into r1)
```

```
instruction machine code: 000 0 001 000000 010
```

- How: ① Set **SEL = r2** causes **r2's** value to be on the output of the mux

② Set **r2N = 1**