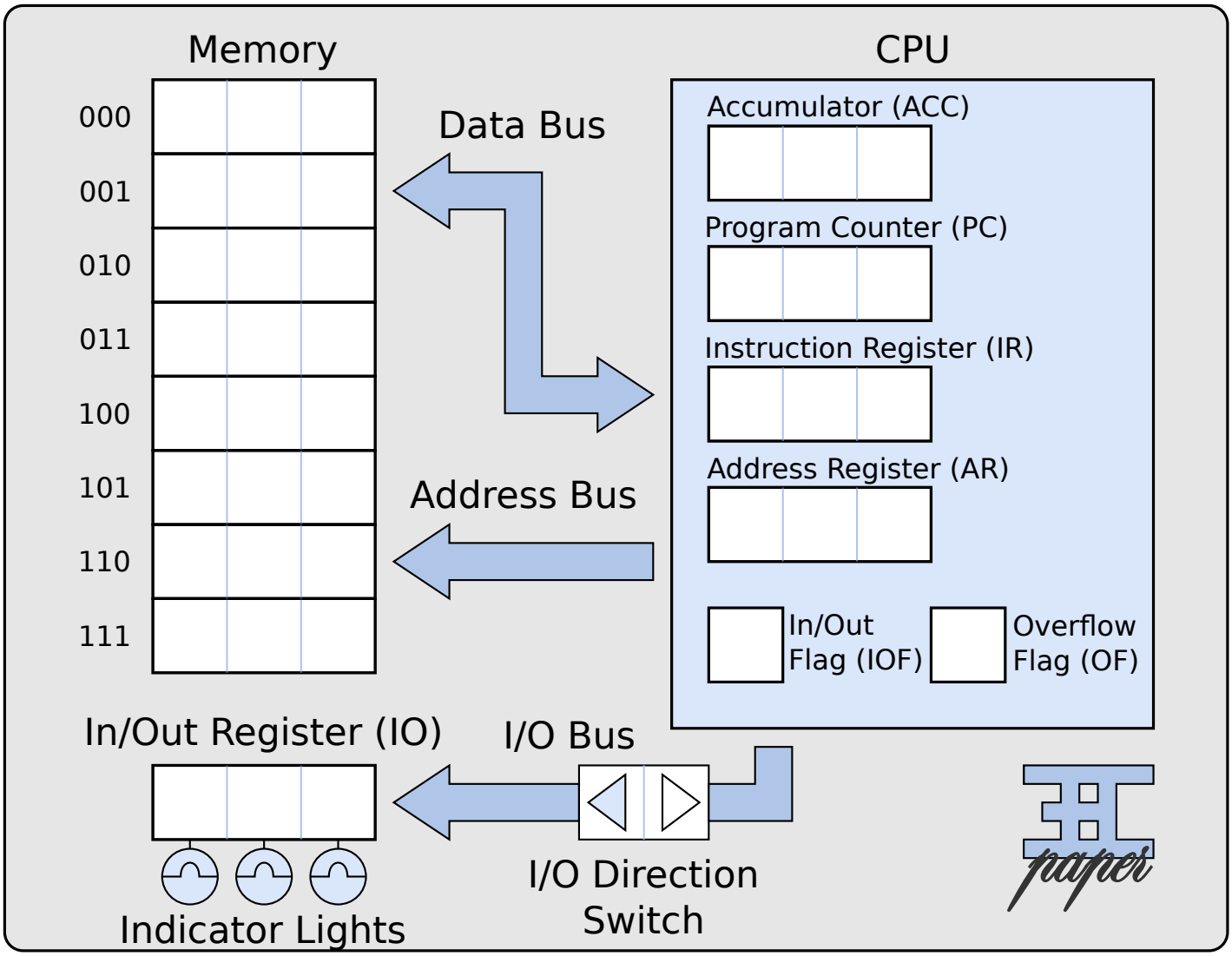
The 3-Bit Computer (3BC) Paper



Bits	Opcode	Description
000	io	if IOF, ACC = IO, else IO = ACC
001	add	ACC = ACC + Memory[AR]
010	sub	ACC = ACC - Memory[AR]
011	ld	ACC = Memory[AR]
100	lda	ACC = PC
101	st	Memory[AR] = ACC
110	b	PC = Memory[AR]-1
111	bo	PC = Memory[AR]-1 if OF = 1

Flags

Overflow Flag: When addition or subtraction occurs s.t. x < 0 or x>7, the flag is flipped. It stays set until an add/sub is done without an overflow.

I/O Flag: not set does output a hardware switch sets the flag. When input is received, the flag is unset.

Operation Cycle

- Fetch: IR = Memory[PC], if IR != io, PC = PC + 1
  AR = Memory[PC]
- Decode: Decode the opcode in IR and operand in AR.
- Execute: Carry out instructions, PC = PC + 1

Programs

```
#add user nums
start:
io #iof=t(f to end)
add   sum
st    sum
b     start
sum: 000
```

```
#count up
loop:
bo    end
io  #iof=f
add  one
b     loop
one: 001 end:
```

papers

Tim Wylie 3BC paper v0.3, 2020