

# Tiny CPU – Control Path (2C)

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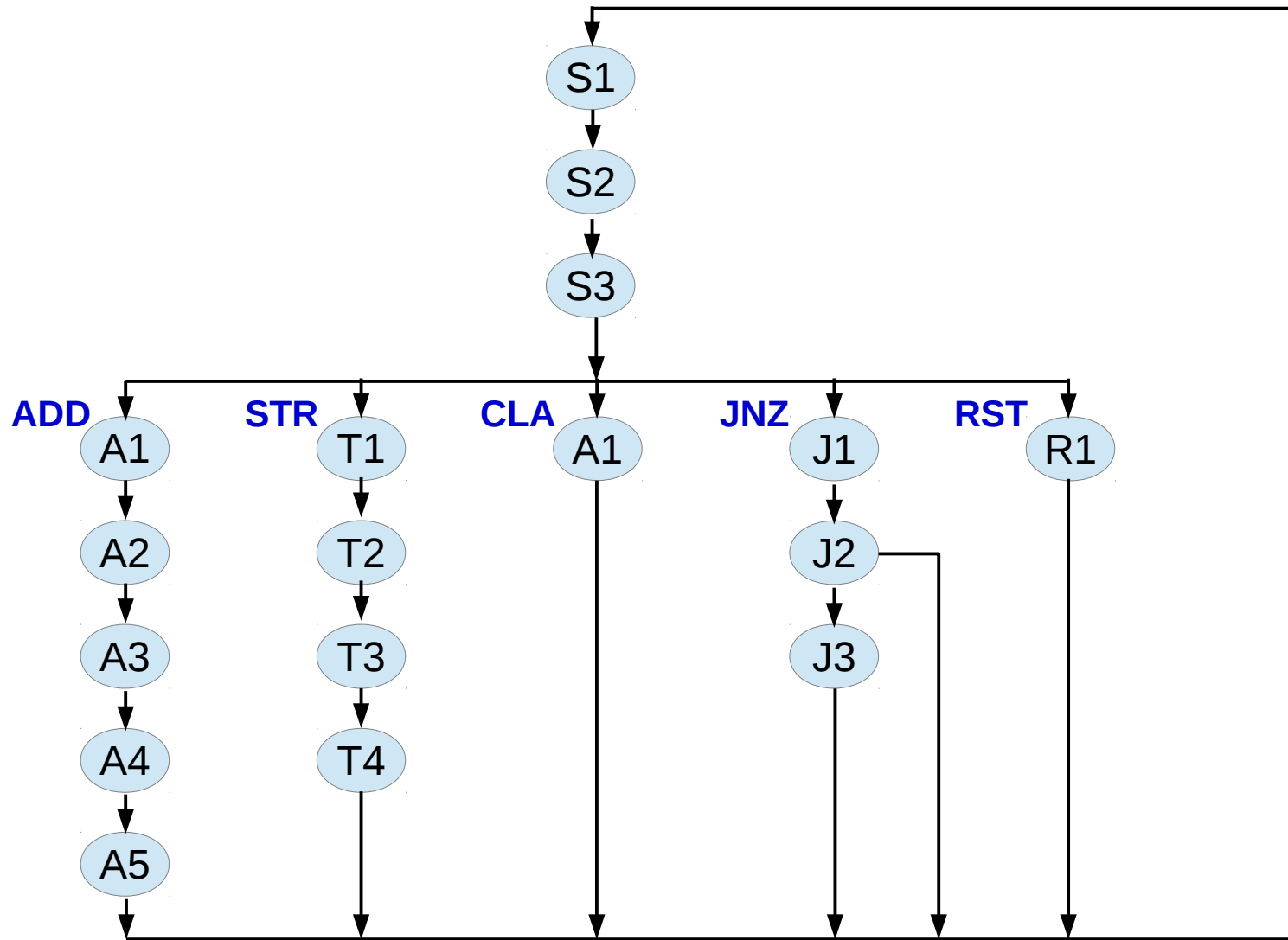
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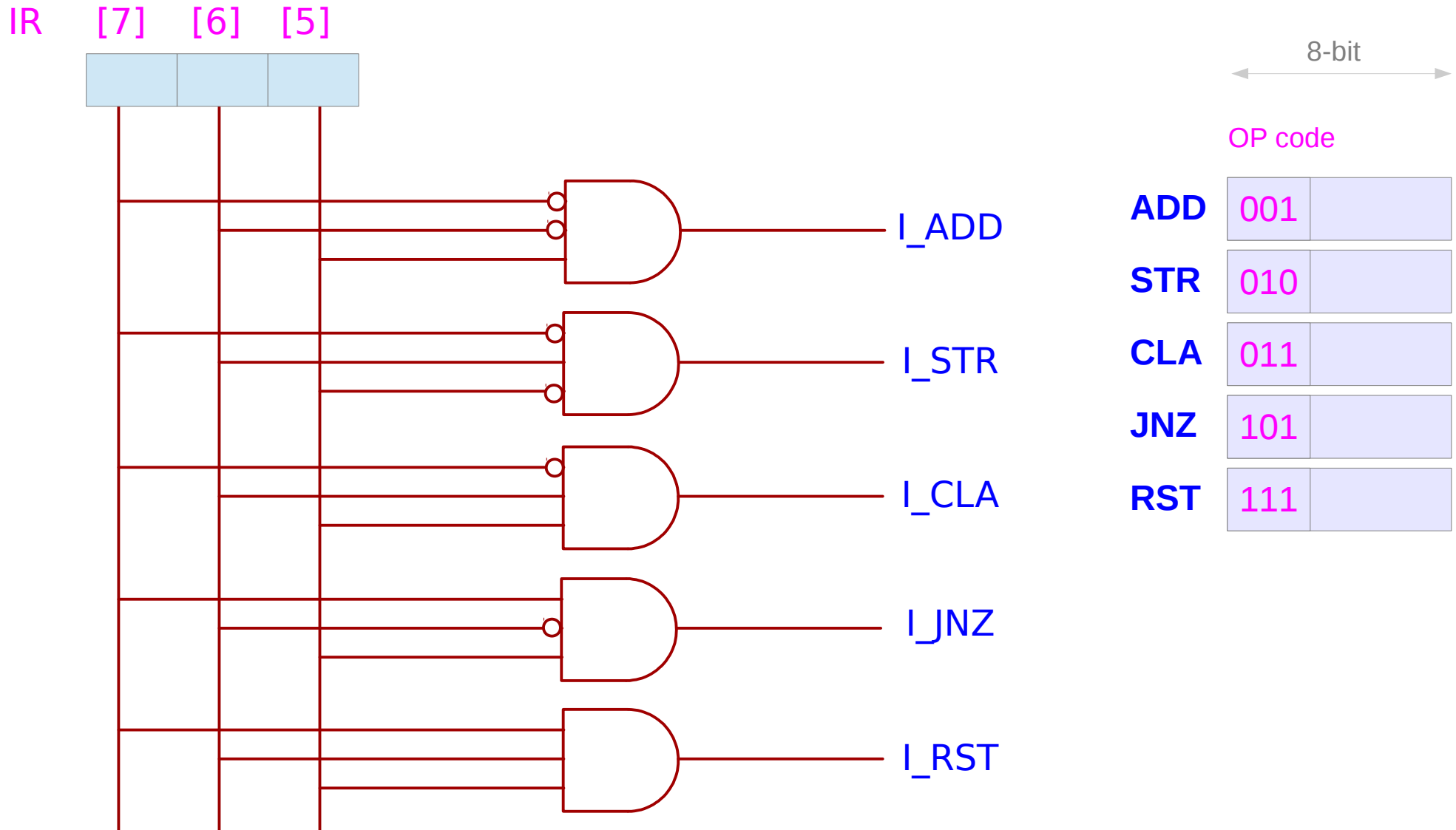
Please send corrections (or suggestions) to [youngwlim@hotmail.com](mailto:youngwlim@hotmail.com).

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# FSM I

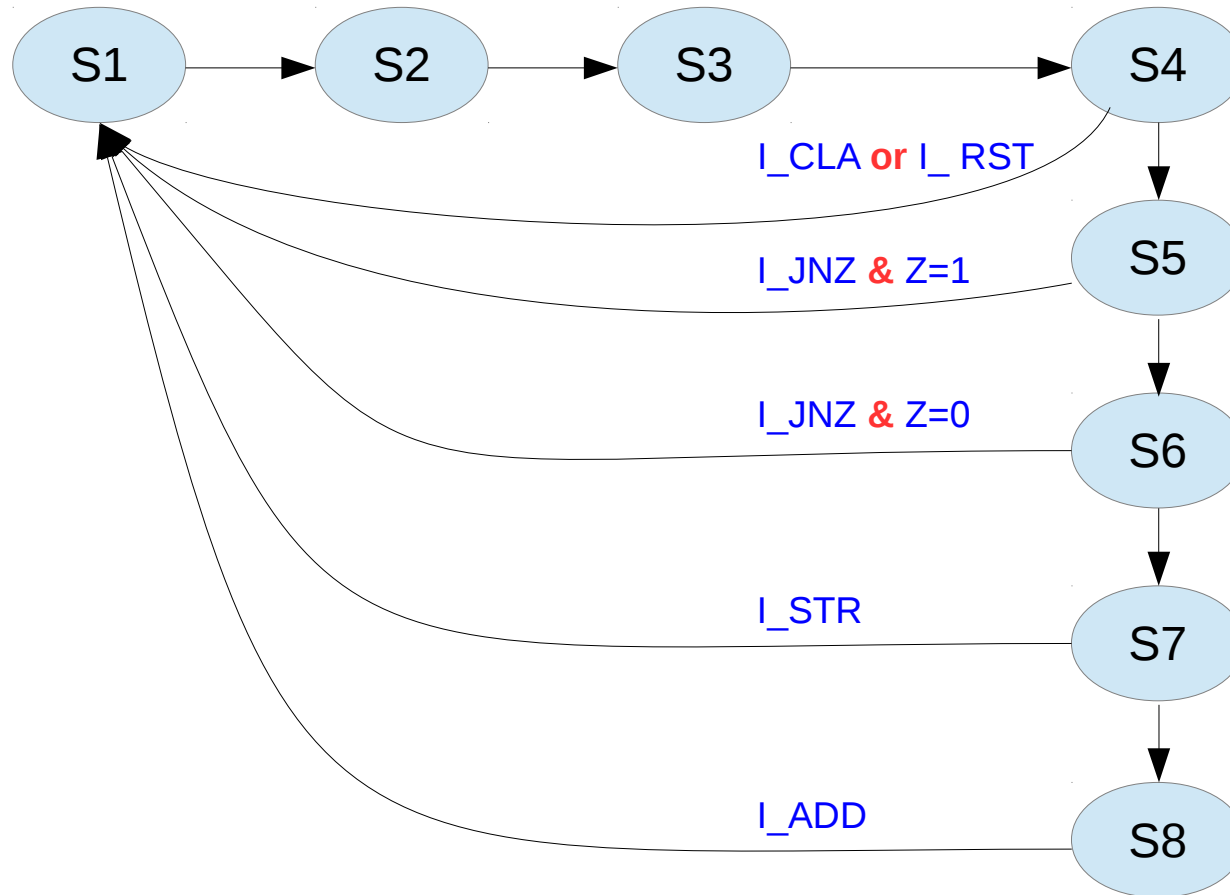


# Instruction Decoder



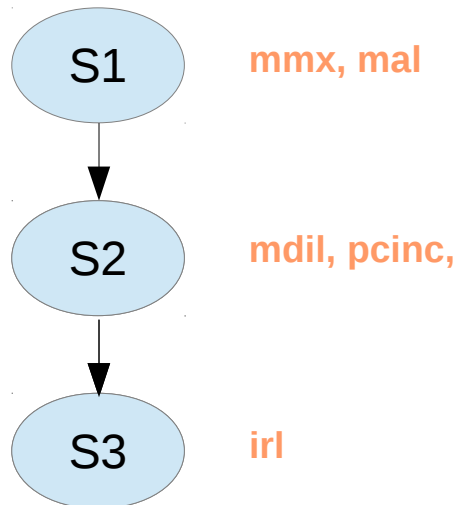
Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# FSM II

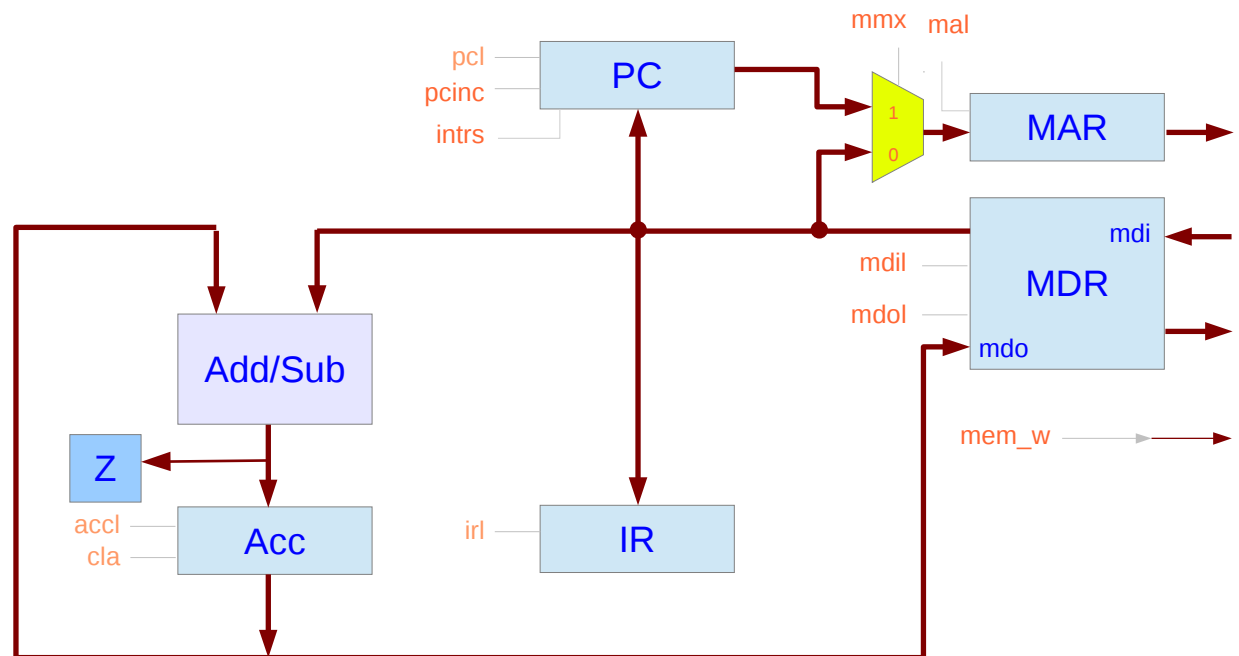


Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# Control Signal - IF

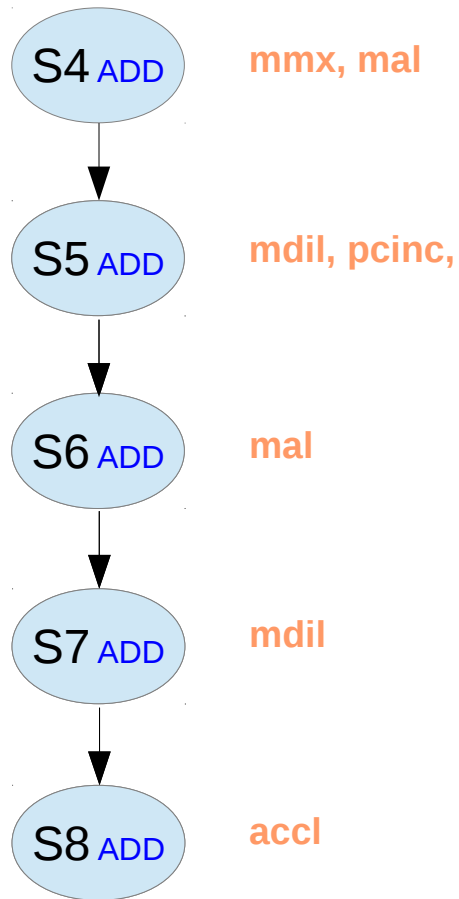


S1    **MAR** ← PC; **MEM\_RD**;  
S2    MDR ← MEM; PC ← PC+1;  
S3    IR ← MDR



Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# Control Signal - ADD



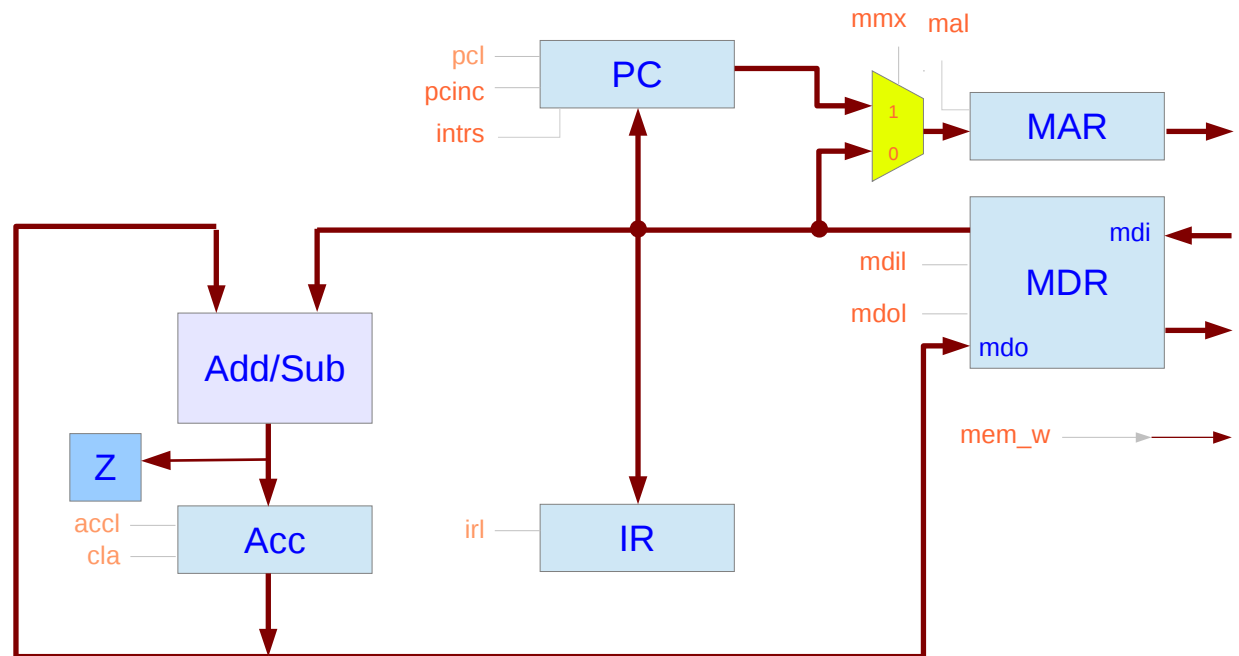
S4 MAR  $\leftarrow$  PC; **MEM\_RD**

S5 MDR  $\leftarrow$  MEM; PC  $\leftarrow$  PC+1

S6 MAR  $\leftarrow$  MDR; **MEM\_RD**

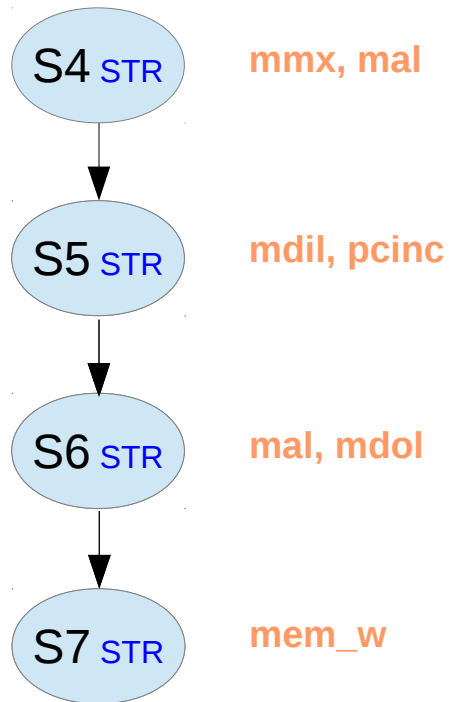
S7 MDR  $\leftarrow$  MEM;

S8 ACC  $\leftarrow$  ACC + MDR;

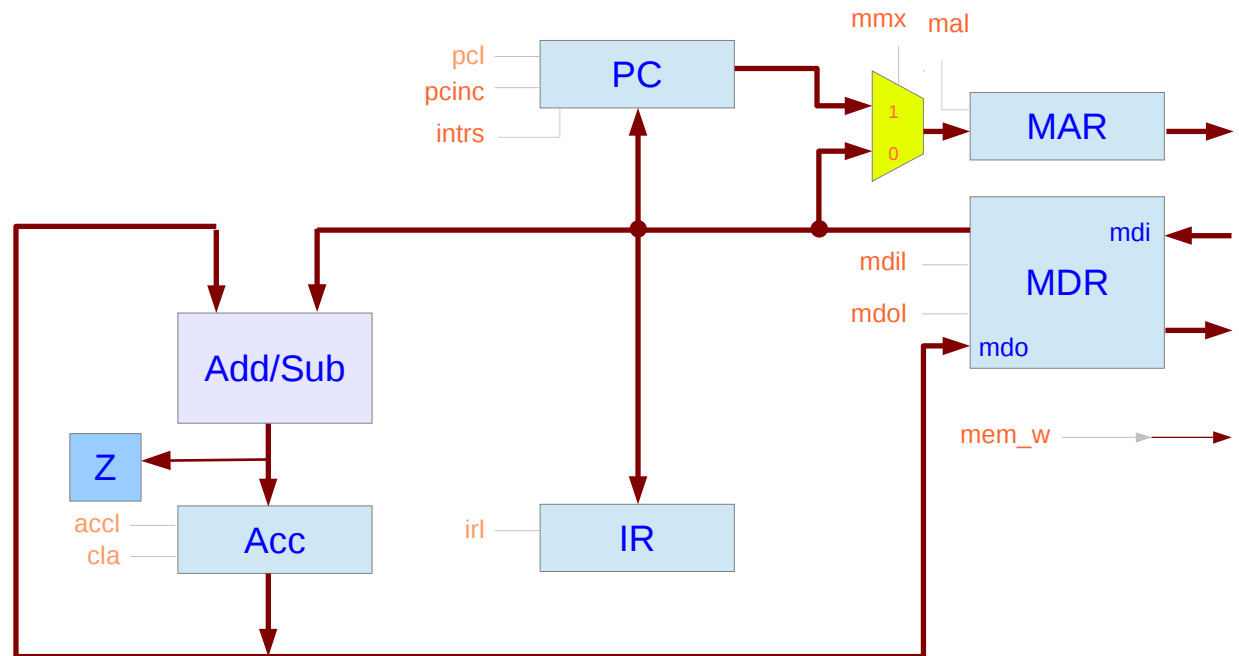


Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# Control Signal - STR



- S4 MAR  $\leftarrow$  PC; **MEM\_RD**
- S5 MDR  $\leftarrow$  MEM; PC  $\leftarrow$  PC + 1
- S6 MAR  $\leftarrow$  MDR; MDR  $\leftarrow$  ACC
- S7 **MEM\_WR**;



Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

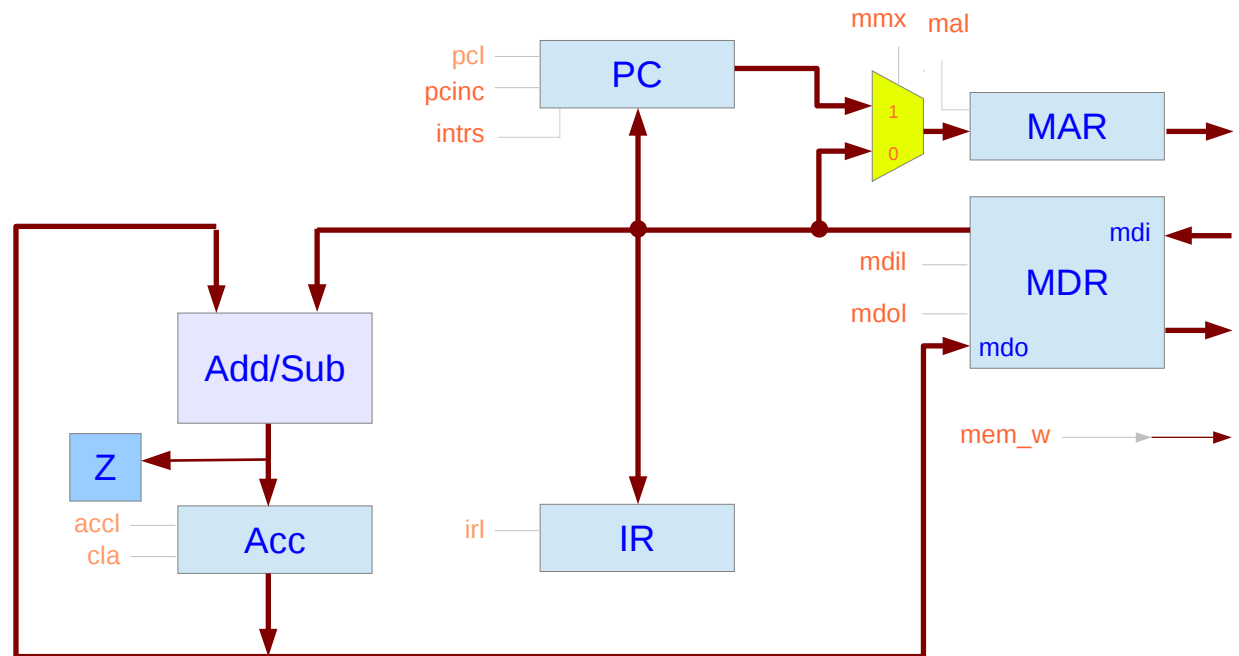


# Control Signal - CLA

S4 CLA

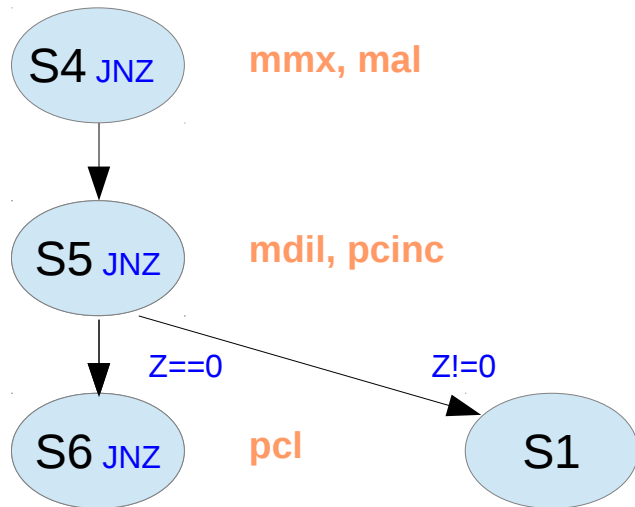
cla

S4 ACC ← "00"

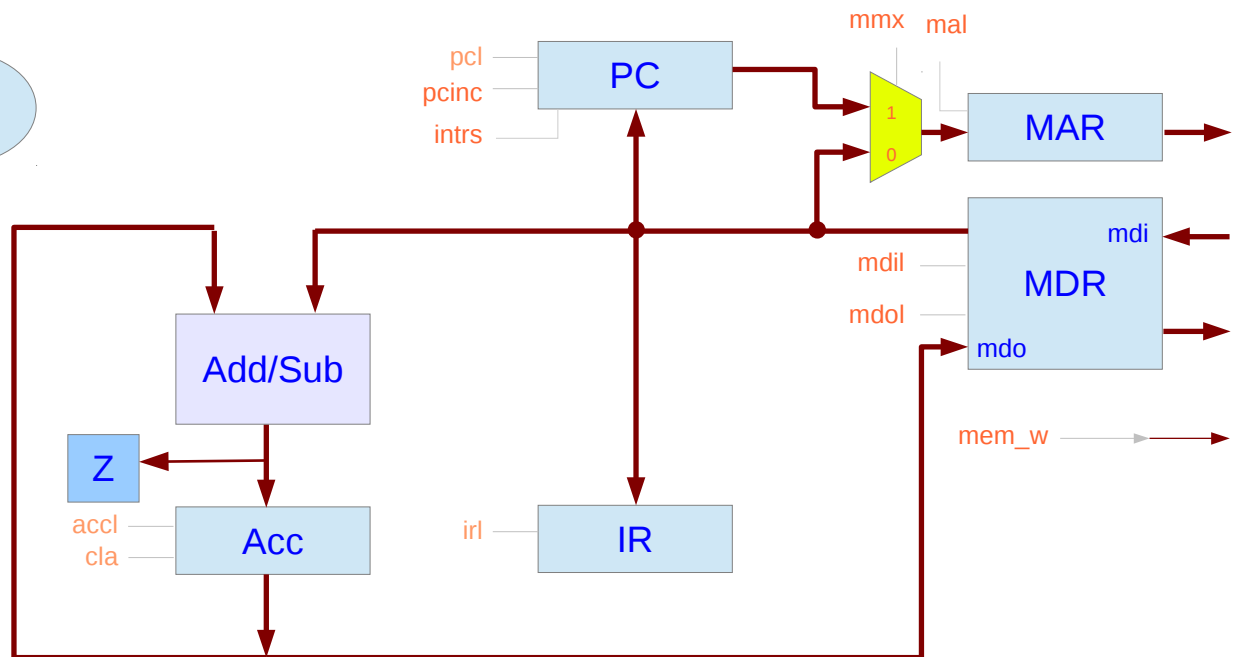


Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# Control Signal - JNZ



S4 MAR  $\leftarrow$  PC; MEM\_RD;  
 S5 MDR  $\leftarrow$  MEM; PC  $\leftarrow$  PC + 1  
 S6 If (Z=='0') PC  $\leftarrow$  MDR;



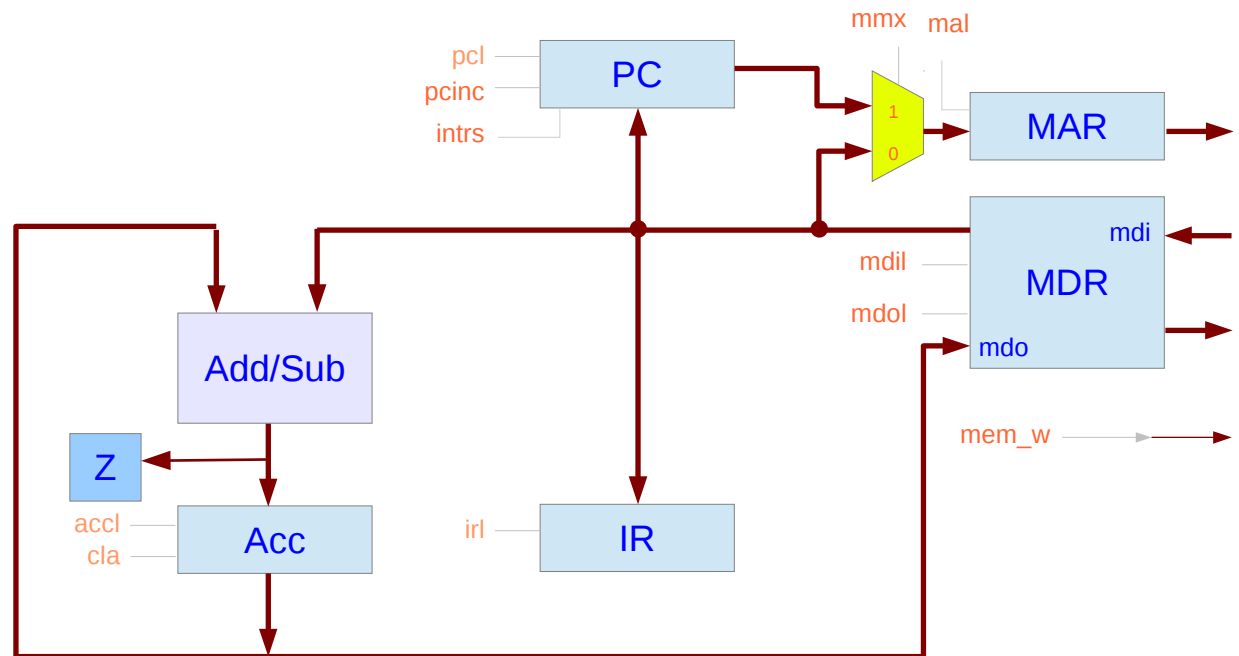
Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>

# Control Signal - RST

S4<sub>RST</sub>

intrs

S4 PC ← "00"



Based on <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>



## References

- [1] <http://en.wikipedia.org/>
- [2] [https://en.wikiversity.org/wiki/The\\_necessities\\_in\\_SOC\\_Design](https://en.wikiversity.org/wiki/The_necessities_in_SOC_Design)
- [3] [https://en.wikiversity.org/wiki/The\\_necessities\\_in\\_Digital\\_Design](https://en.wikiversity.org/wiki/The_necessities_in_Digital_Design)
- [4] [https://en.wikiversity.org/wiki/The\\_necessities\\_in\\_Computer\\_Design](https://en.wikiversity.org/wiki/The_necessities_in_Computer_Design)
- [5] [https://en.wikiversity.org/wiki/The\\_necessities\\_in\\_Computer\\_Architecture](https://en.wikiversity.org/wiki/The_necessities_in_Computer_Architecture)
- [6] [https://en.wikiversity.org/wiki/The\\_necessities\\_in\\_Computer\\_Organization](https://en.wikiversity.org/wiki/The_necessities_in_Computer_Organization)
- [7] [https://en.wikiversity.org/wiki/Understanding\\_Embedded\\_Software](https://en.wikiversity.org/wiki/Understanding_Embedded_Software)
- [8] Digital Systems, Hill, Peterson, 1987
- [9] <http://en.wikipedia.org/>
- [10] <http://www.ele.uri.edu/Courses/ele306/f01/Tinydoc.pdf>