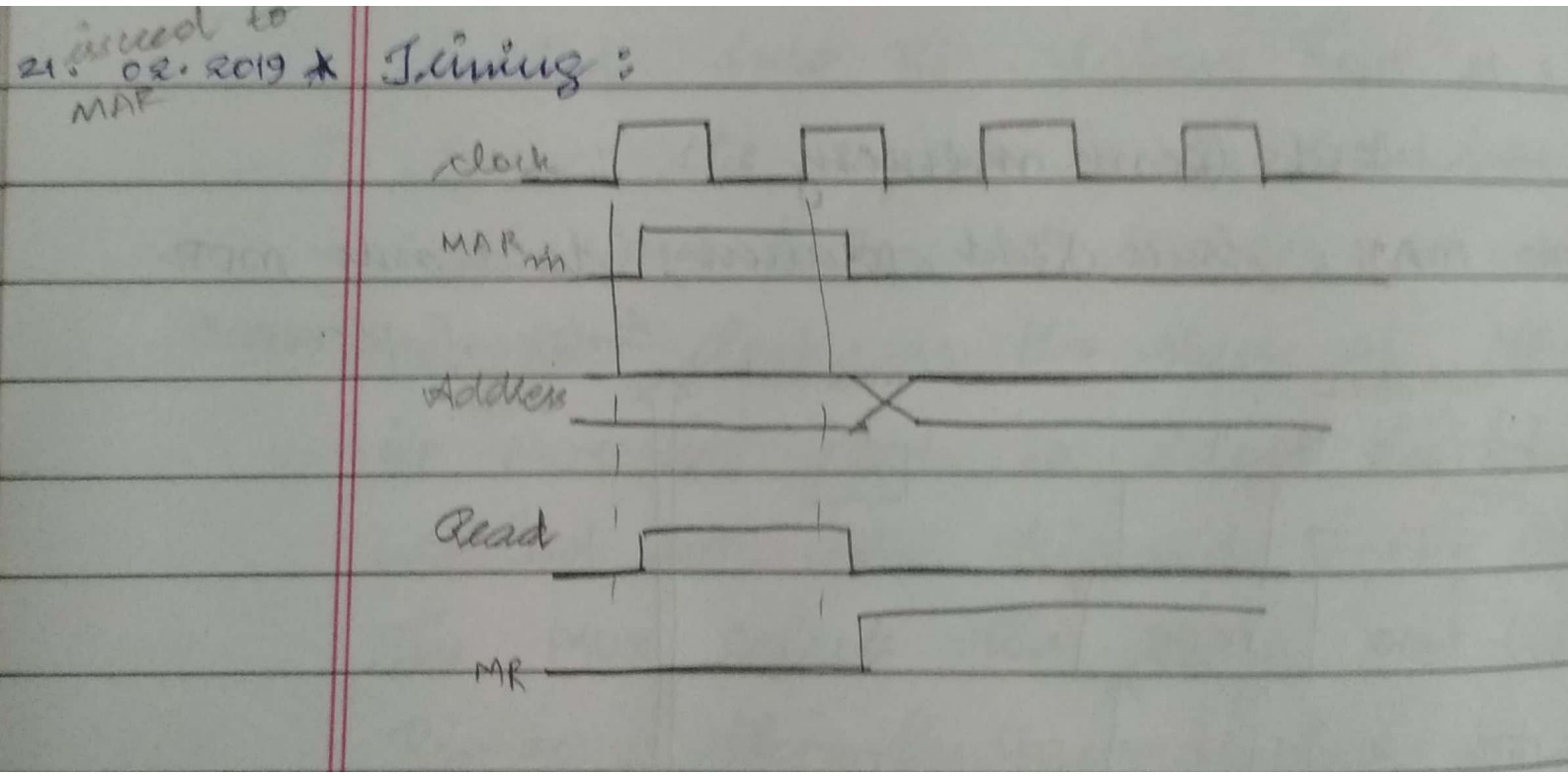
21. 02. 2019 ★ Timing :



Date __/__/____

Saathi

* MFC: It is a control s/g that indicates the requested read operation from MAR has been completed. When MFC s/g has been set to 1 it indicates the contents of specified location has been read into the data lines of the mem. bus.

MFC is used to accomodate the variability in response time to access the memory.

4) Storing of a word in memory:

Address is loaded into MAR

Data to be written loaded into MDR.

Write command is issued.

Example: Move R2, (R1) R2 contents should be moved to the address of R1.

$R_{1\,out}$, MAR$_{in}$

$R2_{out}$, MDR$_{in}$, Write

MDR$_{outE}$, WMFC → processor waits until the write operation has been completed.
(wait)

* Execution of a complete instruction:

(i) Add (R3), R1

(ii) Fetch the instruc^n.

(iii) Fetch the first operand (the contents of the memory loc^n. pointed to by R3).

(iv) Perform the add^n,

(v) Load the result into R1.

Date __/__/____

- Execution of a complete instruction:

Add (R3), R1

Step Action

common
1. PC out, MAR in, Read, Select 4, Add, Z in
2. Z out, PC in, Y in, WMFC (checks if instruc. reached MDR)
3. MDR out, IR in (instruc.)

4. R3 out (contains address), MAR in, Read
5. R1 out, Y in, WMFC
6. MDR out, Select Y, Add, Z in
7. Z out, R1 in, End

* Execution of branch instructions:

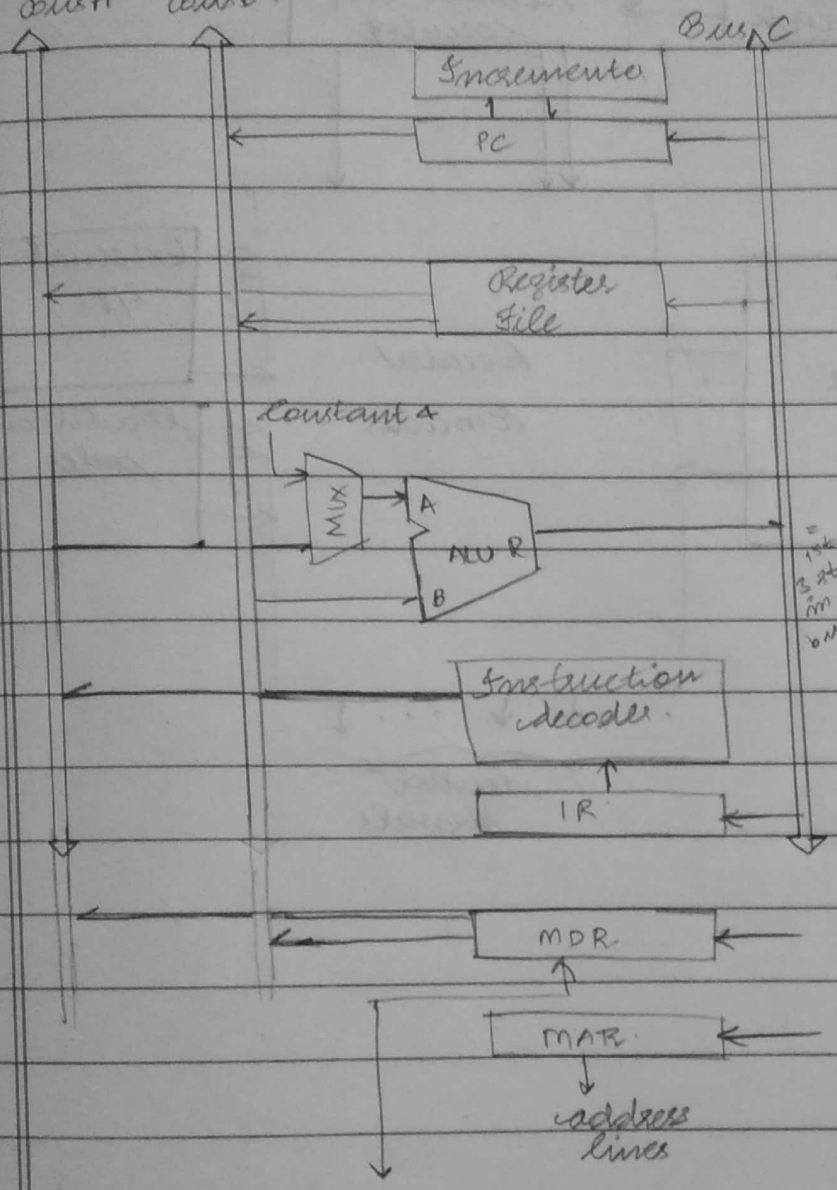
(i) A branch instruction replaces the contents of PC with the "branch target address", which is usually obtained by adding an offset X given in the branch instruc".

(ii) The offset X is usually the diff. b/w IR & PC

1. PC out, MAR in, Read, Select 4, Add, Z in
2. Z out, PC in, Y in, WMFC
3. MDR out, IR in
4. Offset-field of IR out, Add, Z in
5. Z out, PC in, End

Date ___/___/___

* Multiple bus organisation :



Constant 4 can be used to increment other address such as loadmultiple & storemultiple.

Add R4, R5, R6.

1. PCout, R = B, MARin, Read, IncPC.
2. WMFC.
3. MDRoutB, R = B, IRin
4. R4outA, R5outB, SelectA, Add, R6in, End.

hardwired control
microprogrammed control.

* Hardwired control :

Bcoz changes to hardwire. — speed ↑, flexibility ↓
no change can be made to the code.