Serie N° 6

Exercise 1

a) Consider the instruction at address 300:
LOAD 200,IMM
Explain the different phases of execution with a diagram.
Give the contents of the various registers involved.

b) Give the contents of the Accumulator after executing each of the following instructions:

LOAD 200, IND
LOAD 200, XRI (XRI index register)
We have :

Address	Content
100	A
101	d
200	100
202	B
XRI	2

Exercise 2

a) Give the contents of the Accumulator after the execution of each instruction.
b) What does this program do?
c) What is the value stored in F?

```
LOAD    101, D
MUL     201, IND
MUL     102, D
STORE   Y, D
LOAD    303, IND
MUL     202, D
SUB     Y, D
STORE   F, D
```

Address	Content
101	A
102	4
201	302
202	B
302	C
303	202

Exercise 3

Given the contents of the following registers and memories:

(XR1)=1 ; (XR2)=2 ; (1000)=0 ;(1001)=1 ; (2000)=2 ; (2001)=3 ; (3000)=4 ; (3001)=5 ; (0)=1000
XR1 et XR2 are index registers.
Values in brackets represent memory addresses.

a) Indicate the contents of the Accumulator after each of the following operations:

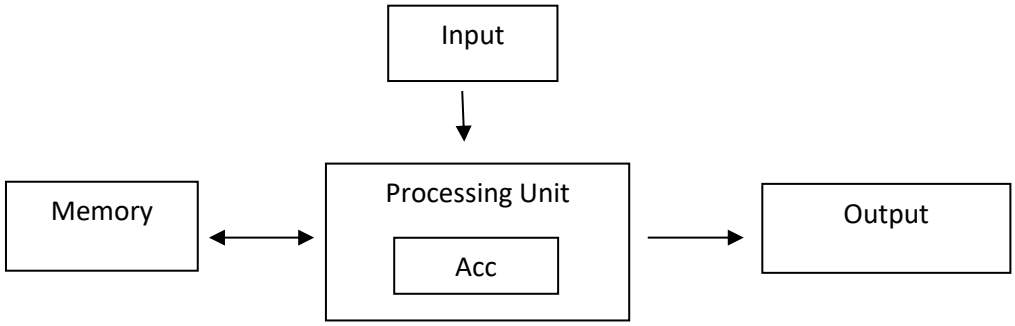
LOAD 3000, XRI
LOAD 999, XR2
LOAD 1000, IND
LOAD 2, IMM
LOAD 1000, D

b) What is the value of F after executing the program below?

```
LOAD    3000, D
ADD     2000, XRI
SUB     5, IMM
MUL     3001, D
DIV     2000, D
ADD     1000, D
SUB     0, IMM
STORE   F, D
```

Exercise 4

Given a machine whose architecture is given by the following figure:



1) Carry out the following instructions using only the operations studied in class.
Use direct addressing.

a) 1/ Read A ;
2/ Read B ;
3/ C := A-B ;
4/ R := (A+B)- C ;
5/ Write R.

b) 1/ Read A ;
2/ Read B;
3/ C := $A^2 + A*B + B^2$;
4/ Write C.

2) Knowing that A = 10 and B = 5 and that an Ordinal Counter (CO) has been added to the processing unit described above.

2-1) What address does the Ordinal Counter contain at the end of instruction (a)?

2-2) When instruction (b) is executed, what are the different values taken by the Accumulator?

Exercise 5

Give the formula that calculates the area of this figure.
Write the corresponding assembly program. The value of PI (3.14) is in main memory, the value of C is in the input device.
Don't use any variables other than PI and C.