REPORT

Our code first truncates a number entered by the user (may be decimal or not decimal), and then calculates the sum of squares of digits of the number obtained after truncating the original number.

Input Format:

The user has to input instructions in Assembly Language. The program continues to take instructions until the input is “EXIT”. After taking the instructions, the assembler displays the corresponding Machine Language Program. The user can then input their desired number.

Assembly Code:

LOAD M(0) TRUN

STOR M(0)

// The below instructions are in a loop

LOAD M(0) DIVI M(1)

POWR M(2) ADDD M(3)

STOR M(3)

LOAD (MQ) STOR M(0)

JUMP M(252, 0:19)

EXIT

New Instructions:

- TRUN : Stands for Truncate. Truncates the content of the accumulator (overwrites the accumulator with the truncated value of the original number). Opcode = 00100011.

- POWR M(X) : Stands for Power. Calculates AC raised to the power of M(X), i.e., $AC^{M(X)}$, and stores the result in AC. Opcode = 00100010.

Output:

```
Enter instructions:
LOAD M(0) TRUN
STOR M(0)
LOAD M(0) DIVI M(1)
POWR M(2) ADDD M(3)
STOR M(3)
LOAD (MQ) STOR M(0)
JUMP M(252, 0:19)
EXIT

Machine Language Program:
00000001000000000000001000110000000000000
00000000000000000000001000010000000000000
00000001000000000000000011000000000000001
00100010000000000010000001010000000000011
00000000000000000000001000010000000000011
00001010000000000000001000010000000000000
00000000000000000000000011010000011111100

Enter a number:
713.89
-----------------------
PC :251
AC: 713.89
-----------------------
PC :251
AC: 713
-----------------------
PC :252
AC: 713
-----------------------
PC :253
AC: 713
-----------------------
PC :253
AC: 3
MQ: 71
-----------------------
PC :254
AC: 9
-----------------------
PC :254
AC: 9
-----------------------
PC :255
AC: 9
-----------------------
PC :256
AC: 71
-----------------------
PC :256
AC: 71
-----------------------
PC :252
-----------------------
```

```
PC :253
AC: 71
-----------------------
PC :253
AC: 1
MQ: 7
-----------------------
PC :254
AC: 1
-----------------------
PC :254
AC: 10
-----------------------
PC :255
AC: 10
-----------------------
PC :256
AC: 7
-----------------------
PC :256
AC: 7
-----------------------
PC :252
-----------------------
PC :253
AC: 7
-----------------------
PC :253
AC: 7
MQ: 0
-----------------------
PC :254
AC: 49
-----------------------
PC :254
AC: 59
-----------------------
PC :255
AC: 59
-----------------------
PC :256
AC: 0
-----------------------
PC :256
AC: 0
-----------------------
The sum of squares of digits = 59
```