

(Autonomous College Affiliated to University of Mumbai)

Batch: B1 Roll No.: 1711072

Experiment / assignment / tutorial No. 5

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of the Staff In-charge with date

Title: To find the value of 2×-1 and to find the square-root of a number using 8087 instruction set.

Objective: To understand usage of the instruction set of 8087

Expected Outcome of Experiment:

CO 3: Analyze the techniques for faster execution of instructions and enhance performance of microprocessors

Books/ Journals/ Websites referred:

Microcomputer Systems: 8086/8088 family Architecture, Programming and

Design: By Liu & Gibson (PHI Publication).

Pre Lab/ Prior Concepts:

What are the Transcendental Instruction 8087?

Instructions used:

1. FINIT:

This instruction used to initialize 8087. Disables interrupt.

Syntax:

FINIT

2. FLD instruction:

This instruction is used to load stack with some value. It is like PUSH operation. It decrement stack pointer by 1 and copies number into stack top (ST or ST(0))



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Example

FLD 4.6

3. FMUL instruction:

This instruction performs multiplication between ST(0) & ST(1) and store result in ST(0)

Examples:

```
\begin{array}{lll} FMUL & ST(0) := ST(0) \ *SY(1) \\ FMUL \ i & ST(0) := ST(0) \ * \ i \\ FMUL \ i,0 & ST(i) := ST(i) \ * \ ST(0) \\ FMUL \ 0,i & ST(0) := ST(0) \ * \ ST(i) \\ FMUL \ mem4r & ST(0) := ST(0) \ * \ mem4r \\ FMUL \ mem8r & ST(0) := ST(0) \ * \ mem8r \end{array}
```

4. FSQRT instruction:

Calculate square root of ST & store result in ST.

Example:

FLD 4.0 FSQRT

5. F2XM1 instruction:

It 2X -1 where $0 \le x \le 0.5$. X must be in ST & result will be in ST.

Syntax:

F2XM1

Eg:

F2XM1

Algorithm:

DATA SEGMENT

A DD 9.0

B DD 0.25

DATA ENDS

CODE SEGMENT

ASSUME CS:CODE, DS:DATA

START:



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MOV AX, DATA

MOV DS, AX

FINIT

FLD A

FSQRT

FST ST(3)

FLD B

F2XM1

FST ST(2)

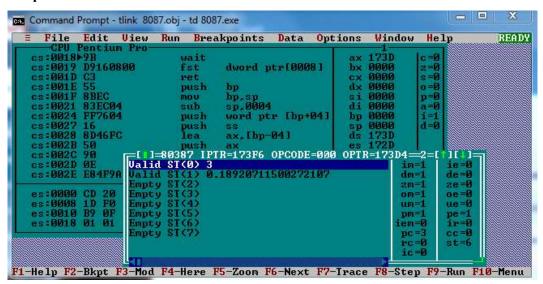
MOV AH, 4CH

INT 21H

CODE ENDS

END START

Output Screen:



Conclusion: The program was executed successfully in TASM. The program gave appropriate results.



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Post Lab Descriptive Questions (Add questions from examination point view) Explain various types of instruction sets in 8087

INSTRUCTION SET

The 8087 instruction mnemonics begins with the letter F which stands for Floating point and distinguishes from 8086. These are grouped into Four functional groups.

The 8087 detects an error conditio instruction it will set the bit in its Status register. Types:

- I. DATA TRANSFER INSTRUCTIONS.
- II. II. ARIT
- III. COMPARE INSTRUCTIONS.
- IV. TRANSCENDENTAL INSTRUCT (Trigonometric and Exponential)

Data Transfers Instructions

REAL TRANS

FLD Load real

FST Store real

FSTP Store real and pop and pop

FXCH Exchange registers

INTEGER TRANSFER

FILD Load integer

FIST Store integer

FISTP Store integer

PACKED DECIMAL TRANSFER(BCD)

FBLD Load BCD

FBSTP Store BCD and pop

Example FLD Source- Decrements the stack pointer by one and copies a real element from a number of stack elements or memory location to new ST.

FLD LONG_REAL[BX]; Number from memo; copied to ST.

FLD Destination- Copies ST to a specified stack position or to a specified memory location.

FST ST(2); Copies ST to ST(2)

Date: 12/03/2019 Signature of faculty in-charge