Assignment No. 10

Title : Find roots of quadratic equation

problem statement:
write 8087 program to find roots of quadratic equation. All possible cases must be considered in calculating the roots

objective:
To be able to solve mathematical problems in ALP.

Outcome
student will be efficient in handling & solving mathematical problems using ALP.

S/w & H/w requirements:-

processor - core dual i3/i5/i7
OS - linux 32/64 bit
Editor - gedit
assemblee - NASM
debuggee - gdb

theory :-

80387 microprocessor -

80387 is the first intel coprocessor to be fully compliant with the IEEE 754-1985 standard released in 1987. a full years after 386 chip the 1387 includes much improved speed over intel's previous 8087/ 80287 coprocessor & improved characteristics of its trignometric functions.

The 8087 & 80287's FPTAP and FPATAN are limited to an argument in the range $\pm \pi/4$ ($\pm$ use) & 8027 & 80287 have no direct instruction for the Sin & Cos functions.

without a coprocessor 386 normally performs floating point arithmatic through s/w routine implemented at runtime through a s/w exception handler.

The 1387 is computable only with standard 1386 chip which is a 32-bit processor but the later cost reduced 1386) which has narrower 16-bit data bus can't interface with 1387 32-bit bus

Instruction set :

All instruction of 8086 mov JC, JNC, JNZ, JZ, PUSH, POP, INC, CMP, ADD, ETC, all is used in this program.

Algorithm -

1) write msg to entee the quadratic eqn.
2) write msg to entee 1st coefficient a
3) Read first coefficient
4) conveet nu from ascii to hex.
5) write msg to entee 2nd coefficient b
6) Read 2nd coefficient
7) conveet it into hex
8) write msg to entee 3rd coefficient c
9) Read 3rd coefficient
10) conveet it in hex
11) formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
12) Identify value of a, b, c in eqn, a is coefficient of x^2, b is of x & c is constant
13) substitute it into equation / formula to find quadratic eqn
14) Do the artee you how plugged in the no. do remaining operation to simplify tve, -ve sign of squaee of remaining terms

15) Simplify square root of the number under the radical symbol is the perfect square, you will get whole no. 5.

16) convert final roots into ascii
17) print final roots, real & imaginary.

Conclusion :-

Thus roots of quadratic eqn are calculated & also understand 80387 instruction sets.