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#include <stdio.h>
#include <math.h>

double x1;
double x2;
int flag;
double a, b, c;

void funreal( double );
void funimag( double );

void main()
{
    double d;

    /* reading parameters a b c */
    printf("Put the parameters of the QP equation\n"
           "   a   b   c \n");
    scanf("%lf %lf %lf", &a, &b, &c);

    /* printing out the entered parameters */
    printf("Entered equation coefficients\n"
           "   a=%lf   b=%lf   c=%lf\n\n",a,b,c);

    /* calculation of the roots */
    if ( a == 0.0 ){
        flag =1;
        x1=-c/b;
    }
    else {
        d=b*b-4*a*c;
        if ( d >= 0.0)
            funreal(d);
        else
            funimag(d);
    }

    /* printing the results */
    switch (flag) {
        case 1:
            printf("Linear equation; root = %lf\n",
                   x1);
            break;
        case 2:
            printf("Two separate real roots\n"
                   "   x1= %lf   x2= %lf\n",
                   x1, x2);
            break;
        case 3:
            printf("Real double root   x1= %lf\n",
                   x1);
            break;
        case 4:
            printf("Two separate imaginary roots\n"
                   "x1=%lf+%lf*i   x2=%lf-%lf*i\n",
                   x1, x2, x1, x2);
            break;
        default:
            break;
    }
}

void funreal( double d )
{
    if ( d > 0.0 ) {
        d=sqrt(d);
        x1=(-b+d)/(2*a);
        x2=(-b-d)/(2*a);
        flag=2; /* two real roots */
    }
    if (d == 0.0) {
        x1=x2=-b/(2*a);
        flag=3; /* double real root */
    }
}

void funimag( double d )
{
    x1=-b/(2*a); /* real part of the
                  imaginary root */
    x2=d/(2*a); /* modulus of the
                  imaginary part */
    flag=4; /* imaginary root */
}

```