```c
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <stdbool.h>

struct point {
    double x;
    double y;
};

double
f(struct point z)
{
    return (z.x*z.x + 4*z.y*z.y + 10);
    //return (10*z.x*z.x - z.y*z.y*z.y);
    //return (exp(z.x*z.x + z.y*z.y) + 2*z.x - 3.5*z.y);
}

struct point grad(struct point z)
{
    struct point t;
    t.x = 2*z.x;
    t.y = 8*z.y;
    //t.x = 20*z.x;
    //t.y = -3*z.y*z.y;
    //t.x = 2*z.x*exp(z.x*z.x + z.y*z.y) + 2;
    //t.y = 2*z.y*exp(z.x*z.x + z.y*z.y) - 3.5;
    return t;
}

double gold(double b, double eps, struct point old)
{
    double fi = (1 + sqrt(5))/2;
    double x1;
    double x2;
    double y1;
    double y2;
    struct point cur1;
    struct point cur2;
    double a = 0.0;
    while(fabs(b - a) > eps){
        x1 = b - (b-a)/fi;
        x2 = a + (b-a)/fi;
        cur1.x = old.x - x1*grad(old).x;
        cur1.y = old.y - x1*grad(old).y;
        cur2.x = old.x - x2*grad(old).x;
        cur2.y = old.y - x2*grad(old).y;
        y1 = f(cur1);
        y2 = f(cur2);
        if(y1 >= y2){
            a = x1;
        }else{
            b = x2;
        }
    }
    return (a+b)/2;
}

```

```
int
main(void)
{
    double eps;
    double step = 10;
    struct point old;
    struct point new;
    struct point cur;
    int i = 1;
    bool flag = true;
    printf("Введите начальное приближение\n");
    scanf("%lf %lf",&old.x,&old.y);
    printf("Введите точность\n");
    scanf("%lf",&eps);

    for(i = 1; i < 1001 && flag; i++){
        cur = grad(old);
        new.x = old.x - step*cur.x;
        new.y = old.y - step*cur.y;
        flag = fabs(f(old) - f(new)) > eps;
        while(f(new) > f(old) && flag && step){
            step = gold(step,eps,old);
            new.x = old.x - step*cur.x;
            new.y = old.y - step*cur.y;
            flag = fabs(f(old) - f(new)) > eps;
        }
        flag = (f(old) - f(new) > eps);
            old.x = new.x;
            old.y = new.y;
    }
    printf("Примерная точка минимума (%lf , %lf),\n значение функции в этой точке: %lf\n количество итераций : %d\n",old.x,old.y,f(new),i);
    return 0;
}
```