

```
1 #include <stdio.h>
2 #include <math.h>
3
4 void main(){
5     double a = 0.0, epsilon = 0.00000001;
6     double x = a, y = 1.0;
7     unsigned long n = 0UL;
8
9     printf("Heron-Verfahren zur Bestimmung der Quadratwurzel\n\n");
10    do {
11        printf("a (a > 0)           = ");
12        scanf("%lf", &a); fflush(stdin);
13    } while(a<=0.0);
14
15    do {
16        printf("epsilon (epsilon > 0)       = ");
17        scanf("%lf", &epsilon); fflush(stdin);
18    } while(epsilon <= 0.0);
19
20    x = a;                                // Anfangswert x = a
21
22    while(fabs(x*x - a) >= epsilon) // Abbruchbedingung
23    {
24        ++n;                               // Anzahl Iterationen
25        x = (x + a/x)/2.0;                 // alternativ kuerzer
26    }
27
28    printf("\niterativ sqrt( %10.2lf ) = %16.8lf\n", a, x);
29    printf("math.h   sqrt( %10.2lf ) = %16.8lf\n", a, sqrt(a));
30    printf("Iterationen   n           = %7d", n);
31    getchar();
32 }
33
34
35 /*
36 Heron-Verfahren zur Bestimmung der Quadratwurzel
37
38 a (a > 0)           = 2
39 epsilon (epsilon > 0) = 0.00000001
40
41 iterativ sqrt(      2.00 ) =      1.41421356
42 math.h   sqrt(      2.00 ) =      1.41421356
43 Iterationen   n           =      4
44 */
```