

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <stdio.h>
6
7 int main(void) {
8     const double MOL = 6.02E23;
9     const int GRAM_PER_MOL = 32;
10
11     int mass = 6;
12
13     double quantity = mass * 1.0 / GRAM_PER_MOL * MOL;
14
15     printf("quantity = %.3e\nquantity = %.5g\n",
16           quantity, quantity);
17
18     return 0;
19 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <math.h>
6 #include <stdio.h>
7 #include <ctype.h>
8
9 int main(void) {
10     char first_name[] = "Tayu";
11     char last_name[] = "Lo";
12
13     char gender = 'm';
14
15     int birth_year = 1954;
16     int birth_month = 7;
17     int birth_day = 20;
18     char weekday[] = "Tuesday";
19
20     int c_score = 50;
21     int music_score = 99;
22     int medicine_score = 78;
23
24     double mean = (c_score + music_score + medicine_score
25 ) / 3.0;
26     double sd = sqrt((pow(c_score - mean, 2) +
27         pow(music_score - mean, 2) +
28         pow(medicine_score - mean, 2)) / 3.0);
29
30     int rank = 10;
31
32     printf("%s\t%s\t%c\n"
33         "%d-%d-%d\t%s\n"
34         "%d\t%d\t%d\n"
35         "%f\t%f\t%d\n",
36         first_name, last_name, gender,
37         birth_month, birth_day, birth_year, weekday,
38         c_score, music_score, medicine_score,
39         mean, sd, rank);
40     return 0;
41 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <stdio.h>
6
7 int main(void) {
8     // const: constant
9     const double PI = 3.14159;
10
11     int radius = 10;
12
13     double circumference = 2 * PI * radius;
14
15     double area = PI * radius * radius;
16
17     /*
18      * format is composed of zero or more directives:
19      * ordinary characters and conversion specifications
20      * introduced by %
21      */
22     printf("radius = %d\ncircumference = %.2f\narea = %.2f\n",
23           radius, circumference, area);
24     return 0;
25 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <stdio.h>
6 #include <math.h>
7
8 int main(void) {
9     const double PI = 3.14159;
10
11     int radius = 100;
12
13     double surface_area = 4 * PI * pow(radius, 2);
14     double volume = 4.0 / 3 * PI * pow(radius, 3);
15
16     // .4: precision
17     // 15: minimum width
18     // -: flag
19     printf("%-15.4f : surface_area\n%-15.4f : volume\n",
20           surface_area, volume);
21
22     return 0;
23 }
```

```
1 // Created by hfwei on 2024/9/25.
2
3 #include <stdio.h>
4
5 int main(void) {
6     /*
7      * (scanf-ub-1)
8      */
9     double pi;
10    printf("Enter the value of pi:\n");
11    scanf("%f", &pi);
12    printf("pi = %f\n", pi);
13
14    /*
15     * (scanf-ub-2)
16     * enter "100000000000000000000" (19 0's)
17     */
18    int age;
19    printf("Enter your age:\n");
20    scanf("%d", &age);
21    printf("Your age is %d.\n", age);
22
23    /*
24     * (scanf-ub-3)
25     * enter a long string
26     * Linux: *** stack smashing detected *** terminated
27     * Aborted
28     */
29    char name[6];
30    printf("What's your name?\n");
31    scanf("%s", name);
32    printf("Hello %s!\n", name);
33
34    return 0;
35 }
```

```
1 // Created by hfwei on 2024/9/25.
2
3 #include <stdio.h>
4
5 int main(void) {
6     // (printf-ub-1)
7     int secret = 42;
8     printf("secret = %f\n", secret);
9
10    // (printf-ub-2)
11    double pi = 3.14159;
12    printf("pi = %d\n", pi);
13
14    // (printf-ub-3)
15    int light_speed = 299792458;
16    printf("light_speed = %c\n", light_speed);
17
18    return 0;
19 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <math.h>
6 #include <stdio.h>
7 #include <ctype.h>
8
9 int main(void) {
10     char first_name[] = "Tayu";
11     char last_name[] = "Lo";
12
13     char gender = 'm';
14     // char upper_gender = 'm' + 'A' - 'a';
15     // printf("upper_gender : %c\n", upper_gender);
16
17     int birth_year = 1954;
18     int birth_month = 7;
19     int birth_day = 20;
20     char weekday[] = "Tuesday";
21
22     int c_score = 50;
23     int music_score = 99;
24     int medicine_score = 78;
25
26     double mean = (c_score + music_score + medicine_score
27 ) / 3.0;
28     double sd = sqrt((pow(c_score - mean, 2) +
29         pow(music_score - mean, 2) +
30         pow(medicine_score - mean, 2)) / 3.0);
31
32     int rank = 10;
33
34     printf("%s %s \t %c\n"
35         "%.2d-%d-%d \t %.3s.\n"
36         "%d \t %d \t %d\n"
37         "%.1f \t %.2f \t %d%%\n",
38         first_name, last_name, toupper(gender),
39         birth_month, birth_day, birth_year, weekday,
40         c_score, music_score, medicine_score,
41         mean, sd, rank);
42
43     return 0;
44 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <math.h>
6 #include <stdio.h>
7 #include <ctype.h>
8
9 int main(void) {
10     char first_name[10];
11     char last_name[10];
12
13     char gender;
14
15     int birth_year;
16     int birth_month;
17     int birth_day;
18     char weekday[10];
19
20     int c_score;
21     int music_score;
22     int medicine_score;
23     int rank;
24
25     double mean = (c_score + music_score + medicine_score
26 ) / 3.0;
27
28     double sd = sqrt((pow(c_score - mean, 2) +
29                     pow(music_score - mean, 2) +
30                     pow(medicine_score - mean, 2)) / 3.0);
31
32     /*
33      * zero or more directives:
34      * (1) one or more white-space characters ( , \t, \n);
35      * (2) ordinary characters (neither % nor white-space
36      characters)
37      * (3) conversion specification introduced by %
38      */
39     scanf("%s%s%c %d%d%d%s %d%d%d %lf%lf %d%",
40         first_name, last_name, &gender,
41         &birth_year, &birth_month, &birth_day, weekday,
42         &c_score, &music_score, &medicine_score,
43         &mean, &sd, &rank);
44 }
```



```
43     printf("%s %s \t %c\n"  
44             "%.2d-%d-%d \t %.3s.\n"  
45             "%d \t %d \t %d\n"  
46             "%.1f \t %.2f \t %d%%\n",  
47             first_name, last_name, toupper(gender),  
48             birth_month, birth_day, birth_year, weekday,  
49             c_score, music_score, medicine_score,  
50             mean, sd, rank);  
51  
52     return 0;  
53 }
```

```
1 add_executable(circle circle.c)
2
3 add_executable(sphere sphere.c)
4 target_link_libraries(sphere m)
5
6 add_executable(mol mol.c)
7
8 add_executable(admin admin.c)
9 target_link_libraries(admin m)
10
11 add_executable(admin-final admin-final.c)
12 target_link_libraries(admin-final m)
13
14 add_executable(admin-scanf admin-scanf.c)
15 target_link_libraries(admin-scanf m)
16
17 add_executable(admin-scanf-final admin-scanf-final.c)
18 target_link_libraries(admin-scanf-final m)
19
20 add_executable(printf-ub printf-ub.c)
21 add_executable(scanf-ub scanf-ub.c)
22
23 add_executable(scanf-c17-ex2 scanf-c17-ex2.c)
24 add_executable(scanf-c17-ex3 scanf-c17-ex3.c)
```

```
1 // Created by hfwei on 2024/9/25.
2
3 // Get-Content .\scanf-c17-ex2-input.txt | .\scanf-c17-ex2
  .exe > scanf-c17-ex2-output.txt
4 // ./scanf-c17-ex2 < scanf-c17-ex2-input.txt > scanf-c17-
  ex2-output.txt
5
6 #include <stdio.h>
7
8 // Example 2 from C17 (Page 234)
9 int main(void) {
10     int i;
11     double x;
12     char name[50];
13
14     // enter "56789 0123 56a72"
15     scanf("%2d%lf%d %[0123456789]",
16         &i, &x, name);
17
18     // fscanf(stdin, ...);
19
20     printf("i = %d\n"
21         "x = %f\n"
22         "name = %s\n",
23         i, x, name);
24
25     return 0;
26 }
```

```
1 // Created by hfwei on 2024/9/25.
2
3 #include <stdio.h>
4
5 // Example 3 from C17 (Page 234)
6 int main(void) {
7     int count = 0;
8     double quant = 0;
9     char units[21] = "";
10    char item[21] = "";
11
12    // input:
13    // 2 quarts of oil
14    // -12.8degrees Celsius
15    // lots of luck
16    // 10.0LBS
17    // of
18    //     dirt
19    // 100ergs of energy
20    do {
21        count = scanf("%lf%20s of %20s",
22                      &quant, units, item);
23        scanf("%*[^\\n]");
24
25        // added
26        printf("count = %d\\n"
27              "quant = %f\\n"
28              "units = %s\\n"
29              "item = %s\\n",
30              count, quant, units, item);
31    } while (!feof(stdin) && !ferror(stdin));
32
33    // output:
34    // count = 3;
35    // quant = 2; strcpy(units, "quarts"); strcpy(item, "oil
36    ");
37    // count = 2; // "C" fails to match "o"
38    // quant = -12.8; strcpy(units, "degrees");
39
40    // count = 0; // "l" fails to match "%f"
41
42    // count = 3;
43    // quant = 10.0; strcpy(units, "LBS"); strcpy(item, "
```

```
43 dirt");
44
45 // count = 0; // "100e" fails to match "%f" // 100.
    000000 rgs energy!!! (not conformed to the C Standard)
46
47 // count = EOF;
48
49 // A bug in gcc: https://sourceware.org/bugzilla/show\_bug.cgi?id=1765#c1
50
51 // input & output:
52 // 2 quarts of oil
53 // quant = 2.000000
54 // units = quarts
55 // item = oil
56
57 // -12.8degrees Celsius
58 // quant = -12.800000
59 // units = degrees
60 // item = oil
61
62 // lots of luck
63 // quant = -12.800000
64 // units = degrees
65 // item = oil
66
67 // 10.0LBS
68 // of
69 // dirt
70 // quant = 10.000000
71 // units = LBS
72 // item = dirt
73
74 // 100ergs of energy
75 // quant = 100.000000
76 // units = rgs
77 // item = energy
78
79 return 0;
80 }
```

```
1 //
2 // Created by hfwei on 2024/9/25.
3 //
4
5 #include <math.h>
6 #include <stdio.h>
7 #include <ctype.h>
8
9 int main(void) {
10     char first_name[10];
11     char last_name[10];
12
13     char gender;
14
15     int birth_year;
16     int birth_month;
17     int birth_day;
18     char weekday[10];
19
20     int c_score;
21     int music_score;
22     int medicine_score;
23     int rank;
24
25     /*
26      * zero or more directives:
27      * (1) one or more white-space characters ( , \t, \n);
28      * (2) ordinary characters (neither % nor white-space
29      characters)
30      * (3) conversion specification introduced by %
31      */
32     scanf("%9s%9s %c %d-%d-%d %9s %d%d%d %*lf%*lf %d%",
33           first_name, last_name, &gender,
34           &birth_year, &birth_month, &birth_day, weekday,
35           &c_score, &music_score, &medicine_score,
36           &rank);
37     double mean = (c_score + music_score + medicine_score
38 ) / 3.0;
39     double sd = sqrt((pow(c_score - mean, 2) +
40         pow(music_score - mean, 2) +
41         pow(medicine_score - mean, 2)) / 3.0);
42 }
```

```
43
44     printf("%s %s \t %c\n"
45            "%.2d-%d-%d \t %.3s.\n"
46            "%d \t %d \t %d\n"
47            "%.1f \t %.2f \t %d%%\n",
48            first_name, last_name, toupper(gender),
49            birth_month, birth_day, birth_year, weekday,
50            c_score, music_score, medicine_score,
51            mean, sd, rank);
52
53     return 0;
54 }
```

1 56789 0123 56a72



```
1 2 quarts of oil
2 -12.8degrees Celsius
3 lots of luck
4 10.0LBS
5 of
6 dirt
7 100ergs of energy
```