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1 //
2 // Created by hfwei on 2022/12/8.
3 //
4
5 #include <stdio.h>
6 #include <string.h>
7 #include <stdlib.h>
8 #include <stddef.h>
9 #include <time.h>
10
11 typedef enum gender {
12     MALE,
13     FEMALE,
14 } Gender;
15
16 typedef struct score {
17     int c_score;
18     int java_score;
19     int python_score;
20 } Score;
21
22 typedef struct musician {
23     char *name;
24     // char gender;
25     Gender gender;
26     struct tm birth;
27
28     char *album;
29
30     Score score;
31 } Musician;
32
33 // void PrintMusician(const Musician m);
34 void PrintMusician(const Musician *m);
35 int CompareMusician(const void *m1, const void *m2);
36
37 int main() {
38     printf("sizeof(Score) = %zu\n", sizeof(Score));
39     printf("sizeof(Musician) = %zu\n", sizeof(Musician));
40     printf("offsetof(Musician, name) = %zu\n", offsetof(Musician, name
41 ));
42     printf("offsetof(Musician, gender) = %zu\n", offsetof(Musician,
43 gender));
44     printf("offsetof(Musician, album) = %zu\n", offsetof(Musician, album
45 ));
46     printf("offsetof(Musician, score) = %zu\n", offsetof(Musician, score
47 ));
48
49     Musician luo = {
50         .name = "Luo Dayou",
51         .gender = MALE,
52         .birth = {
53             .tm_year = 1954 - 1900,
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50         .tm_mon = 7 - 1,
51         .tm_mday = 20,
52         .tm_wday = 2, // Tuesday
53     },
54     .album = "ZhiHuZheYe",
55     .score = {
56         .c_score = 0,
57         .java_score = 10,
58         .python_score = 20,
59     },
60 };
61
62 Musician cui = {
63     .name = "Cui Jian",
64     .gender = MALE,
65     .birth = {
66         .tm_year = 1961 - 1900,
67         .tm_mon = 8 - 1,
68         .tm_mday = 2,
69         .tm_wday = 3, // Wednesday
70     },
71     .album = "XinChangZhengLuShangDeYaoGun",
72     .score = {
73         .c_score = 10,
74         .java_score = 20,
75         .python_score = 30,
76     },
77 };
78
79 char album[] = "YiKeBuKenMeiSuDeXin";
80 Musician zhang = {
81     .name = "Zhang Chu",
82     .gender = MALE,
83     .birth = {
84         .tm_year = 1968 - 1900,
85         .tm_mon = 11 - 1,
86         .tm_mday = 17,
87         .tm_wday = 0, // Sunday
88     },
89     // .album = "YiKeBuKenMeiSuDeXin",
90     .album = album,
91     .score = {
92         .c_score = 20,
93         .java_score = 30,
94         .python_score = 40,
95     },
96 };
97
98 Musician guo = zhang;
99 guo.name = "Guo Fucheng";
100 strcpy(guo.album, "YiKeJiuMeiSuDeXin");
101 // PrintMusician(guo);
102 // PrintMusician(zhang);

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103     PrintMusician(&guo);
104     PrintMusician(&zhang);
105
106     Musician musicians[] = { luo, cui, zhang, };
107     int len = sizeof musicians / sizeof *musicians;
108     for (int i = 0; i < len; ++i) {
109         // PrintMusician(musicians[i]);
110         PrintMusician(&musicians[i]);
111     }
112
113     qsort(musicians, len,
114           sizeof *musicians,
115           CompareMusician);
116
117     for (int i = 0; i < len; ++i) {
118         // PrintMusician(musicians[i]);
119         PrintMusician(&musicians[i]);
120     }
121
122     return 0;
123 }
124
125 // void PrintMusician(const Musician m) {
126 //     printf("\n%s\t%d\t%s\t%d\t%d\t%d\n",
127 //           m.name,
128 //           m.gender,
129 //           m.album,
130 //           m.score.c_score,
131 //           m.score.java_score,
132 //           m.score.python_score);
133 // }
134
135 void PrintMusician(const Musician *m) {
136     printf("\n%s\t%d\t%s\t%s\t%d\t%d\t%d\n",
137           m->name,
138           m->gender,
139           asctime(&m->birth),
140           m->album,
141           m->score.c_score,
142           m->score.java_score,
143           m->score.python_score);
144 }
145
146 int CompareMusician(const void *m1, const void *m2) {
147     const Musician *m_left = m1;
148     const Musician *m_right = m2;
149
150     return strcmp(m_left->album, m_right->album);
151 }

```