計算機程式語言

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Chapter 5_project 7

Write a program that finds the largest and smallest of four integers entered by the user;

Enter four integers : 21 43 10 35
Largest : 43
Smallest : 10

Use as few if statements as possible. *Hint:* Four if statements are sufficient.

Solution

```
2
3   #include <stdio.h>
4
5   int main(void){
6       int n1,n2,n3,n4,
7           largest12, smallest12,
8           largest34, smallest34,
9           largest, smallest;
10
11      printf("Enter four integers : ");
12      scanf("%d%d%d%d", &n1, &n2, &n3, &n4);
13
14      if(n1 > n2){
15
16
17      }else{
18
19
20      }
21
22      if(n3 > n4){
23
24
25      }else{
26
27
28      }
29
```

Solution


29
30 if(largest12 > largest34)
31
32 else
33
34
35 if(smallest12 > smallest34)
36
37 else
38
39
40 printf("Largest : %d\n", largest);
41 printf("Smallest : %d\n", smallest);
42
43 return 0;
44
45 }

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter four integers : 21 43 10 35
Largest : 43
Smallest : 10
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter four integers : 1234 999 9999 5
Largest : 9999
Smallest : 5
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```

Chapter 5_project 8

8. The following table shows the daily flights from one city to another;

Departure time	*Arrival time*
8:00 a.m.	10:16 a.m.
9:43 a.m.	11:52 a.m.
11:19 a.m.	1:31 p.m.
12:47 p.m.	3:00 p.m.
2:00 p.m.	4:08 p.m.
3:45 p.m.	5:55 p.m.
7:00 p.m.	9:20 p.m.
9:45 p.m.	11:58 p.m.

Chapter 5_project 8

Wrile a program that asks user to enter a time (expressed in hours and minutes, using the 24 - hour clock). The program then displays the departure and arrival times for the flight whose departure time is closest to that entered by the user:

Enter a 24-hour time： 13:15

Closest departure time is 12:47 p.m., arriving at 3:00 p.m.

Hint: Convert the input into a time expressed in minutes since midnight, and compare it to the departure times, also expressed in minutes since midnight. For example, 13:15 is 13 X 60 + 15 = 795 minutes since midnight, which is closer to 12:47 p.m. (767 minutes since midnight) than to any of the other departure times.

Solution

```
#include <stdio.h>

int main(void){
    int hours, minutes, time, closest;

    printf("Enter a 24-hour time : ");
    scanf("%d : %d", &hours, &minutes);

    time = hours * 60 + minutes;

    /*
        Bound time entered by user between two successive departures,
        then determine which one is closer.
    */

    if(time <= 480)      // 8:00 a.m.
        closest = 480;
    else if(time <= 583)     // 9:43 a.m.
        closest = (time - 480) <= (583 - time) ?  :  ;
    else if(time <= 679)     // 11:19 a.m.
        
    else if(time <= 767)     // 12:47 p.m.
        
    else if(time <= 840)     // 2:00 p.m.
        
    else if(time <= 945)     // 3:45 p.m.
        
    else if(time <= 1140)    // 7:00 p.m.
        
    else                     // 9:45 p.m.
        

```

Solution

```
34
35      /*
36          Display departure and arrival times. Code from Programming Project2
37          could be used here, but arrival time would need to be stored in a variable.
38      */
39
40      switch(closest){
41          case 480:
42              printf("Closest departure time is 8:00 a.m, arriving at 10:16 a.m.\n");
43              break;
44          case 583:
45              printf("Closest departure time is 9:43 a.m, arriving at 11:52 a.m.\n");
46              break;
47          case 679:
48              printf("Closest departure time is 11:19 a.m, arriving at 1:31 p.m.\n");
49              break;
50          case 767:
51              printf("Closest departure time is 12:47 p.m, arriving at 3:00 p.m.\n");
52              break;
53          case 840:
54              printf("Closest departure time is 2:00 p.m, arriving at 4:08 p.m.\n");
55              break;
56          case 945:
57              printf("Closest departure time is 3:45 p.m, arriving at 5:55 p.m.\n");
58              break;
59          case 1140:
60              printf("Closest departure time is 7:00 p.m, arriving at 9:20 p.m.\n");
61              break;
62          case 1305:
63              printf("Closest departure time is 9:45 p.m, arriving at 11:58 p.m.\n");
64              break;
65      }
66
67      return 0;
68
69  }
70
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a 24-hour time : 9:45
Closest departure time is 9:43 a.m., arriving at 11:52 a.m.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter a 24-hour time : 13:15
Closest departure time is 12:47 p.m., arriving at 3:00 p.m.
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```

Chapter 5_project 9

9. Write a program that prompts the user to enter two dates and then indicates which date comes earlier on the calendar;

Enter first date (mm/dd/yy): 3/6/08

Enter second date (mm/dd/yy)： 5/17/07

5/17/07 is earlier than 3/6/08

Solution

```
3   #include <stdio.h>
4
5   int main(void){
6       int month1, day1, year1, month2, day2, year2;
7       bool first_earlier;
8
9       printf("Enter first date (mm/dd/yy) : ");
10      scanf("%d/%d/%d", &month1, &day1, &year1);
11      printf("Enter second date (mm/dd/yy) : ");
12      scanf("%d/%d/%d", &month2, &day2, &year2);
13
14
15      if(year1 != year2)
16          first_earlier = (year1 < year2);
17      else if(month1 != month2)
18
19      else
20
21
22      if(first_earlier)
23
24
25      else
26
27
28
29      return 0;
30
31  }
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter first date (mm/dd/yy) : 12/12/99
Enter second date (mm/dd/yy) : 1/1/01
1/1/01 is earlier than 12/12/99
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter first date (mm/dd/yy) : 3/6/08
Enter second date (mm/dd/yy) : 5/17/07
5/17/07 is earlier than 3/6/08
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```

Chapter 5_project 10

Using the switch statement, write a program that converts a numerical grade into a letter grade:

```
Enter numerical grade: 84

Letter grade: B
```

Use the following grading scale: A=90-100, B=80-89, C=70-79, D=60-69, F=0-59.

Print an error message if the grade is larger than 100 or less than 0.Hint: Break the garde into two digits, then use a switch statement to test then the ten's digit.

Chap5_2.c > ...

```c
#include <stdio.h>

int main(void) {

    int grade;

    printf("Enter numerical grade: ");
    scanf("%d", &grade);

    if (grade > 100 || grade < 0)
        grade = -11; /* To be properly caught in default case */

    switch (        ) {

        case 6:

        case 7:

        case 8:

        case 9: case 10:

        default:
            printf("Error: numerical grade out of range 0-100\n");
            break;
    }

    return 0;
}
```

Example

```
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter numerical grade: 84
Letter grade: B
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter numerical grade: 100
Letter grade: A
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter numerical grade: 1000
Error: numerical grade out of range 0-100
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$ ./a.out
Enter numerical grade: -200
Error: numerical grade out of range 0-100
ming173899@LAPTOP-MTRC7IR7:/mnt/c/Users/bobo/Desktop$
```