Computer Programming

Quiz1

Apr. 12, 2024

Problem 1 (pr1.c)

- Write a program that prompts the user to enter a positive integer and then prints the Fibonacci sequence up to that number. The Fibonacci sequence starts with the first and second terms being 1, and each subsequent term is the sum of the two preceding terms.

  ✓ Use the *while* statement.

  ✓ The Fibonacci sequence is a sequence in which the first and second terms are 1, and all subsequent terms are the sum of the previous two terms. This can be expressed as a formula:

  $F(n)=F(n-1)+F(n-2)$

  - First term: 1
  - Second term: 1
  - Third term: Calculated as the sum of the first term (1) and the second term (1), so $1 + 1 = 2$
  - Fourth term: Calculated as the sum of the second term (1) and third term (2), so $1 + 2 = 3$
  - Fifth term: Calculated as the sum of the third term (2) and fourth term (3), so $2 + 3 = 5$
  - ...

Problem 1 (pr1.c)

- **Program output**

```
[ohyong@cse Quiz1_s345]$ vi pr1.c
[ohyong@cse Quiz1_s345]$ gcc pr1.c -o pr1
[ohyong@cse Quiz1_s345]$ ./pr1
Enter a positive integer: 10
Fibonacci sequence up to 10: 1 1 2 3 5 8
```

```
[ohyong@cse Quiz1_s345]$ ./pr1
Enter a positive integer: 50
Fibonacci sequence up to 50: 1 1 2 3 5 8 13 21 34
```

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Problem 2 (pr2.c)

- Write a program that receives a positive integer as input from the user and outputs a triangle like the one below.

- **Program output**

```
[ohyong@cse Quiz1_s345]$ vi pr2.c
[ohyong@cse Quiz1_s345]$ gcc pr2.c -o pr2
[ohyong@cse Quiz1_s345]$ ./pr2
Enter the number of rows: 7
*
**
***
****
*****
******
*******
```

```
[ohyong@cse Quiz1_s345]$ ./pr2
Enter the number of rows: 15
*
**
***
****
*****
******
*******
********
*********
**********
***********
************
*************
**************
***************
```

Problem 3 (pr3.c)

- Write a program by *implementing* a **function** that returns the number of divisors of *n* entered by the user.
    - ✓ If you program without implementing a separate function, -6 points will be deducted.
    - ✓ The function's prototype is:
        - int countDivisors(int n);

    - ✓ A *divisor* is a number that is divided when one integer is divided by another integer. In other words, when an integer *n* is divided by another integer *m* and the remainder is 0, *m* is a divisor of *n*.
        - ■ For example, the divisors of the integer 12 are 1, 2, 3, 4, 6, and 12. Because when you divide 12 by 1, 2, 3, 4, 6, and 12, the remainders are all 0. Therefore, 1, 2, 3, 4, 6, and 12 are factors of 12.
        - ■ Divisors of 24
            - ➤ 1, 2, 3, 4, 6 , 8, 12, 24
            - ➤ Total 8 divisors

Problem 3 (pr3.c)

- **Program output**

```
[ohyong@cse Quiz1_s345]$ vi pr3.c
[ohyong@cse Quiz1_s345]$ gcc pr3.c -o pr3
[ohyong@cse Quiz1_s345]$ ./pr3
Enter an integer: 8
Number of divisors of 8: 4
```

```
[ohyong@cse Quiz1_s345]$ ./pr3
Enter an integer: 24
Number of divisors of 24: 8
```

```
[ohyong@cse Quiz1_s345]$ ./pr3
Enter an integer: 5
Number of divisors of 5: 2
```

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Submission

- **Submit to CSE server**

At the end of the Quiz1, submit your C source files by typing

~gs1401/bin/submit Quiz1_s345 pr1.c pr2.c pr3.c   // due : 12:00

You may check that you have submitted your source code correctly by typing

~gs1401/bin/submit -check