In The Name Of God

The Most Compassionate And Merciful

Problem Set - 2

Functions + Fundamentals of Arrays

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Sheet info :

* Problem Set 2
* Due Date : Not Set
* Just upload scorable questions on HWS.
* File name format : “**studentNumber\_PS2.zip**”
* Do not hesitate to ask any question from your graders!

1 - Write a function in C to check whether a number is a prime number or not using the function.

Functions : int get\_number(void) , int check\_prime(int n)

// check\_prime() shall return 1 if “ true “ and 0 if “false”

2 - Write a function in C to calculate the first n terms of Fibonacci series( recursively).write a function using putchar() to display the output .

Fibonacci series 0 1 1 2 3 5 8 13 ....

|  |
| --- |
| Test Data :  Input number of terms to display : 10  Expected Output : Here is the Fibonacci series upto to 10 terms :  0 1 1 2 3 5 8 13 21 34 |

3 - Write a function in C to find GCD of two numbers using recursion.

Test Data :

|  |
| --- |
| Input 1st number: 10  Input 2nd number: 50  Expected Output : The GCD of 10 **and** 50 is: 10 |

4 - Write a function for multiply(a, b), where a and b are both(+ or -) integers, but you can only use the + or − operators.

5 - Write a function in C to Check whether a given positive integer is Palindrome or not by using recursion.(output is yes or no).

Test Data :

|  |
| --- |
| Input any decimal number : 616  Expected Output : Yes |

6 - write a program that solves hanoi tower problem recursively for input n .

Example :

Input :

|  |
| --- |
| 3 |

Output :

|  |
| --- |
| From 1 to 3 From 1 to 2 From 3 to 2 From 1 to 3 From 2 to 1 From 2 to 3 From 1 to 3 |

7 - Write a function in C to convert decimal number to binary number.

Void converter ( char binary\_form [ ] , int decimal\_number )

Test Data :

|  |
| --- |
| Input any decimal number : 65  Expected Output : The Binary value is : 1000001 |

8 - Write a function in C to convert a number from any base to the wanted base .

Function prototype -> void converter ( char number [ ] , int from\_base , int to\_base )

(from\_base and to\_base are between 2 to 16 )

|  |
| --- |
| converter(“79” , 10 , 16 )  // Convert 79 from base 10 to base 16 . Expected Output : The equivalent in base 16 : 4F |

9 - 2520 is the smallest number that can be divided by

each of the numbers from 1 to 10 without any remainder (remainder = 0 ) .

Write a program that finds the smallest positive number

that is divisible by all of the numbers from one ​ to ​y ​?

( the user inputs the y )

10 - write a function that takes a number n as input and

returns the smallest number that can be made with the

digits of n. ( by using arrays )

Array Part :

11 - تابعی بنویسید که به عنوان ورودی یک آرایه کاراکتری بگیرد ، آرایه را برعکس کرده و در خروجی چاپ کند.( توجه : در کل برنامه فقط از یک آرایه کاراکتری استفاده کنید )

EX :

|  |
| --- |
| Void **reverse** ( **char** input [] ) {....}  // calling the function  Void **main**(**void**){  Char sentence[] = "abcdefg" ;  reverse(sentence);  print\_array(sentence); } //output : gfedcba |

12 - write a program to get an integer input and saves all of it’s divisors into an array ( by defining the suitable function ) and finally prints the array . ( it’s up to you to search about divisors if you don’t know what they are )

13 - given an array and a positive integer K , write a program that rotates the array k times .( rotate it from left to right - in other words : pop from the end and push to the beginning )

|  |
| --- |
| array =[ 1,5,4,7,2,9] Input : 3 Output : [7,2,9,1,5,4]  -------------------------------------------- Input : 2 Output : 2,9,1,5,4,7 |

The Questions below are from your source BOOK ( K & R ) :

14-Write a program to print a histogram of the lengths of words in its input. (horizontally and vertically)

15 - Write a program to print a histogram of the frequencies of different characters in its input.

16 - Write a program to print all input lines that are longer than 80 characters.

17 - Write a program to remove trailing blanks and tabs from each line of input, and to delete entirely blank lines.

18 - Write a program entab that replaces strings of blanks by the minimum number of tabs and blanks to achieve the same spacing.

19 - Write a program to remove all comments from a C program. Don't forget to handle quoted strings and character constants properly. (C comments don't nest.)

scorable

20 - بازی " عدد را حدس بزن " :

در این بازی ، کاربر ابتدا یک محدوده وارد میکنید . سپس کاربر یک عدد را در ذهن خودش به عنوان جواب در نظر میگیرد . حالا برنامه باید سعی کند عددی را که در ذهن کاربر است حدس بزند . ( چطور ؟؟ به مثال توجه کنید )

Ex :

فرض میکنیم عددی که مد نظر کاربر است 45 باشد

|  |
| --- |
| >> Input your range : 0 125 >>is your number 62 ? < Y **for** yes , L **for** being less , B **for** being bigger ) >> L >> is your number 31 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >> B >> is your number 46 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >>L >>is your number 38 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >>B >>is your number 42 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >>B >>is your number 44 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >>B >>is your number 45 ?< Y **for** yes , L **for** being less , B **for** being bigger ) >>Y //End of Program |

نکته این سوال این است که برنامه شما باید بتواند در کمترین تعداد حدس ممکن عدد مورد نظر کاربر را تشخیص دهد .

**#Do Your best and don’t worry about your score .**

**#Use google to get new ideas … don’t use it for cheating .**