

CSE102 – Computer Programming

Homework #2

Due Date: 06/03/2020

Hand in: A student with number 20180000001 should hand in a file named 20180000001_partx.c for each part of this homework and compress it into a .zip file which is named 20180000001.

Part 1. [30pts]

Write a complete program describing all the tasks below. In the main () function, the 3 integer values requested from the user will represent the lengths of the sides of a triangle, and the 4 functions specified below will be called from the main () function, ensuring that all tasks are performed completely.

- Determining whether the triangle can be drawn according to the triangle inequality theorem.
 - **If the triangle cannot be drawn;**
 - "According to the triangle inequality theorem, this triangle cannot be drawn. " message should be printed on the screen and the process should end.
 - **If the triangle can be drawn;**
 - "According to the triangle inequality theorem, this triangle can be drawn." message should be printed on the screen
 - the type of triangle should be determined
 - the perimeter of the triangle should be calculated
 - the area of the triangle should be calculated

1. Write a function that determines whether the triangle can be drawn according to the triangle inequality theorem and returns 1 if it can be plotted and 0 if it cannot be drawn.

"The Triangle Inequality Theorem states that the sum of any 2 sides of a triangle must be greater than the measure of the third side."

Function prototype is `int draw_triangle(int side1, int side2, int side3)`

2. Write a function that determines the type of the triangle (equilateral, isosceles or scalene) and prints on the screen, without returning value.

Function prototype is `void type_triangle(int side1, int side2, int side3)`

3. Write a function that calculates the perimeter of the triangle and returns this value.

Function prototype is `int perimeter_triangle(int side1, int side2, int side3)`

4. Write a function that calculates the area of the triangle according to the formula below and returns this value.

Let a,b,c be the lengths of the sides of a triangle. The area is given by:

$$Area = \sqrt{p(p-a)(p-b)(p-c)}$$

where p is half the perimeter, or $\frac{a+b+c}{2}$

Function prototype is `double area_triangle(int side1, int side2, int side3, int perimeter)`

Tip: When calculating the area of the triangle, take root by using the `sqrt()` function of the math library. You can find detailed information about using this function [here](#).

```
The length of first side:
3
The length of second side:
4
The length of third side:
5

According to the triangle inequality theorem, this triangle can be drawn.

It is a Scalene Triangle
The perimeter of the triangle:12
The area of the triangle:6.000000 ✖
```

Part 2. [50pts]

In the main () function, ask the user to enter a maximum of 6 digits and consider this number written 100 times next to each other. Write a complete program that tries to find the number in an index to be determined by the user in this large series of numbers.

Please note that the integer array and loops will not be used in the question.

You are expected to use 2 functions except the main function while performing the desired operations in the question.

1. A function that finds the length of the number entered by the user on the command screen and returns the integer value expressing the length should be defined.

Function prototype is `int number_length(int number)`

Hint : You can use the logarithm to find out how many digits the number is. You can access log functions and their uses in the math library for logarithm operation from [here](#).

2. According to the index value entered by the user on the command screen, define a function that finds the number in the specified index and returns that integer value.

Function prototype is `int find_digit(int number, int index)`

Hint : In order to obtain the number in a certain index within the number, you should use the digit values of the number. You may need the powers of 10 in your mathematical calculation. In this case, you can find detailed information about using pow () function in the math library [here](#).

```
Enter a number (maximum 6 digits):
123456
Your number has 6 digits

When your number is written 100 times next to each other, which digit of
this number would you like to see? :
561

561.th digit of the big number sequence: 3
```

Part 3. [20pts]

Write a currency converter program in the Main () function. You do not have to define functions for this part.

Exchange rate information will be accepted as follows.

1 Euro = 6.69 Turkish Lira

1 Dollar = 6.14 Turkish Lira

As you can see the screen output below, the user must first be greeted with the message "***** Welcome to ABC Exchange Office *****".

Then the user should be asked to write the amount of money he/she has on the command screen. The menu in the screenshot below should be created in order to select the currency that the user has.

By using the '**switch case**' structure according to the user's choice;

For example, if the user chose 1, 'You have xxx Turkish Liras' message should be printed on the screen.

Then, the user should be asked to choose the rate he / she wants to convert according to the menu above.

Currency exchange calculations should be completed depending on the user's choice again.

Please note that when the user makes a wrong choice (for example, if he makes a choice of 5), 'Your selection is invalid.' message should be printed.

```
*****Welcome to ABC Exchange Office*****
Enter your amount:
100

Please select your currency
1. Turkish Lira
2. Euro
3. Dollar

1
You have 100.000000 Turkish Liras
Choose which currency you want to convert
2

You have 14.947683 Euro
```

```
*****Welcome to ABC Exchange Office*****
Enter your amount:
50

Please select your currency
1. Turkish Lira
2. Euro
3. Dollar

1
You have 50.000000 Turkish Liras
Choose which currency you want to convert
5

Your selection is invalid!
```

General Rules:

1. Obey and don't broke the function prototypes that are shown on each part, otherwise, you will get zero from the related part.
2. The program must be developed on Linux based OS and must be compiled with gcc compiler, any problem which rises due to using another OS or compiler won't be tolerated.
3. Note that if any part of your program is not working as expected, then you can get zero from the related part, even it's working in some way.
4. Upload your .zip file on to Moodle to deliver your homework. The zip file must consist of one .c file that contains your solutions. Name format can be found on the top of this homework sheet.
5. You can ask any question about the homework by sending an email to bbuluz@gtu.edu.tr.