Programming Fundamentals Lab – 3

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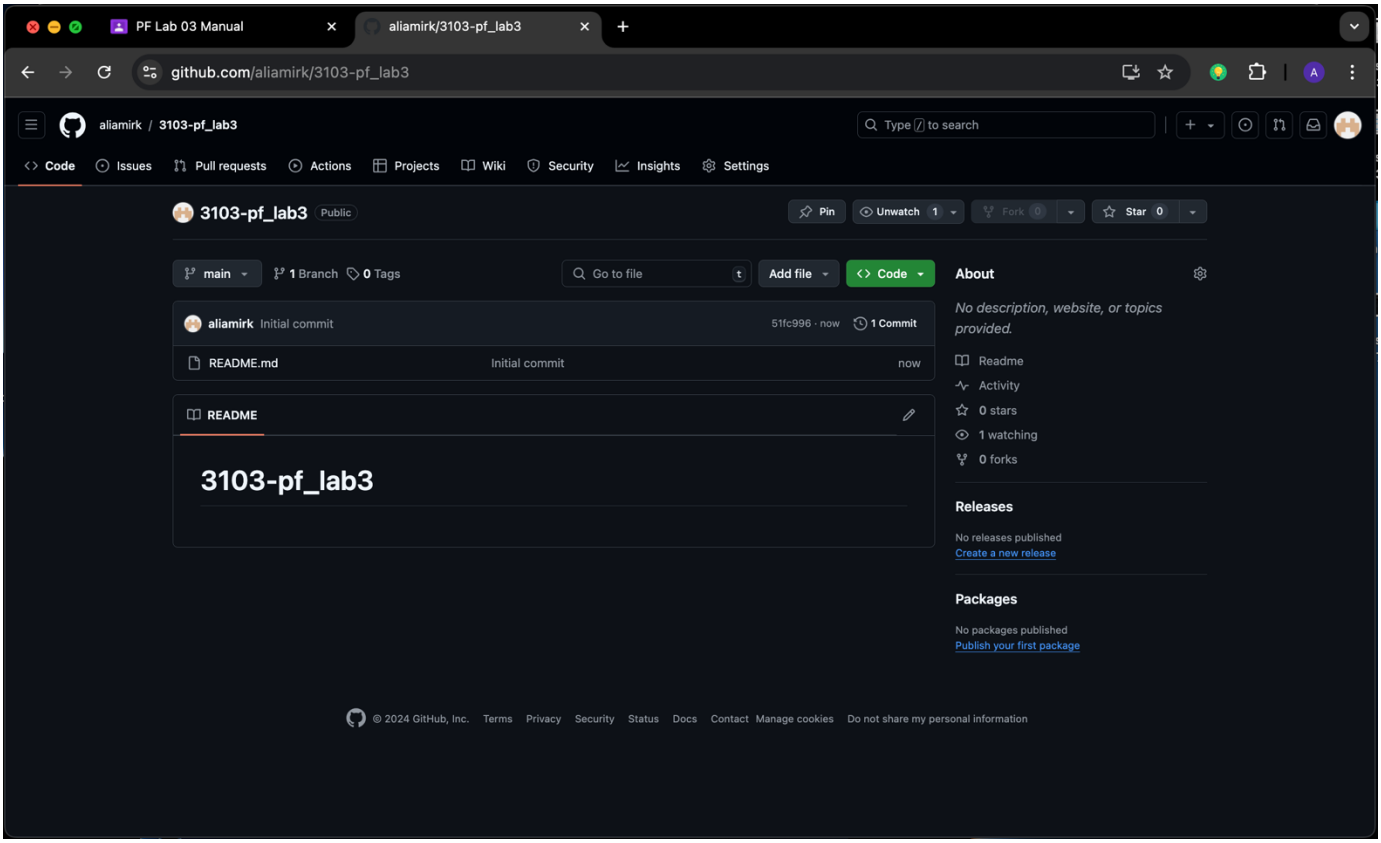
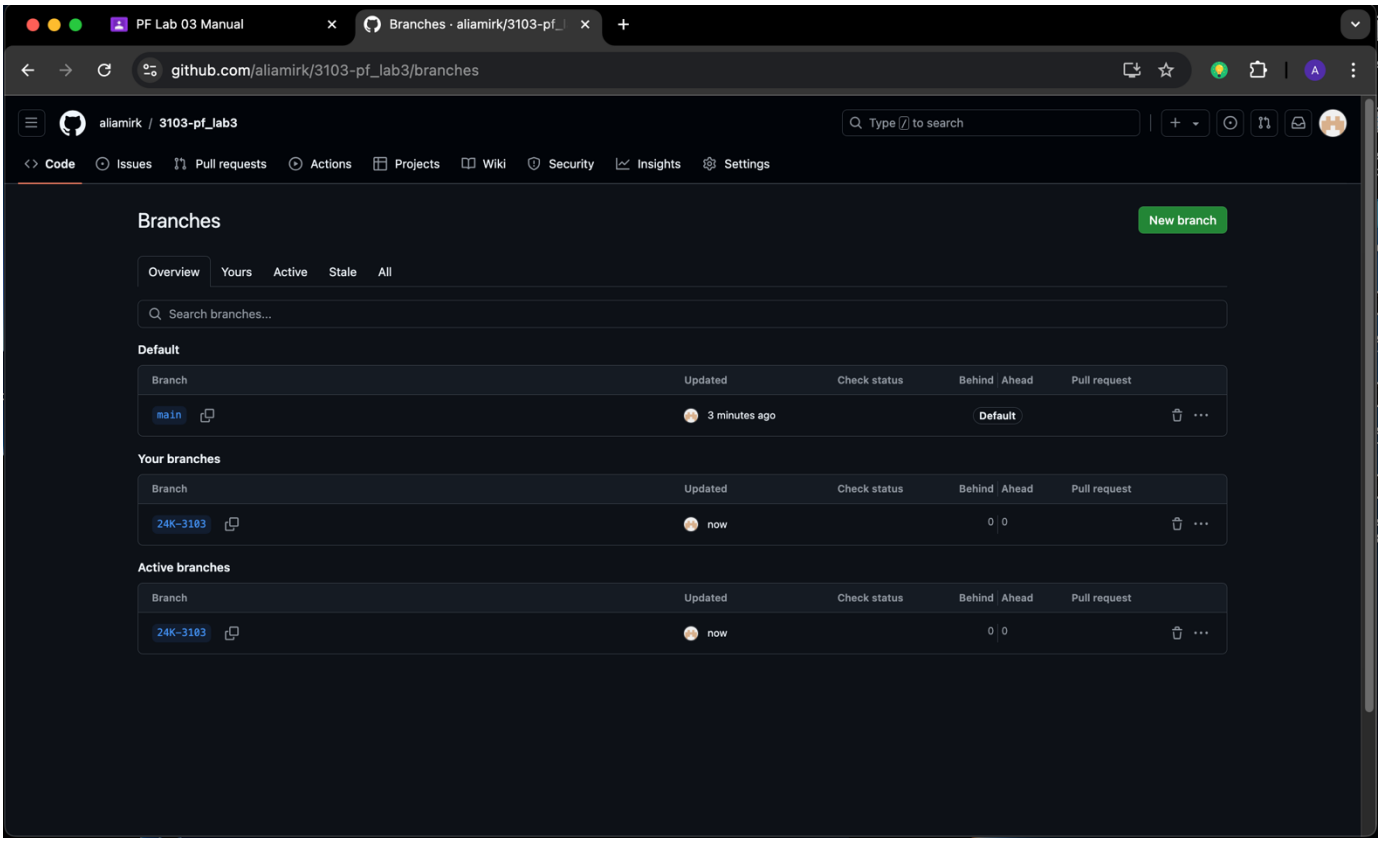
BS. Software Eng. - 01B

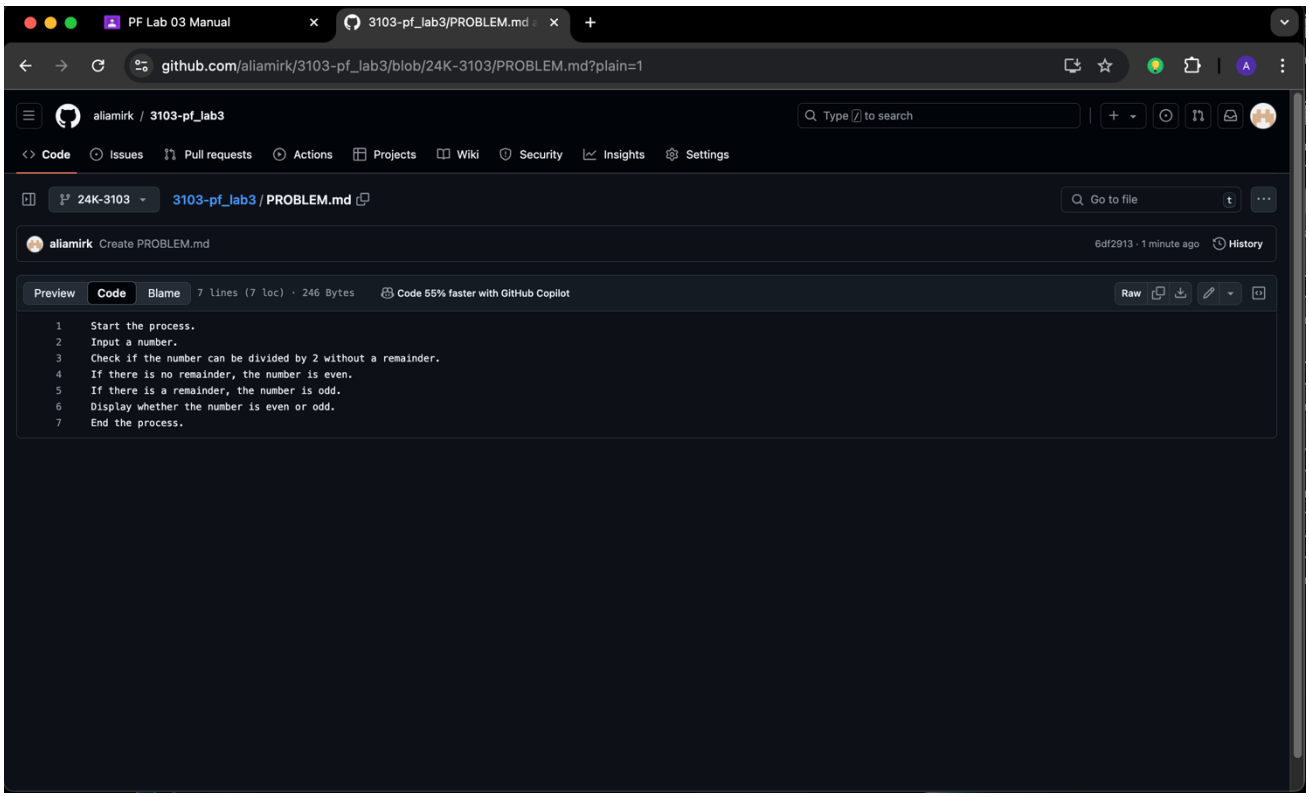
Task 1: Github Repository and Pull Request.



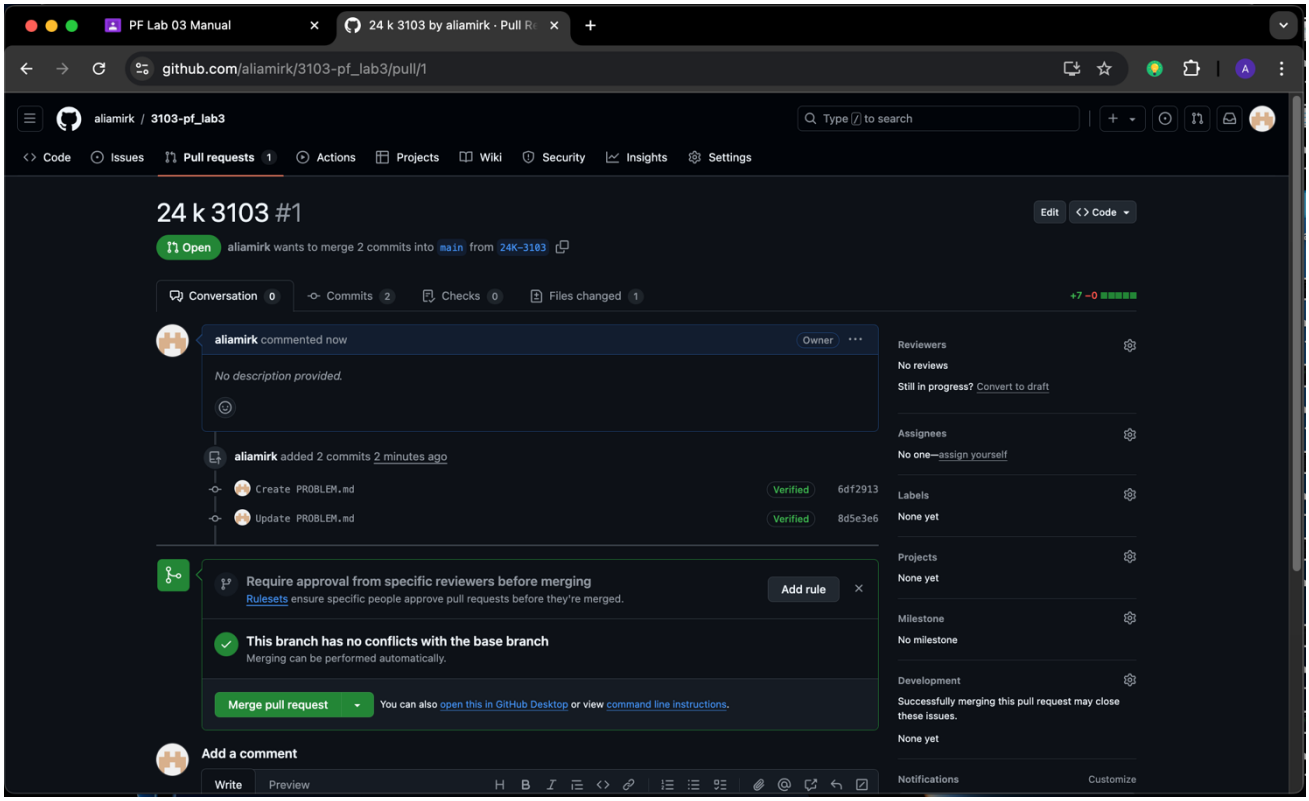
Created New Repository.



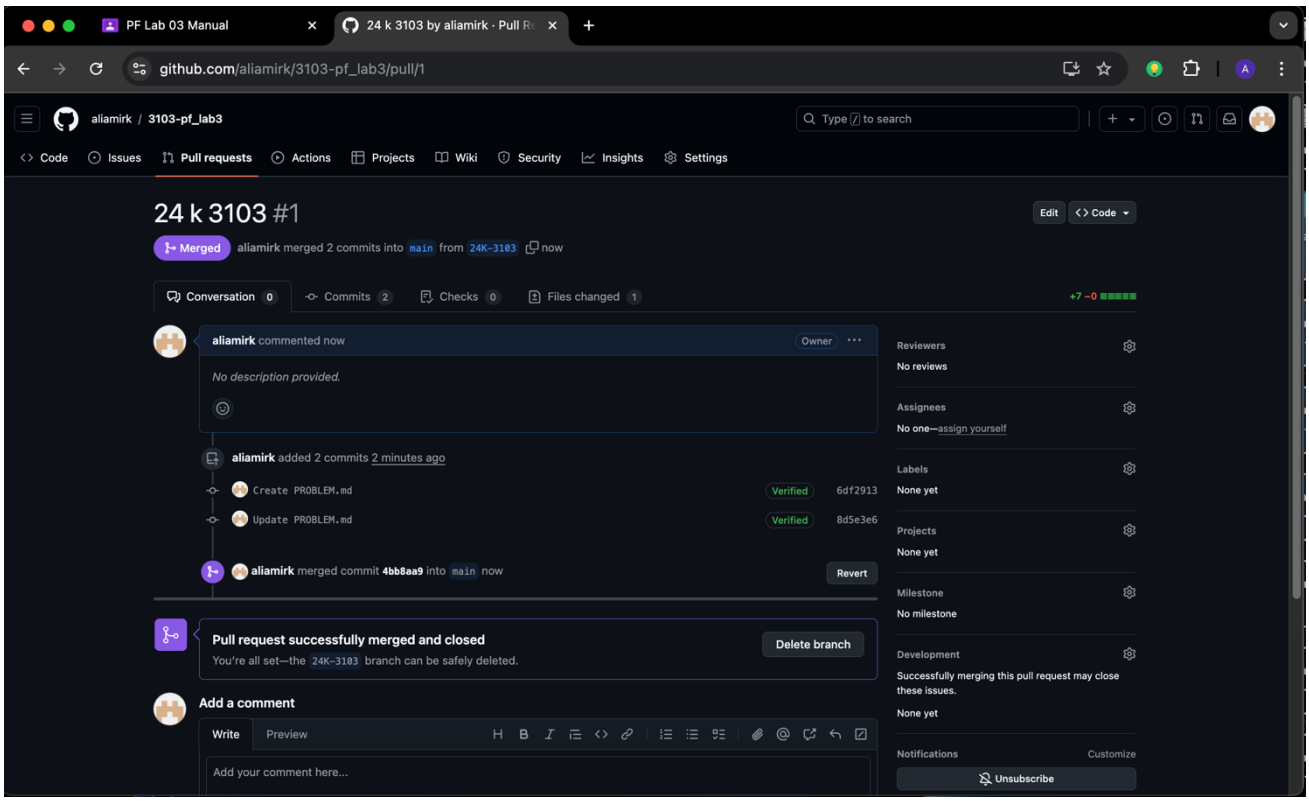
Created New Branch Named “24K-3101”.



Created PROBLEM.md File and added Algorithm Code.



Initiating a Pull Request.



New Branch Merged With “Main”

Task 2: Practice Programs.

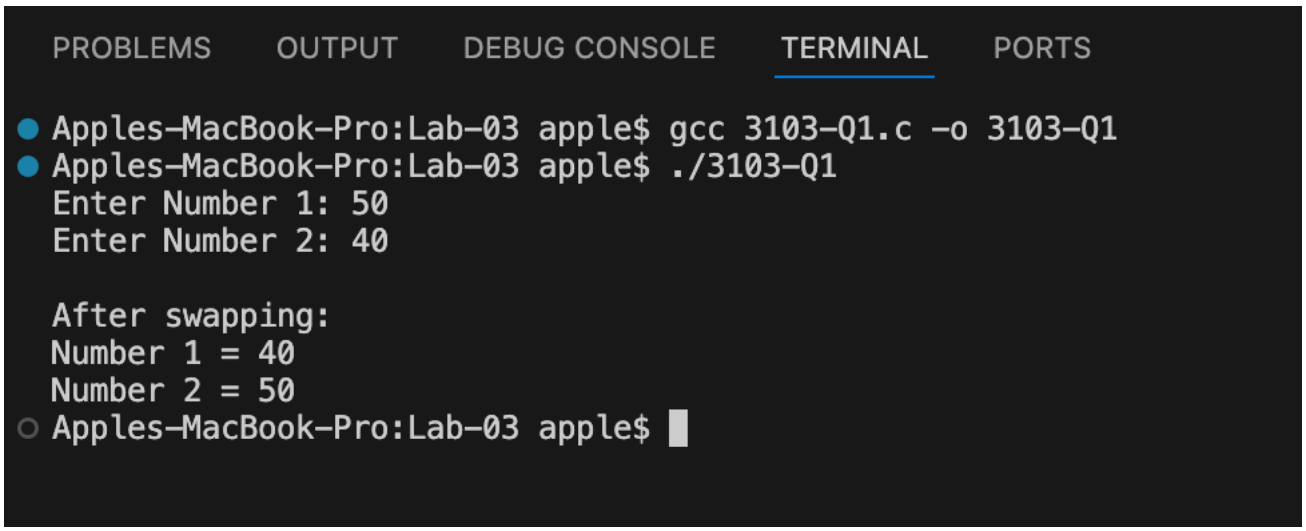
Q1: Explain the output of this C program. Why the wrong value is being displayed in the output?

Ans) The wrong value is calculated because the number 3000000000 is too big to fit in the int data type, which leads to an overflow. In C, int can hold numbers from -2147483648 to 2147483647. Since 3000000000 is bigger than this, it wraps around into the negative range, making the result wrong. To fix this, a larger data type should be used.

Q2: Write a C program that takes two integer values as input from the user. Then swap the values taken from the user and display the output of the variables.

3103-Q1.c

```c
#include <stdio.h>

int main() {
    int Num1,Num2,temp;

    printf("Enter Number 1: ");
    scanf("%d" ,&Num1);

    printf("Enter Number 2: ");
    scanf("%d",&Num2);


    temp = Num2;
    Num2 = Num1;
    Num1 =  temp;

    printf("\nAfter swapping:\n");
    printf("Number 1 = %d\nNumber 2 = %d\n", Num1, Num2);

    return 0;
};

```


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter Number 1: 50
Enter Number 2: 40
After swapping:
Number 1 = 40
Number 2 = 50
Apples-MacBook-Pro:Lab-03 apple$

Q3: Construct a C program where you calculate the slope of two points (5,4), (3,2). Use format specifiers to cap the result to 3 decimal places.

3103-Q1.c 3103-Q2.c

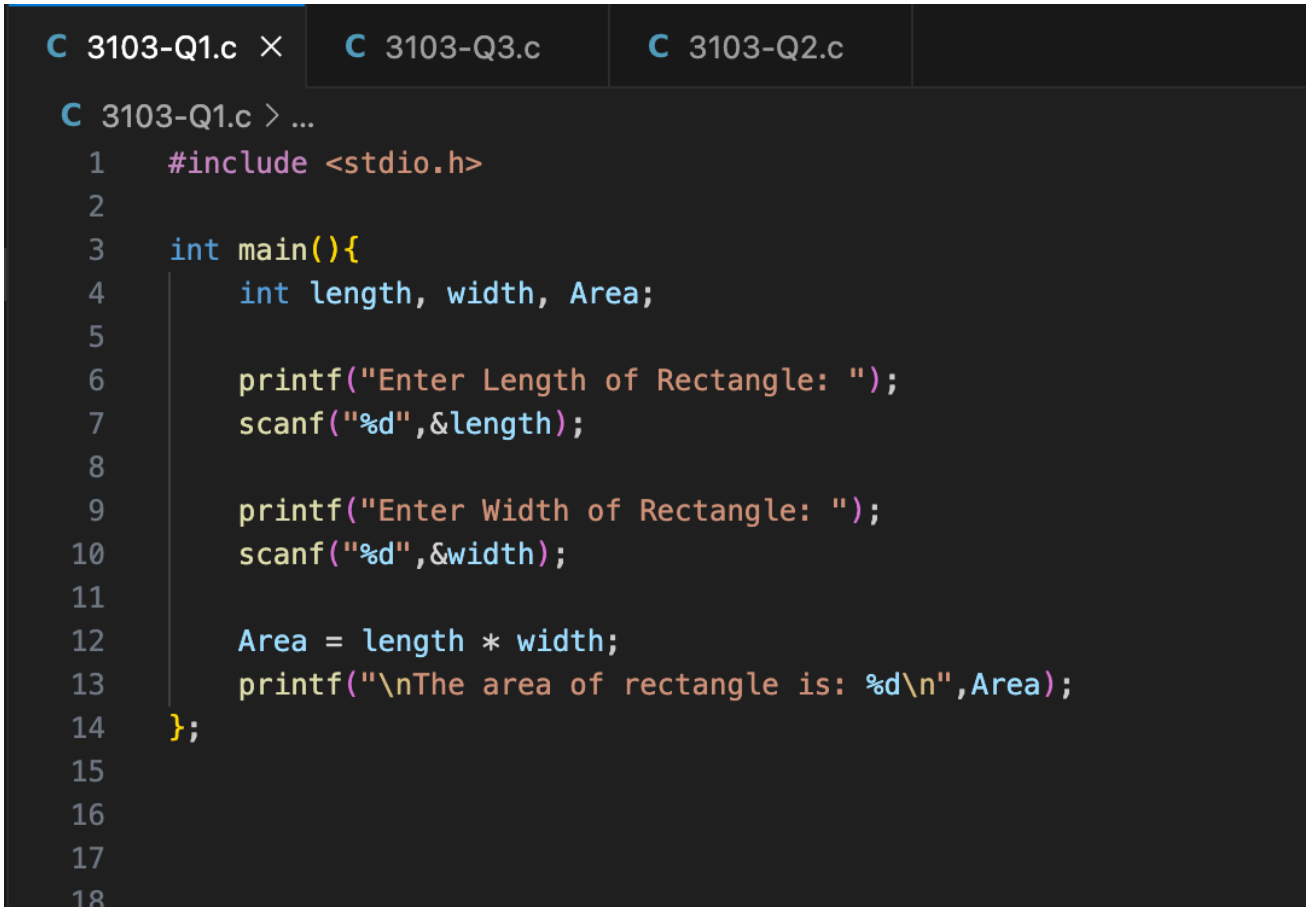
3103-Q1.c > ...

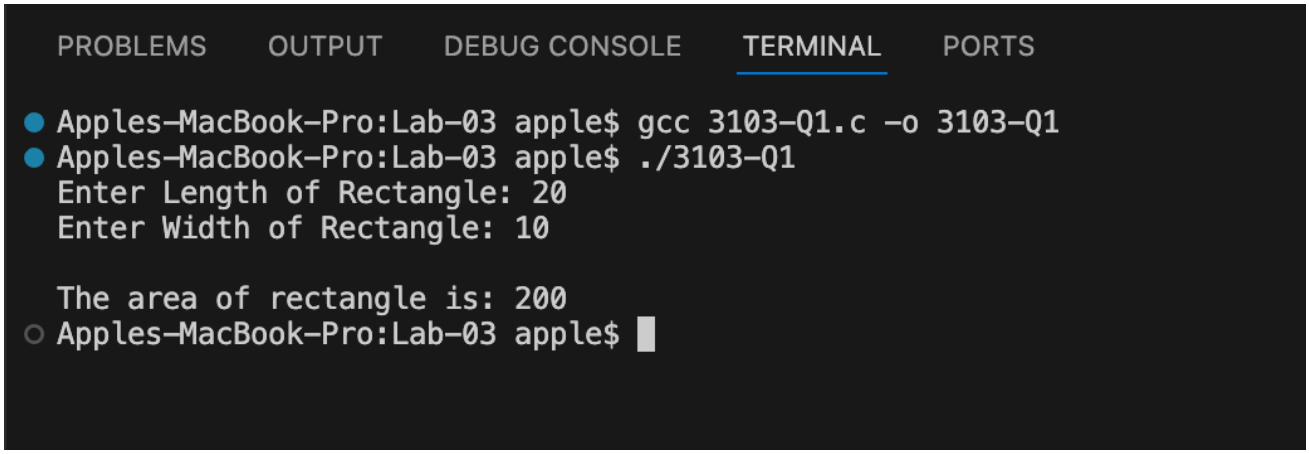
```c
#include <stdio.h>

int main(){
    int _x1,_x2,_y1,_y2;
    float slope;

    _x1 = 5;
    _x2 = 3;
    _y1 = 4;
    _y2 = 2;

    slope = (_x2-_x1)/(_y2-_y1);
    printf("The slope of the line is: %.3f\n", slope);
    return 0;

};
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
The slope of the line is: 1.000
Apples-MacBook-Pro:Lab-03 apple$
```

Q4: Construct a C program where you calculate the area and perimeter of a rectangle given its length and width. Take value of length and width from user.



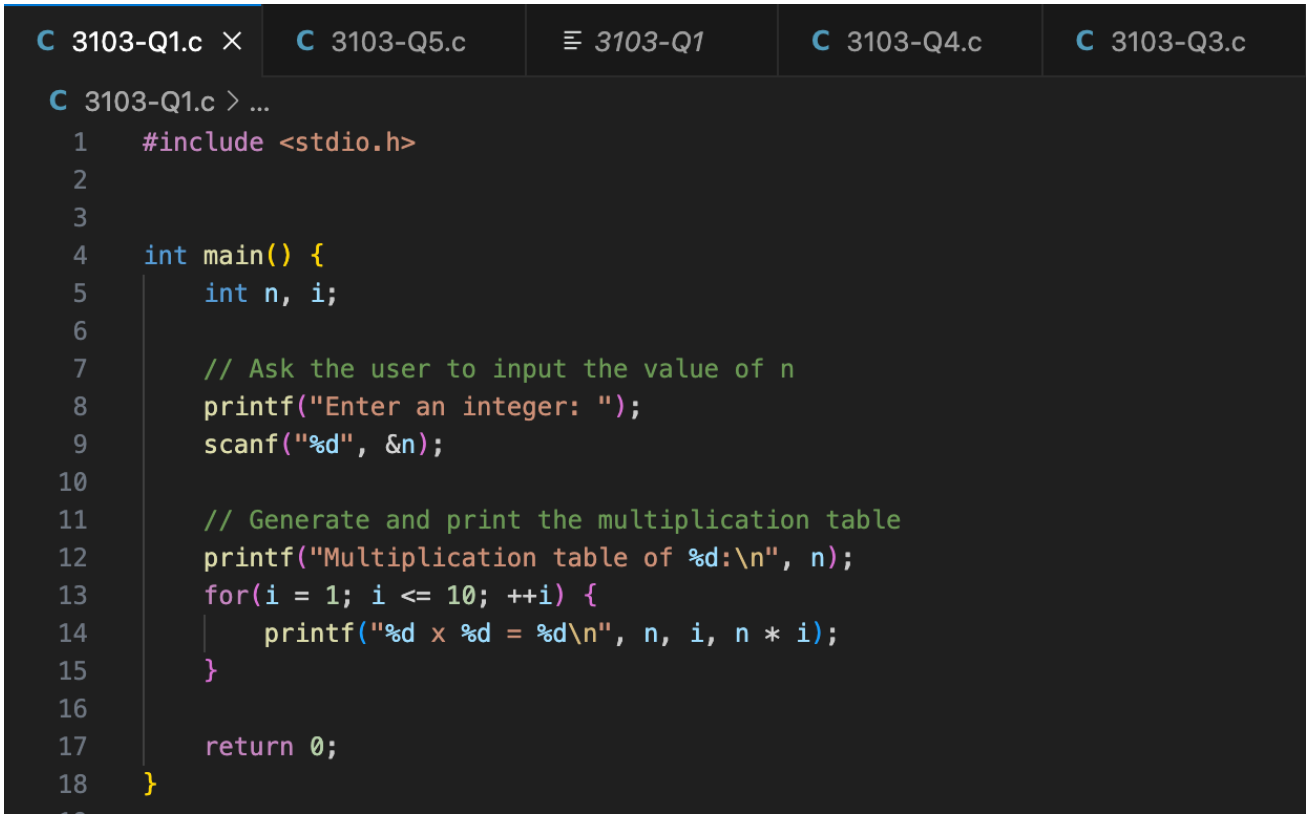


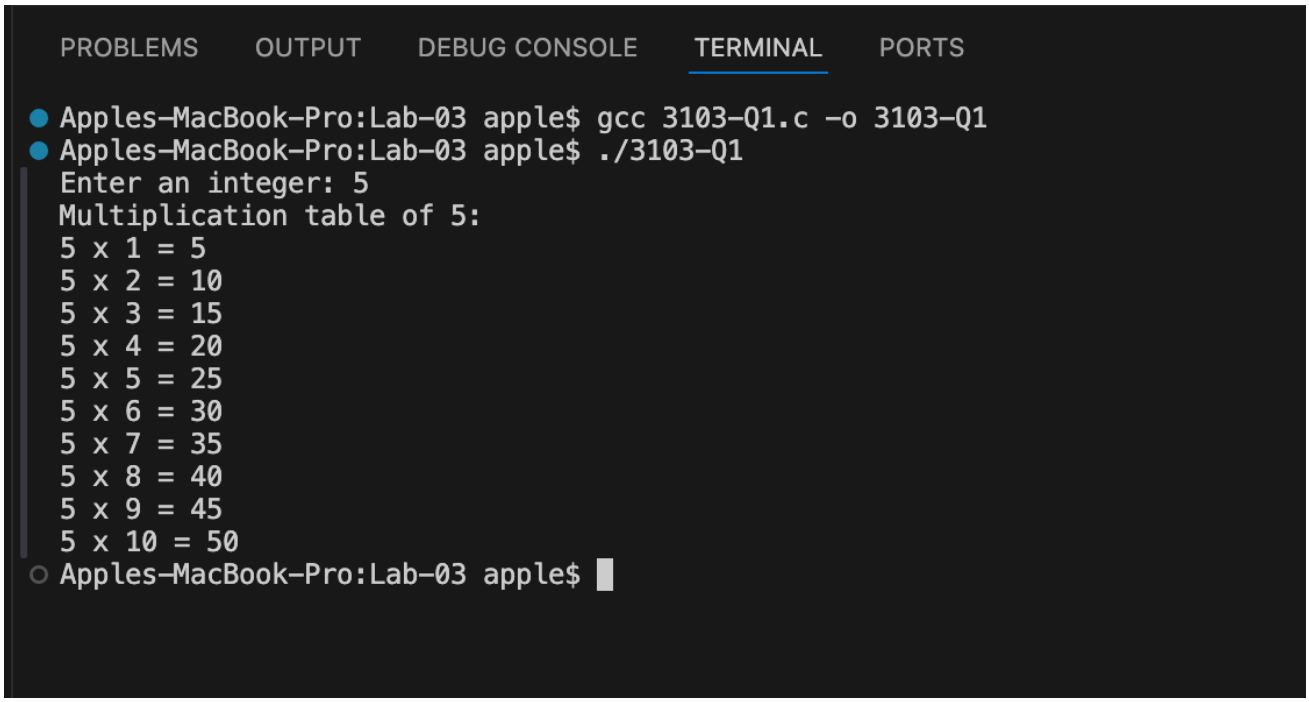
Q5: Construct a C program with the flowchart below. The input value of the principle must be between 100 Rs. To 1,000,000 Rs. The Rate of interest must be between 5% to 10% and Time Period must be between 1 to 10 years. Hint: these restrictions can be displayed in the form of a message on the window.

```c
#include <stdio.h>

int main() {
    float principle, rate, time, interest;

    printf("Enter the following values within the given limits:\n");
    printf("Principle: Between 100 Rs. and 1,000,000 Rs.\n");
    printf("Rate of interest: Between 5%% and 10%%\n");
    printf("Time period: Between 1 and 10 years\n");

    printf("\nEnter the Principle amount (Rs.): ");
    scanf("%f", &principle);
    printf("Enter the Rate of Interest (%%): ");
    scanf("%f", &rate);
    printf("Enter the Time period (years): ");
    scanf("%f", &time);

    if (principle < 100 || principle > 1000000) {
        printf("Invalid Principle amount! It must be between 100 Rs. and 1,000,000 Rs.\n");
        return 1;
    }

    if (rate < 5 || rate > 10) {
        printf("Invalid Rate of Interest! It must be between 5%% and 10%%.\n");
        return 1;
    }

    if (time < 1 || time > 10) {
        printf("Invalid Time period! It must be between 1 and 10 years.\n");
        return 1;
    }

    interest = (principle * rate * time) / 100;

    printf("\nThe Simple Interest is: %.2f Rs.\n", interest);

    return 0;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter the following values within the given limits:
Principle: Between 100 Rs. and 1,000,000 Rs.
Rate of interest: Between 5% and 10%
Time period: Between 1 and 10 years

Enter the Principle amount (Rs.): 2500
Enter the Rate of Interest (%): 7
Enter the Time period (years): 4

The Simple Interest is: 700.00 Rs.
Apples-MacBook-Pro:Lab-03 apple$
```

Q6: Write a C program to generate and print the multiplication table for a given integer ‘n’ up to 10.





Q7: Write a program to convert a given temperature in Celsius to Fahrenheit using the formula:

C 3103-Q1.c × | C 3103-Q5.c | C 3103-Q6.c | C 3103-Q4.c | C 3103-Q3.c | C 3103-Q

C 3103-Q1.c > ...

```c
#include <stdio.h>


int main(){
    float _fahrenheit, _celcius;

    printf("Enter Temperature in Celcius: ");
    scanf("%f", &_celcius);

    _fahrenheit = (1.8 * _celcius) + 32;
    printf("The given temperature in fahrenheit is: %.2f \n", _fahrenheit);
};

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter Temperature in Celcius: 45
The given temperature in fahrenheit is: 113.00
Apples-MacBook-Pro:Lab-03 apple$
```

Q8: Write a C program to print the total cost of the 3 items purchased by user. Take cost of each item input from the user.

C 3103-Q1.c × | C 3103-Q7.c | C 3103-Q5.c | C 3103-Q6.c | C 3103-Q4

C 3103-Q1.c > ...

```c
#include <stdio.h>


int main(){
    int item1,item2,item3,total;
    total = 0;

    printf("Enter cost of item 1: ");
    scanf("%d", &item1);
    total = total + item1;

    printf("Enter cost of item 3: ");
    scanf("%d", &item2);
    total = total + item2;

    printf("Enter cost of item 3: ");
    scanf("%d", &item3);
    total = total + item3;

    printf("The total cost of items is: %d\n", total);

    return 0;
};

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter cost of item 1: 20
Enter cost of item 3: 35
Enter cost of item 3: 65
The total cost of items is: 120
Apples-MacBook-Pro:Lab-03 apple$
```

Q9: A customer asks the IT firm to develop a program in C language, which can take tax rate and salary from the user on runtime and then calculate the tax, the user must pay and the salary he/she will have after paying the tax. This information is then provided to the user.

3103-Q1.c | 3103-Q9.c | 3103-Q7.c | 3103-Q8.c | 3103-Q5.c

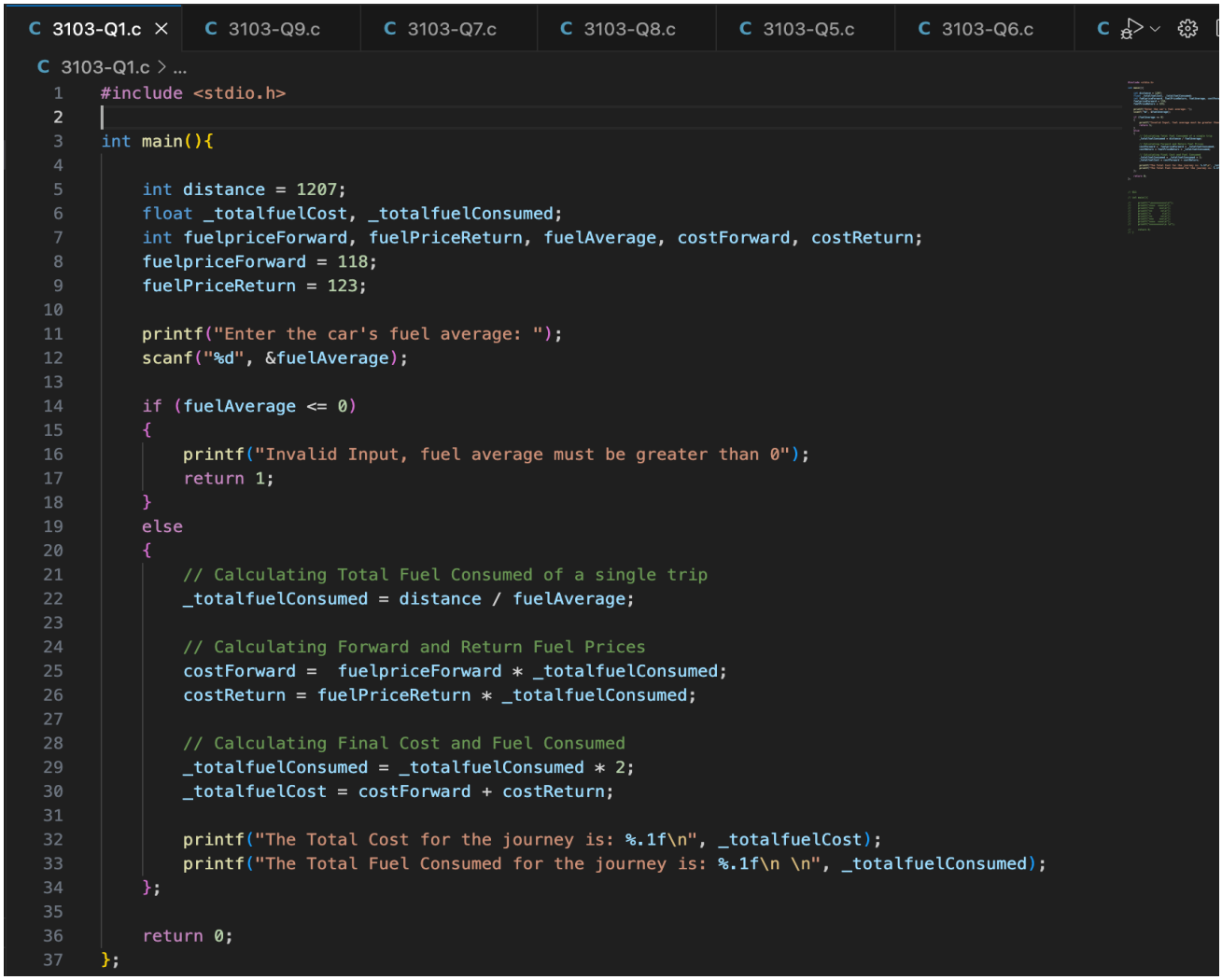
3103-Q1.c > ...

```c
#include <stdio.h>


int main(){
    float taxRate, _netSalary, _taxAmount;
    int salary;

    printf("Enter your Salary: ");
    scanf("%d", &salary);

    printf("Enter Tax Rate: ");
    scanf("%f", &taxRate);

    _taxAmount = salary * taxRate;
     printf("The tax amount for your salary is: %.2f\n",_taxAmount);

     _netSalary = salary - _taxAmount;
    printf("Your Net Salary amount is: %.2f\n \n",_netSalary);

};
```

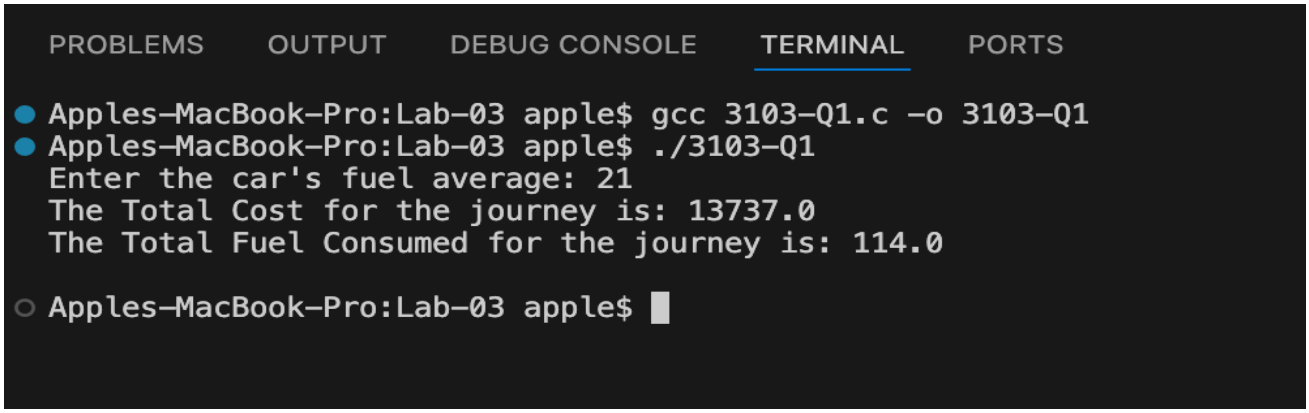
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter your Salary: 20000
Enter Tax Rate: 0.05
The tax amount for your salary is: 1000.00
Your Net Salary amount is: 19000.00

Apples-MacBook-Pro:Lab-03 apple$
```

Q10: A car travelled back and forth from point A to point B. With a distance being (single trip) 1207KM. During the forward trip fuel price was 118/liter while returning it was 123/liter. Calculate the total fuel cost (both ways) and the fuel consumed (total trip). Use the car's fuel average as input from the user (Input must be positive make some restrictions on only accepting positive input)



```c
#include <stdio.h>

int main(){

    int distance = 1207;
    float _totalfuelCost, _totalfuelConsumed;
    int fuelpriceForward, fuelPriceReturn, fuelAverage, costForward, costReturn;
    fuelpriceForward = 118;
    fuelPriceReturn = 123;

    printf("Enter the car's fuel average: ");
    scanf("%d", &fuelAverage);

    if (fuelAverage <= 0)
    {
        printf("Invalid Input, fuel average must be greater than 0");
        return 1;
    }
    else
    {
        // Calculating Total Fuel Consumed of a single trip
        _totalfuelConsumed = distance / fuelAverage;

        // Calculating Forward and Return Fuel Prices
        costForward =  fuelpriceForward * _totalfuelConsumed;
        costReturn = fuelPriceReturn * _totalfuelConsumed;

        // Calculating Final Cost and Fuel Consumed
        _totalfuelConsumed = _totalfuelConsumed * 2;
        _totalfuelCost = costForward + costReturn;

        printf("The Total Cost for the journey is: %.1f\n", _totalfuelCost);
        printf("The Total Fuel Consumed for the journey is: %.1f\n \n", _totalfuelConsumed);
    };

    return 0;
};
```



```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1
Enter the car's fuel average: 21
The Total Cost for the journey is: 13737.0
The Total Fuel Consumed for the journey is: 114.0

Apples-MacBook-Pro:Lab-03 apple$
```

Q11: Write a C program to print hollow diamond star pattern. The output is shown below:

3103-Q1.c | 3103-Q10.c | 3103-Q9.c

3103-Q1.c > main()

```c
#include <stdio.h>

int main(){

    printf("\n**********\n");
    printf("****  ****\n");
    printf("***    ***\n");
    printf("**      **\n");
    printf("*        *\n");
    printf("**      **\n");
    printf("***    ***\n");
    printf("****  ****\n");
    printf("**********\n \n");

    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
Apples-MacBook-Pro:Lab-03 apple$ gcc 3103-Q1.c -o 3103-Q1
Apples-MacBook-Pro:Lab-03 apple$ ./3103-Q1

**********
****  ****
***    ***
**      **
*        *
**      **
***    ***
****  ****
**********

Apples-MacBook-Pro:Lab-03 apple$
```

Q12: Predict the output. Explain it in your own words.

```
#include "stdio.h"
void main() {
int x,
y = 7,
z = 5;
x = y == z;
printf("%d", x);
}
```

Ans) In this program, three variables are declared: x, y, and z. The variable y is initialized with the value 7, and z is initialized with the value 5. The line x = y == z; compares whether y is equal to z. Since 7 is not equal to 5, the comparison evaluates to false, which in C is represented by 0. Therefore, x is assigned the value 0. The printf statement then prints the value of x, so the output of the program will be 0.