LABORATORY 3 – REPORT

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Note: Coursework examiners are entitled to reject any coursework which does not have a signed copy of this form attached or are submitted late.

## Problem 1

The aim of this problem is to look at statements and to check if they are true or false

### Answers

1. True
2. False, as after the equation y will equal 8
3. False, as int \_a and float 1c is incorrect. A correct solution would be int integer\_a and float floatc
4. True
5. False, b is a float and the correct answer for 1.33333 recurring

## Problem 2

The aim of this problem is to write a C program that reads the dimensions of a rectangular field: length and width as well as the quantity of week killer required to treat the field.

### Plan

* Print a welcoming message.
* Ask the user to input data for the length, width and weed killer
* Store the input in type float.
* Calculate the area
* Calculate the amount of weed killer required to treat the field
* Convert the amount needed to liters/square feet.
* Display the results
* Print a goodbye message

### Development

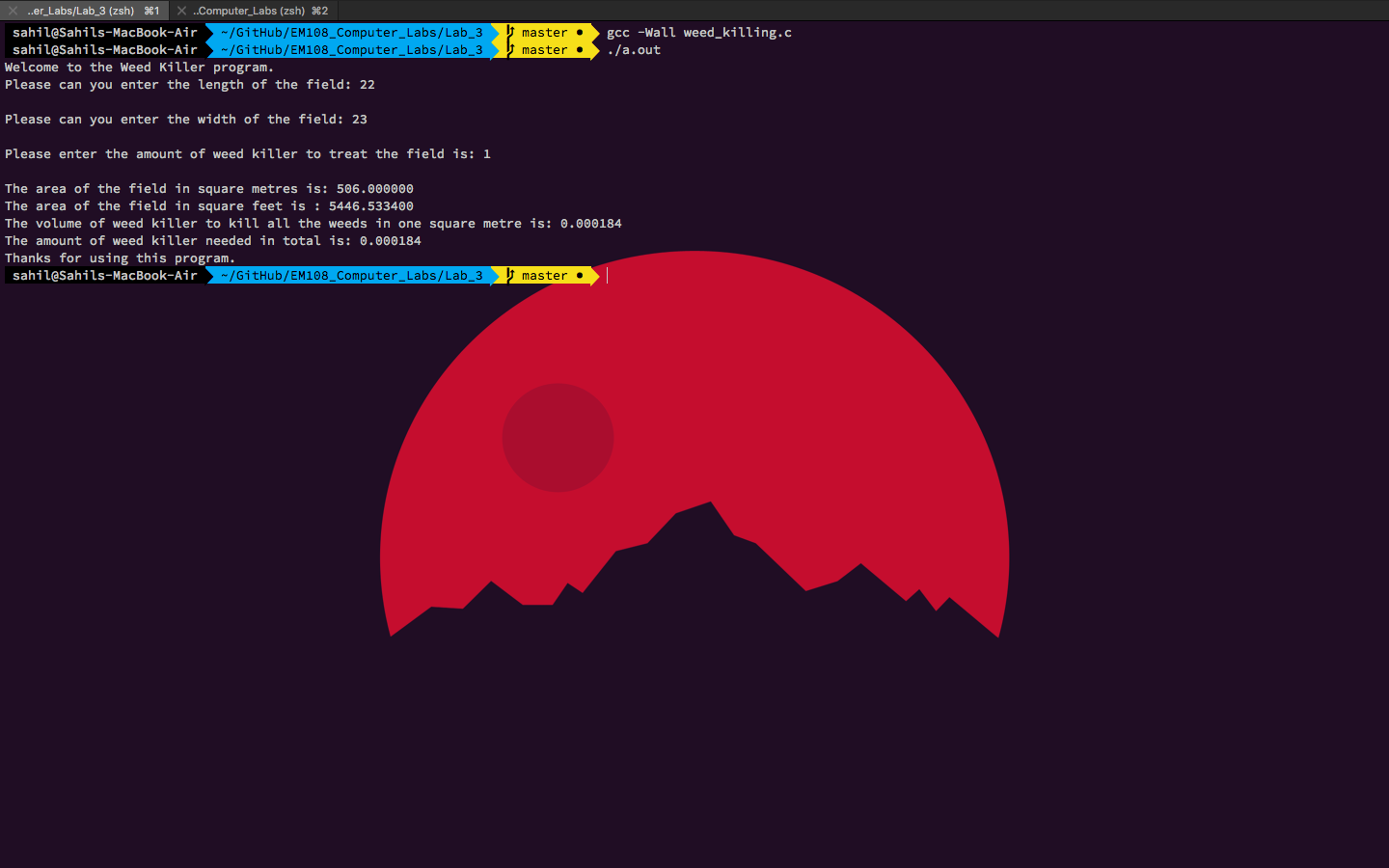
The first step in the development of my program was to include the standard C libraries (stdio.h, stdlib.h,) that in order to be able to use certain functions in the program.

Then, I started to write the main function of the program.

I used the ‘printf’ command to display welcoming message on my screen on my screen. I used a void function to ask for the input from the user. I then used a separate void function to calculate both area and the amount of weed killer required. I called each of these functions from the main function.

### Testing

I compiled and tested the program using the gcc compiler. I was not presented any errors when I compiled my code.



The program ran smoothly without any errors

### Conclusion

During this lab session I learned about some of the functions contained in the stdio.h and stdlib.h libraries (e.g. functions).

The final version of the C source code for problem 2 is attached as weed\_killing.c

The code for this is:

#include <stdio.h>

#include <stdlib.h>

//Declare Variables

float length;

float width;

float weed\_killer;

//Declare Functions

void input();

void calculations();

int main() {

printf("Welcome to the Weed Killer program.\n");

input();

calculations();

printf("Thanks for using this program.\n");

return 0;

}

//Getting user input for length and width and weed killer needed.

void input() {

printf("Please can you enter the length of the field: ");

scanf("%f", &length);

printf("\n");

printf("Please can you enter the width of the field: ");

scanf("%f", &width);

printf("\n");

printf("Please enter the amount of weed killer to treat the field is: ");

scanf("%f", &weed\_killer);

printf("\n");

}

void calculations() {

printf("The area of the field in square metres is: %f\n", length \* width);

printf("The area of the field in square feet is : %f\n", length \* width \* 10.7639);

printf("The volume of weed killer to kill all the weeds in one square metre is: %f\n", weed\_killer / (length \* width \* 10.7639) );

printf("The amount of weed killer needed in total is: %f\n", (weed\_killer / (length \* width \* 10.7639) ) \* weed\_killer );

}

## Problem 2

The aim of this problem is to write a C program that reads three numbers, computes and displays their sum, their product and their average as well as the minimum and the maximum value of the three numbers.

### Plan

* Print a welcoming message
* Ask the user to input three numbers
* Do the calculations
* Display the results
* Print a goodbye message

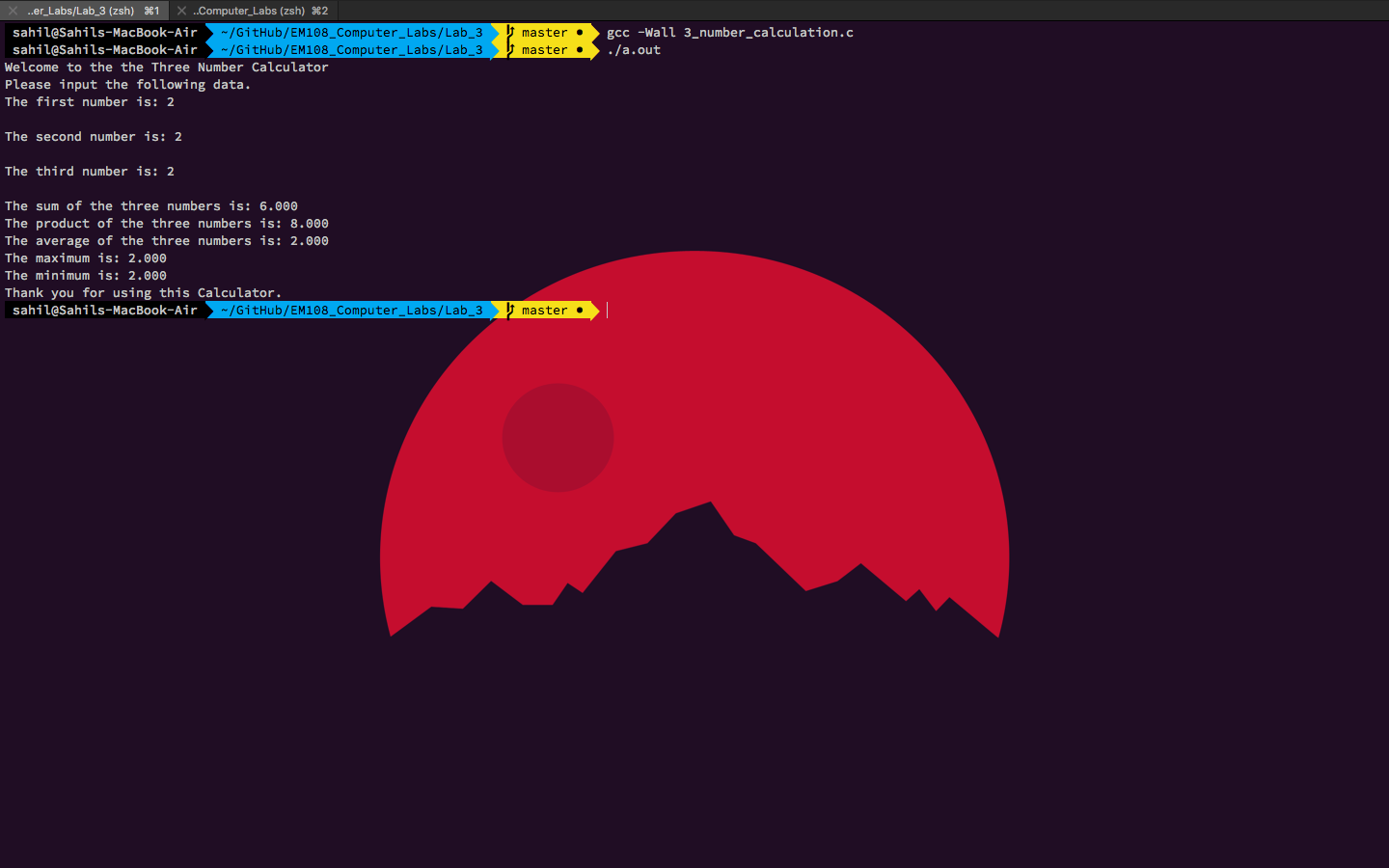
### Development

The first step in the development of my program was to include the standard C libraries (stdio.h, stdlib.h, string.h) that in order to be able to use certain functions in the program.

Then, I started writing up the main function of the program. I used the ‘printf’ command to display welcoming message on my screen on my screen. I used a void function to ask for the input from the user. I then used a separate void function to calculate the sum, product, average, maximum and minimum. I used an if, else if, and else statements to check for the maximum and minimum.

### Testing

I compiled and tested the program using the gcc compiler. I was not presented any errors when I compiled my code.

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### Conclusion

During this lab session I learned about some of the functions contained in the stdio.h, stdlib.h and string.h libraries (e.g. if statements)..

The final version of the C source code for problem 1 is attached as 3\_number\_calculation.c

The code for this is:

#include <stdio.h>

#include <stdlib.h>

//Declaring variable and functions for the program

float x;

float y;

float z;

void input();

void calculations();

void maximum();

void minimum();

int main() {

printf("Welcome to the the Three Number Calculator\n");

input();

calculations();

maximum();

minimum();

printf("Thank you for using this Calculator.\n");

return 0;

}

void input() {

printf("Please input the following data.\n");

printf("The first number is: ");

scanf("%f", &x);

printf("\n");

printf("The second number is: ");

scanf("%f", &y);

printf("\n");

printf("The third number is: ");

scanf("%f", &z);

printf("\n");

}

//The calculations for sum, product and average

void calculations() {

printf("The sum of the three numbers is: %.3f\n", x + y + z);

printf("The product of the three numbers is: %.3f\n", x \* y \* z);

printf("The average of the three numbers is: %.3f\n", (x + y + z)/3 );

}

//The largest number of all three

void maximum() {

if((x >= y) && (x >= z)) {

printf("The maximum is: %.3f\n", x);

}

else if((y >= x) && (y >= z)) {

printf("The maximum is: %.3f\n", y);

}

else if((z >= x) && (z >= y)) {

printf("The maximum is: %.3f\n", z);

}

else {

printf("The numbers equal each other.\n");

}

}

//The smallest number of all three

void minimum() {

if((x <= y) && (x <= z)) {

printf("The minimum is: %.3f\n", x);

}

else if((y <= x) && (y <= z)) {

printf("The minimum is: %.3f\n", y);

}

else if((z <= x) && (z <= y)) {

printf("The minimum is: %.3f\n", z);

}

else {

printf("The numbers equal each other.\n");

}

}

## Problem 3

The aim of this problem is to write a C program that reads reads from the a positive integer N representing how many numbers we have to process then the program should read N numbers, compute and display their sum, their product and their average.

### Plan

* Print a welcoming message
* Ask the user for input
* Do the calculations
* Print the answers
* Print a goodbye message

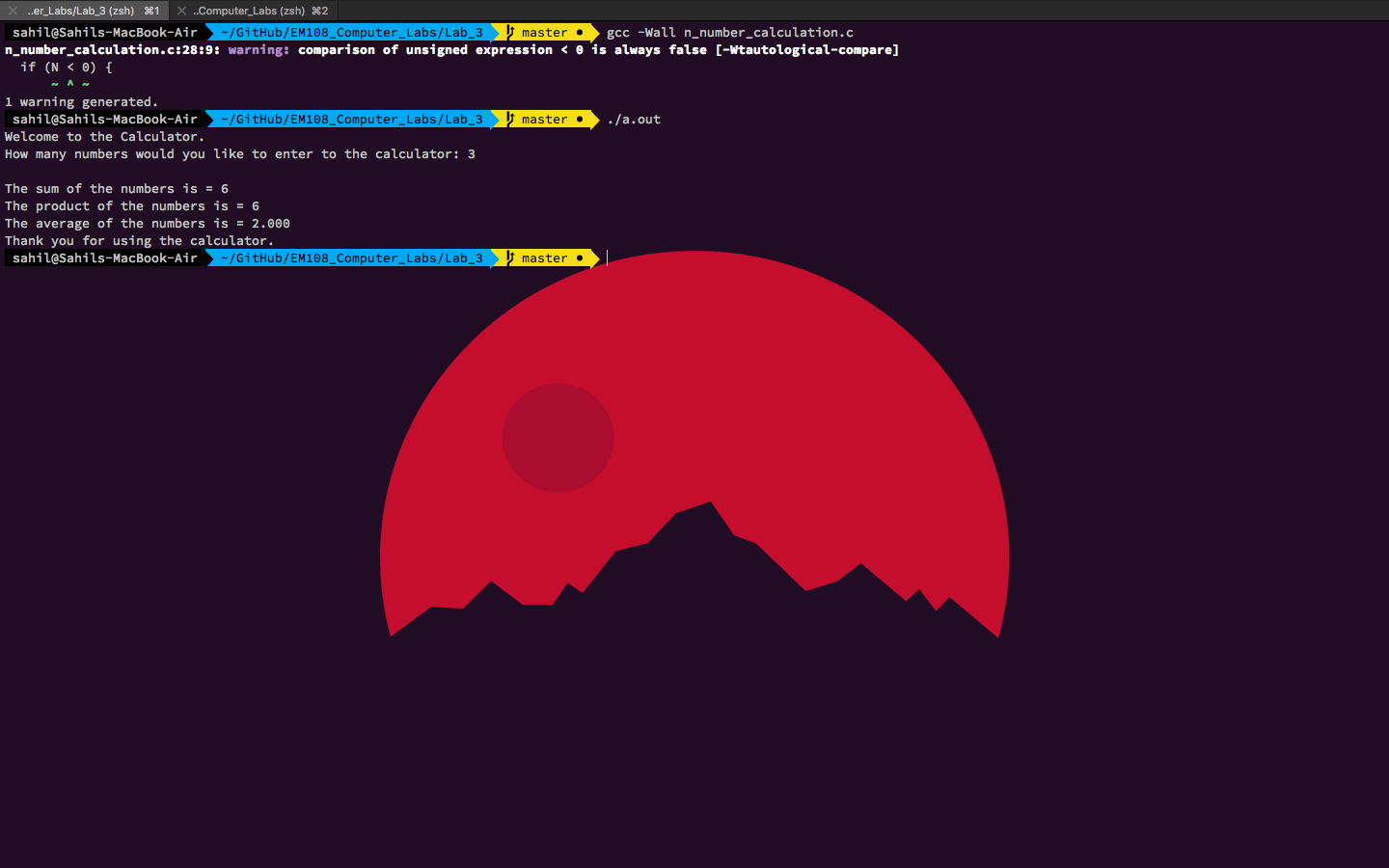
### Development

The first step in the development of my program was to include the standard C libraries (stdio.h, stdlib.h, string.h) that in order to be able to use certain functions in the program.

Then, I started writing up the main function of the program. I used the ‘printf’ command to display welcoming message on my screen on my screen. I used a void function to ask for the input from the user. I then used a separate void function to calculate the sum, product, average. I used a for loop in the function to calculate the sum and average. I then used multiple ‘printf’ statements to display the results.

### Testing

I compiled and tested the program using the gcc compiler. I was not presented any errors when I compiled my code.



### Conclusion

During this lab session I learned about some of the functions contained in the stdio.h, stdlib.h and string.h libraries (e.g. for loops)..

The final version of the C source code for problem 1 is attached as n\_number\_calculation.c

The code for this is:

#include <stdio.h>

#include <stdlib.h>

unsigned int N;

int i;

int j;

int sum;//The sum of all the numbers

int prod;//The product of all the numbers

float avrg;//average

void input();

void calculations();

int main() {

printf("Welcome to the Calculator.\n");

input();

calculations();

printf("Thank you for using the calculator.\n");

return 0;

}

void input() {

printf("How many numbers would you like to enter to the calculator: ");

scanf("%d", &N);

printf("\n");

if (N < 0) {

input();

}

}

void calculations() {

prod = 1;

for(i=1; i <=N; ++i)

{

sum = sum + i;

prod = prod \*i;

}

avrg = sum / N;

printf("The sum of the numbers is = %d\n", sum);

printf("The product of the numbers is = %d\n", prod);

printf("The average of the numbers is = %.3f\n", avrg);

}