

Lab 4

LAB # 4

SECTION C

Akash Patel

SUBMISSION DATE: 2/21/19

2/20/19

Problem

The purpose was to debug programs and learn how small changes can affect the program.

Analysis

The programs required me to try and compile/run them and then effectively alter the code if bugs were found. All programs were different but most of the bugs were syntax errors. One of the programs needed to include a library.

Design

All the programs were already designed for me so all I had to do was look for errors and correct them. I didn't change any of the designs however I corrected syntax errors and included functions or library where needed. I also added comments next to line that required changing. All the fixes for each program are explained below.

Testing

The first thing I did to test the program was compile them, if they didn't compile then I went back and looked for errors. If they did compile, I ran the program and checked to see if I was getting the correct output. If I didn't get the correct output I fixed it, recompiled, and ran the program until it was correct

Comments

This lab wasn't too difficult. There were some obvious errors and then there were some that took me while to figure out. It certainly challenged me.

4_1_1) line 13 – insert ; line 16- insert “ line 17- insert ; line 21- close } line 23- open { line 24- spellcheck print

Syntax errors made it unable to compile

4_1_2) declare double mass and double accel line 17,20 change to %d

Syntax errors made it unable to compile

4_1_3) line 11, create prototype void print_face(int opt);

Syntax errors made it unable to compile

4_1_4) line 13- remove !, line 14- change “- “ to “_”, line 15 remove “~” line 16- insert _ between variable, line 17 remove integer from variable

Syntax errors made it unable to compile

4_1_5) remove int main function, remove function and print statement

Syntax errors made it unable to compile

4_2_1) line 22,26 – insert another = to make it true.

Syntax errors made it unable to compile

4_2_2) For all the if and else if statements, make it >= 1

Syntax errors made it unable to compile

4_2_3) line 20- change to %d because they are integers

Syntax errors made it unable to compile

4_2_4) line 19- change from integer to double

Syntax errors made it unable to compile

4_2_5) Change all the single & | to && and ||. Change int to double

Syntax errors made it unable to compile

4_3) I had to include a new library so it can read the rand functions.

Source Code

```
/*-----  
-                               SE 185 Lab 05  
-                               Developed for 185-Rursch by T.Tran and K.Wang  
-----*/  
#include <stdio.h>
```

```
/* This program outputs if a integer will divide into another integer with no  
remainder*/
```

```
int main() {  
    int i, j;
```

```
    printf("Enter an integer: "); //insert ;  
    scanf("%d", &i);
```

```
    printf("Enter another integer:" ); //insert "  
    scanf("%d", &j); //insert ;
```

```
    if (j % i == 0) {  
        printf("%d divides %d\n", i, j);  
    } //close bracket
```

```
    else{ //open bracket  
        printf("%d does not divide %d\n", i, j); //correct "print"  
        printf("%d %% %d is %d\n", j, i, (j % i) );  
    }
```

```
    return 0;  
}
```

```
/*-----  
-                               SE 185 Lab 05  
-                               Developed for 185-Rursch by T.Tran and K.Wang  
-----*/  
#include <stdio.h>
```

```
/* This program takes in a number from the user and checks if it is  
 * a whole number. It also should print if the number is a  
 * postive, negative, or zero number.  
 * Ex.  
 *     input:  num = 5  
 *     output: 5 is a postive and 5 is non-negative and 5 is non-zero and 5 is a  
whole number.*/
```

```
int isPositive(double n);
```

```
int isNegative(double n);
```

```
int isZero(double n);
```

```

int main()
{
    int num;

    printf("Please type a number between -1000 and 1000: ");
    scanf("%d", &num);

    if(num > 1000 || num < -1000)
    {
        printf("Number is out of range!\n");
        return -1;
    }

    if( ( isPositive(num) && !isNegative(num) ) || isZero(num) )
    {
        printf("%d is a whole number.\n", num);
    }
    else
    {
        printf("%d is non-whole number.\n", num);
    }

    return 0;
}

int isPositive(double n)
{
    if(n>0)
    {
        printf("%d is postive and ", n);
        return 1;
    }
    else
    {
        printf("%d is non-postive and ", n);
        return 0;
    }
}

int isNegative(double n)
{
    if(n<0)
    {
        printf("%d is negative and ", n);
        return 1;
    }
    else
    {
        printf("%d is non-negative and ", n);
        return 0;
    }
}

int isZero(double n)
{

```

```

    if(n==0)
    {
        printf("%d is zero and ", n);
        return 1;
    }
    else
    {
        printf("%d is non-zero and ", n);
        return 0;
    }
}

```

```

/*-----
-                               SE 185 Lab 05
-               Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include<stdio.h>

```

```

#include<time.h>
#include<stdlib.h> // add library

```

```

/* Prototypes */ //include asterisk
char AskToPlay(int playedBefore); //change to played before

```

```

void RunGame (int computerNum);
int SelectRandNum(); //define selectrandnum

```

```

int main()
{
    char prompt = '-';
    int played = 0, computerGuess = 0;

```

```

    prompt = AskToPlay(played);
    played = 1;

```

```

    while(prompt == 'y')    /* This line does not contain an error */
    {
        computerGuess = SelectRandNum();
        RunGame(computerGuess);
        prompt = AskToPlay(played);
    }
    printf("\n\nThank you for playing.\n"); //missing semicolon
    return 0;
}

```

```

char AskToPlay(int playedBefore)
{
    char yesNo;
    if (playedBefore == 0)
    {
        printf("Do you want to play a game?\n ->");

```

```

        scanf(" %c", &yesNo); //include &
    }
    else
    {
        printf("Do you want to play again?\n ->");
        scanf(" %c", &yesNo);
    }
    return yesNo;
}

```

```

int SelectRandNum()
{
    int compGuess = 0; //change to compGuess
    srand((int)time(0));
    compGuess = ((rand() % 100) + 1);
    return compGuess;
}

```

```

void RunGame (int computerNum)
{
    int number = 0, correct = 0;

```

```

    printf("\nYou are guessing a number. The options are 1 through 100.\n\n");
    printf("What is your guess on what number I will select?\n ->");
    scanf("%d", &number);

```

```

    while ((number <1) || (number >100)) /* This line does not contain an error */
    {
        printf("\nYour number is not within the correct range of numbers. Guess again\n ->");
        scanf("%d", &number);
    }

```

```

    while (correct == 0) /* This line does not contain an error */
    {

```

```

        if (number = computerNum)
        {
            printf("\nYou guessed the number correctly!\n");
            printf("The number was %c\n\n", computerNum);
            correct = 1;
        }
        else if (number < computerNum) //take out semi colon
        {
            printf("\nYou guessed too low. Enter another guess.\n ->");
            scanf("%d", &number);
        }
        else
        {
            printf("\nYou guessed too high. Enter another guess.\n ->");
            scanf("%d", &number);
        }
    }

```

```
}  
}
```

```
/*-----  
- SE 185 Lab 05  
- Developed for 185-Rursch by T.Tran and K.Wang  
-----*/  
#include <stdio.h>
```

```
/* This program takes two inputs acceleration  
and mass, and outputs the force = mass*acceleration */
```

```
void force(double mass, double accel);  
double accel; // declare accel  
double mass; //declare mass  
int main() {  
    double mass;
```

```
    printf("Enter an acceleration: ");  
    scanf("%lf", &accel); //change to %lf
```

```
    printf("Enter the mass of the object: ");  
    scanf("%lf", &mass); //change to %lf
```

```
    force(mass, accel);
```

```
    printf("You entered %lf m/s^2\n", accel);  
    printf("You entered %lf kg\n", mass);
```

```
    return 0;  
}
```

```
void force(double m, double accel) {  
    mass = m / 1000;
```

```
    printf("The force is %lf milliNewtons\n", mass * accel);
```

```
    accel = accel*1000;
```

```
    printf("The force is %lf Newtons\n\n", mass * accel);  
}
```

```
/*-----  
- SE 185 Lab 05  
- Developed for 185-Rursch by T.Tran and K.Wang  
-----*/  
#include <time.h>  
#include <stdlib.h> //insert stdlib for rand  
#include <stdio.h> //insert stdio  
/* This is a simple program that takes a user inputs and prints out a message based  
on that input */
```

```
void hoo();
```



```

void print_face(int opt); //create prototype

int main() {
    srand(time(NULL));
    int option = 0;

    printf("Enter 1 for happy, 2 for sad, 3 for neutral, any other integer for
random: ");
    scanf("%d", &option);

    if (option < 1 || option > 3) {

        option = rand() % 4;
    }

    print_face(option);

    return 0;
}

void print_face(int opt) {
    if (opt == 1) {
        printf("Have a nice day! :) \n");
    }
    else if (opt == 2) {
        printf(":(\n");
    }
    else if (opt == 3) {
        printf("meh :\\ \n");
    }
    else {
        hoo();
    }
}

void hoo() {
    printf(" * __ * \n {0,0} \n /) __ ) \n \" _ \" _ \n");
}

/*-----
-                               SE 185 Lab 05
-       Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>
#include <math.h>

/* This program calculates the energy of one photon of uder inputed wavelength
* of light */

int main()
{
    double speed_light; //remove !
    double wave_length; //change from - to _
    double length_in_meters; //REMOVE ~

```

```

double planck_const; //insert _
double o_energy; //remove integer from variable

planck_const = (6.62606957)*(pow(10,-34)); //Planck's constant
speed_light = (2.99792458)*(pow(10,8)); //Constant for the speed of light
wave_length = 0;
length_in_meters = 0;
o_energy = 0;

printf("Welcome! This program will give the energy, in Joules,\n");
printf("of 1 photon with a certain wavelength.\n");
printf("Please input a wavelength of light in nano-meters.\n");
printf("Please do not enter a negative, or zero, wavelength.\n");

scanf("%lf", &wave_length);

if (wave_length > 0.0)
{
    length_in_meters = wave_length / pow(10,9); //Converting nano-meters to
meters
    o_energy = (planck_const*speed_light) / (length_in_meters); //Calculating the
energy of 1 photon
    printf("A photon with a wavelength of %08.3lf nano-meters, carries\n%030.25lf
joules of energy.", wave_length, o_energy);
}
else
{
    printf("Sorry, you put in an invalid number.");
    printf("Please rerun the program and try again.");
}

return 0;

}

```

```

/*-----
-                               SE 185 Lab 05
-           Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>

/* This program calculates the sum of 1 to x, where x is a user input */

int sum_func(int n);

//remove int main function

int main()
{
    int input;

    printf("Please input a number from to sum up to: ");

```

```
scanf("%d", &input);

printf("The sum of 1 to %d is %d\n", input, sum_func(input));
```

```
}
```

```
//remove function and print statement
```

```
int sum_func(int n)
{
    return (n*(n+1))/2;
}
```

```
/*-----
-                               SE 185 Lab 05
-       Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>
```

```
/* This program accepts a user input and determines if the integer is
 * an odd or an even number */
```

```
int isOdd(int i);
```

```
int isEven(int i);
```

```
int main()
{
    int input;
    input == 0;
```

```
printf("Please input an integer: ");
scanf("%d", &input);
```

```
if(isOdd(input)==1) //make it say that it is true by adding another =
{
    printf("%d is an odd number!\n", input);
}
if(isEven(input)==1) //make it say that it is true by adding another =
{
    printf("%d is an even number!\n", input);
}
```

```
    return 0;
}
```

```
int isOdd(int i)
{
    if(i % 2)
    {
        return 1;
    }
}
```

```

    }
    else
    {
        return 0;
    }
}

```

```

int isEven(int i)
{
    if(!(i % 2))
    {
        return 1;
    }
    else
    {
        return 0;
    }
}

```

```

/*-----
-                               SE 185 Lab 05
-               Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>

```

```

/* This program calculates the number of digits in a number from 1 to 100000*/

```

```

void digits(int n);

```

```

int main()

```

```

{
    int input;

```

```

    printf("Please input a number from 1 up to 10000000: ");

```

```

    scanf("%d", &input);

```

```

    if( input > 10000000 || input < 1)
    {
        printf("Invalid number!\n");
        return -1;
    }

```

```

    digits(input);

```

```

    return 0;
}

```

```

/* This function divides a number by the 10^n, to see if the divided number
 * has "n" digits */

```

```

void digits(int n)

```

```

{
    if((double)n/10000000 >= 1)

```

```

    {
        printf("8 digits\n");
    }
    else if((double)n/1000000 >= 1)
    {
        printf("7 digits\n");
    }
    else if((double)n/100000 >= 1)
    {
        printf("6 digits\n");
    }
    else if ((double)n/10000 >= 1)
    {
        printf("5 digits\n");
    }
    else if ((double)n/1000 >= 1)
    {
        printf("4 digits\n");
    }
    else if ((double)n/100 >= 1)
    {
        printf("3 digits\n");
    }
    else if ((double)n/10 >= 1)
    {
        printf("2 digits\n");
    }
    else if ((double)n/1 >= 1)
    {
        printf("1 digit\n");
    }
}
}

```

```

/*-----
-                               SE 185 Lab 05
-       Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>

/* This program accepts two integers as user input and swaps their values
 * using two different methods */

void var_swp(int i, int j);

void math_swp(int i, int j);

int main()
{
    int first = 0;
    int second = 0;
    printf("Please input two integers separated by a space: ");

    scanf("%d %d", &first, &second); //change to %d because they are ints
}

```

```
    printf("\n");
    var_swp(first, second);
```

```
    printf("\n");
    math_swp(first, second);
```

```
    return 0;
}
```

```
void var_swp(int i, int j)
```

```
{
    printf("Now doing a swap using an extra variable: \n");
    printf("Before Swap: First: %d, Second: %d\n", i, j);
```

```
    int k = i;
    i = j;
    j = k;
```

```
    printf("After Swap: First: %d, Second: %d\n", i, j);
}
```

```
void math_swp(int i, int j)
```

```
{
    printf("Now doing a swap using addition and subtraction: \n");
    printf("Before Swap: First: %d, Second: %d\n", i, j);
```

```
    i = i + j;
    j = i - j;
    i = i - j;
```

```
    printf("After Swap: First: %d, Second: %d\n", i, j);
}
```

```
/*-----
-                               SE 185 Lab 05
-       Developed for 185-Rursch by T.Tran and K.Wang
-----*/
#include <stdio.h>
```

```
/* This program calculates values of resistances, voltages, or current
 * using Ohm's Law */
```

```
double voltage(double resistance, double current);
```

```
double resistance(double voltage, double current);
```

```
double current(double voltage, double resistance);
```

```
int main()
```

```
{
    int select = 0;
    double v, i, r; //change from integer to double
```

```

printf("Select:\n1 for voltage\n2 for resistance\n3 for current\n");

scanf("%d", &select);

if(select > 3 || select < 1)
{
    printf("Invalid number\n");
    return -1;
}

printf("Enter floating point numbers for input...\n");
if(select == 1)
{
    printf("Please enter a resistance value: ");
    scanf("%lf", &r);

    printf("Please enter a current value: ");
    scanf("%lf", &i);

    printf("Your voltage is: %lf Volts\n", voltage(r, i));
}
else if(select == 2)
{
    printf("Please enter a voltage value: ");
    scanf("%lf", &v);

    printf("Please enter a current value: ");
    scanf("%lf", &i);

    printf("Your Resistance is: %lf Ohms\n", resistance(v, i));
}
else if(select == 3)
{
    printf("Please enter a resistance value: ");
    scanf("%lf", &r);

    printf("Please enter a voltage value: ");
    scanf("%lf", &v);

    printf("Your current is: %lf Amps\n", current(v, r));
}

return 0;
}

```

```

double voltage(double resistance, double current)

```

```

{
    return resistance * current;
}

double resistance(double voltage, double current)
{
    return voltage / current;
}

double current(double voltage, double resistance)
{
    return voltage / resistance;
}

```

Screen Shots

```

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_1_1
Enter an integer: 30
Enter another integer:15
30 does not divide 15
15 % 30 is 15

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_1_1
Enter an integer: 2
Enter another integer:10
2 divides 10

```

```

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_1_2
Enter an acceleration: 56
Enter the mass of the object: 20
The force is 1.120000 milliNewtons
The force is 1120.000000 Newtons

You entered 56.000000 m/s^2
You entered 20.000000 kg

```



```
apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_2
Please input a number from 1 up to 10000000: 78363
5 digits

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_2
Please input a number from 1 up to 10000000: 8734678
7 digits
```

```
apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_3
Please input two integers separated by a space: 34 76

Now doing a swap using an extra variable:
Before Swap: First: 34, Second: 76
After Swap: First: 76, Second: 34

Now doing a swap using addition and subtraction:
Before Swap: First: 34, Second: 76
After Swap: First: 76, Second: 34
```

```

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_4
Select:
1 for voltage
2 for resistance
3 for current
1
Enter floating point numbers for input...
Please enter a resistance value: 123
Please enter a current value: 234
Your voltage is: 28782.000000 Volts

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_4
Select:
1 for voltage
2 for resistance
3 for current
2
Enter floating point numbers for input...
Please enter a voltage value: 34
Please enter a current value: 45
Your Resistance is: 0.755556 Ohms

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_4
Select:
1 for voltage
2 for resistance
3 for current
3
Enter floating point numbers for input...
Please enter a resistance value: 234
Please enter a voltage value: 4564
Your current is: 19.504274 Amps

```

```

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_5
Please type a number between -1000 and 1000: -988
0 is non-positive and 0 is non-zero and -988 is non-whole number.

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_5
Please type a number between -1000 and 1000: 89
0 is positive and 0 is non-negative and 89 is a whole number.

apatel1@C02018-09 /cygdrive/u/se185r/lab4
$ ./lab4_2_5
Please type a number between -1000 and 1000: 12
0 is positive and 0 is non-negative and 12 is a whole number.

```

```
apate11@C02018-09 /Cygnus/ve/u/se1837/lab4
$ ./lab4_3
Do you want to play a game?
->y

You are guessing a number. The options are 1 through 100.

What is your guess on what number I will select?
->13

You guessed the number correctly!
The number was Y

Do you want to play again?
->y

You are guessing a number. The options are 1 through 100.

What is your guess on what number I will select?
->87

You guessed the number correctly!
The number was

Do you want to play again?
->|
```