LAB SHEET #1

Lab exercises (please code yourself and show the output to instructor):

1. Write a program to display “hello world” in C.
2. Write a program to add two numbers (5&7) and display its sum.
3. Write a program to multiply two numbers (10&8) and display its product.
4. Write a program to calculate area of a circle having its radius (r=5).
5. Write a program to calculate area of an ellipse having its axes (minor=4cm, major=6cm).
6. Write a program to calculate simple interest for a given P=4000, T=2, R=5.5. (I = P*T*R/100)

Objective(s):

To be familiar with different data types, Operators and Expressions in C.

Title:

Write a program to take input of name, rollno and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, rollno with percentage score secured.

Problem Analysis:

Based on the problem, it is required to get the input of name, roll number and marks in 5 subjects of a student. The program should display the name; roll number and percentage of marks secured by that student as output. The input variables shall be: name, rollno, msub1, msub2, msub3, msub4, msub5. We need to calculate percentage of marks obtained. So the variable 'score' holds the percentage to be displayed.

$$\text{Percentage of marks obtained} = \frac{\text{total marks on 5 subjects}}{\text{total full marks}} \times 100$$

Hence, msum = msub1 + msub2 + msub3 + msub4 + msub5;

$$\text{Score} = \frac{\text{msum}}{500} \times 100$$

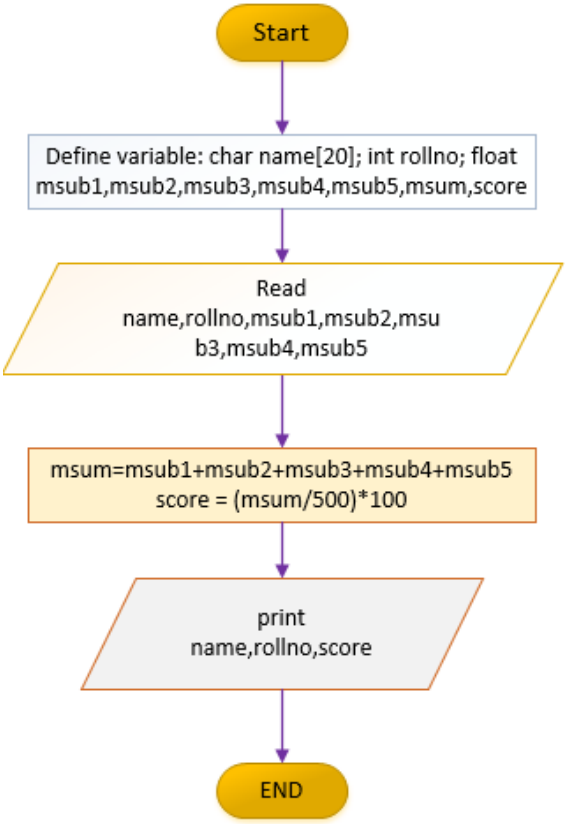
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
Name (char type) rollno (int) msub1, msub2, msub3, msub4, msub5 (float)	msum (float)	name (char type) rollno (int) score(float)	stdio.h conio.h scanf() &printf() for formatted i/o.

Algorithm:

1. Start
2. Define variables: name, rollno, msub1, msub2, msub3, msub4, msub5, msum, score
3. Take input from keyboard for all the input variables
4. Calculate the sum of marks of 5 subjects and also calculate the percentage score as: Msum = msub1 + msub2 + msub3 + msub4 + msub5; Score = $\frac{\text{msum}}{500} \times 100$
5. Display the name, roll number and percentage score.

6. Stop

Flowchart:



Code:

```
#include<stdio.h>
#include<conio.h>

int main(void)
{
char name[20];
introllno;
float msub1, msub2, msub3, msub4, msub5, msum, score;

printf("Enter Name of Student: ");
scanf("%[^\n]", name); /*can use scanf("%s",name) but it reads single word only.*/
printf ("\nRoll Number: "); scanf("%d",
&rollno);
printf ("\nEnter Marks in 5 Subjects:\n"); scanf("%f%f%f%f%f", &msub1,
&msub2, &msub3, &msub4, &msub5);

msum=msub1+msub2+msub3+msub4+msub5; score
= msum/500*100;
```

```
printf("\nName of Student: %s", name);

printf("\nRoll Number: %d", rollno);
printf ("\nPercentage Score Secured: %2.2f%c", score,'%');

return 0;
}
```

Output (Compilation, Debugging & Testing):

```
Enter Name of Student: Shree HariKoirala
Roll Number: 522
Enter Marks in 5 Subjects:
45.5
50
63
76
62.5
Name of Student: Shree HariKoirala
Roll Number: 522
Percentage Score Secured: 59.40%
```

Discussion & Conclusion:

In this second lab of C Programming, based on the focused objective(s) to understand about C data types with formatted input/output functions, the additional lab exercises made me more confident towards the fulfillment of the objectives.

LAB SHEET #2

Lab exercises (please code yourself and show the output to instructor):

1. Write a program to declare two integer and one float variables then initialize them to 10, 15, and 12.6. Also print the variable values in the screen.
2. Write a C program to prompt the user to input 3 integer values and print these values in forward and reversed order.
3. Write a program to calculate simple and compound interest.
4. Write a program to swap two variables' values with and without using third variables
5. Write a program to check odd or even number (a) using modulus operator (b) using bitwise operator (c) without using bitwise and modulus operator (d) using conditional operator.
6. Print the value of y for given x=2 & z=4 and analyze the output.
   a. y = x+++ ++x; b. y= ++x + ++x; c. y= ++x + ++x + ++x;
   d. y = x>z; e. y=x>z? x:z; f. y = x&z;
   g. y= x>>2 + z<<1;
7. Write a program to print the size of char, float, double and long double data types in C.

LAB SHEET #3

Objective(s): To be familiar with formatted and unformatted I/O in C with preprocessor directives

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write a program to produce the output as shown below:

x	y	expressions	results
6	3	x=y+3	x=6
6	3	x=y-2	x=1
6	3	x=y*5	x=15
6	3	x=x/y	x=2
6	3	x=x%y	x=0

2. Given x=3.0, y=12.5, z= 523.3, A=300.0, B=1200.5, C=5300.3, Write a program to display the following:

```
X   y   z=      3.0|    12.5|    523.3|
A   B   C    300.0|  1200.5|   5300.3|
            =
-------------------------------------------------------
X   y   z=    |3.00       |12.50    |523.30
A   B   C=    |300.00      |1200.50  |52300.30
```

3. Given the three numbers a(=8), b(=4),c and constant value PI=3.1415, calculate and display the following result using macros (preprocessor directives)
   a. c = PI * mult(a,b) //the macro mult(a,b) perform the multiplication of a & b(a*b)
   b. c= PI* sum(a,b) //the macro mult(a,b) perform the sum of a & b (a+b)
   c. c= PI *sub(a,b) //the macro mult(a,b) perform the subtraction of a & b (a-b)
   d. c= PI*div(a,b) //the macro mult(a,b) perform the division of a & b (a/b)
4. Demonstrate the differences among getch(), getche(), getchar(). Demonstrate the difference between scanf() & gets(), printf() & puts().
5. Write a program to take a character input from keyboard and check if it is a number or alphabet or special character using ASCII CODE Again check if the character is using character functions below:
   a. Alphanumeric => isalnum()
   b. Blank character => isblank()
   c. Alphabetic => isalpha()
   d. Control character => iscntrl()
   e. Number-digit => isdigit()
   f. Upper case => isupper()
   g. Lower case => islower()

h. Hexadecimal digit => ixdigit()
i. Graphical character => isgraph()

LAB SHEET #4

Objective(s): To understand the programming knowledge using Decision Statements (if, if-else, if- else if ladder, switch and GOTO)

Lab Exercises (Please Code yourself and show the output to instructor):

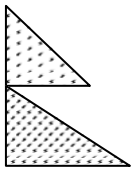
1. Write a program to find the largest and smallest among three entered numbers and also display whether the identified largest/smallest number is even or odd.
2. Write a program to check whether input alphabet is vowel or not using if-else and switch statement.
3. Write a program to get input of two or higher digit integer number and display in reverse order.
4. Write a program that asks a number and test the number whether it is multiple of 5 or not, divisible by 7 but not by eleven.
5. Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)
6. Write a program to read the values of coefficients a, b and c of a quadratic equation $ax^2+bx+c=0$ and find roots of the equation.

LAB SHEET #5

Objective(s): To understand the programming using Loop & nested loop Statements (for, while, do-while)

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write a program to input two integer numbers and display the sum of even numbers between these two input numbers.
2. Write a program to find GCD (greates common divisor or HCF) and LCM (least common multiple) of two numbers.
3. Write a program to display Fibonacci series of last term up to 300.
4. Write a program to display the flag of Nepal using symbolic/HEX character in C.



5. Write a program to display the following.

a.

b.

```
1
1   4
1   4   9
1   4   9   16
1   4   9   16   25
```

c.

d.

```
1   6   10   13   15
2   7   11   14
3   8   12
4   9
5
```

LAB SHEET #6

Objective(s): To understand function programming, its types and function-call

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write a program to add, subtract, multiply and divide two integers using user defined type function with return type.
2. Write a program to calculate sum of first 50 natural numbers using recursive function.
3. Define a function named fact() to calculate factorial of a number n and then write a program that uses this function fact() to calculate combination and permutation.
4. Write a recursive function to generate Fibonacci series.
5. Write a program that illustrates use of local, global and static variables

LAB SHEET #7

Objective(s): To understand programming using different dimensions of Array.

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write a program to enter 10 floating numbers in an array and display it.
2. Write a program to display largest and smallest element of an array defined in Q.No. 1.
3. Write a program to initialize one dimensional array of size 8 and display the sum and average of array elements
4. Write a program to read two matrices of order 3 * 2, add them and display the resultant matrix in matrix form.
5. Write a program to multiply two 3*3 matrix.
6. Write a program to read a string and check for palindrome without using string related function (a string is palindrome if its half is mirror by itself eg: abcdcba).

LAB SHEET #8

Objective(s): To understand programming with Pointer, String and Function call by reference.

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write a program to find biggest among three numbers using pointer.
2. Write a program to find the sum of all the elements of an array using pointers.
3. Write a program to swap value of two variables using pointer.
4. Write a program to read a sentence and count the number of characters &words in that sentence.
5. Write a program to read a sentence & delete all the white spaces. Replace all "." by ":".
6. Write a program to copy one string to another string with and without using string handling function.
7. Write a program to concatenate two strings.
8. Write a program to compare two strings.
9. Write a program to sort 5 string words stored in an array of pointers.
10. Write a program to print the following pattern

```
U N
U N I V
U N I V E R
U N I V E R S I
U N I V E R S I T Y
U N I V E R S I
U N I V E R
U N I V
U N
```

LAB SHEET #9

Objective(s): To understand programming with Structure

Lab Exercises (Please Code yourself and show the output to instructor):

1. Create a structure named company which has name, address, phone and noOfEmployee as member variables. Read name of company, its address, phone and noOfEmployee. Finally display these members' value.
2. Write a program to enter to Cartesian coordinate points and display the distance between them.
3. Write a function which accepts structure as argument and returns structure to the calling program.
4. Pass the structures defined in Question 1 into a function and read the structure member and display the values from the function (use structure pointer).
5. Define a structure "complex" (typedef) to read two complex numbers and perform addition, subtraction of these two complex numbers and display the result.
6. Write a program to read RollNo, Name, Address, Age & average-marks of 12 students in the BCT class and display the details from function.
7. Write a program to show programming examples with union and enumerations.

LAB SHEET #10

Objective(s): To understand data files and file handling in C.

Lab Exercises (Please Code yourself and show the output to instructor):

1. Write characters into a file “filec.txt”. The set of characters are read form the keyboard until an enterkey is pressed (use putc() and getc() function).
2. Read characters form file “filec.txt” created in question 1. Also count the number of characters in the file (use fputs() and fgets() function).
3. Write set of strings each of length 40 into a file “stringc.txt” and display it (use fputs() and fgets() function).
4. Write name, age and height of a person into a data file “person.txt” and read it (use fprintf() and fscanf() function)
5. Write a program to replace DOS command “type” by “watch”. The “watch” command is to be created by C program “watch.c” and read the file “filec.txt” written in question no 1. (In DOS, we use the command like #type filec.txt which is to be replaced like #watch filec.txt)