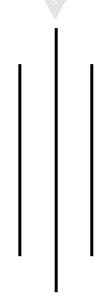
Tribhuwan University Institute of Engineering Purbanchal Campus, Dharan C Lab Report



Submitted By:

Name: Tilak Thapa

Roll No: PUR079BCT094

Submitted To:

Department of Electronic and Computer Engineering

Lab Date:

Submission Date:

Signature:

Table of Contents

1.	Lab Sheet 1 [To be familiar with C Programming]
2.	Lab Sheet 2 [To be familiar Data types, Constants, Operators and Expressions]
3.	Lab Sheet 3 [To be familiar with selective structure (branching)]
4.	Lab Sheet 4 [To be familiar with Unformatted and Formatted I/0]
5.	Lab Sheet 5 [To be familiar with LOOPS]
6.	Lab Sheet 6 [To be familiar with FUNCTIONS:]
7.	Lab Sheet 7 [To be familiar with Array]
8.	Lab Sheet 8 [To be familiar with Pointers]
9.	Lab Sheet 9 [To be familiar with Structure]
10.	Lab Sheet 10 [To be familiar with String]
	Lab Sheet 11 To be familiar with File Handling

Lab Sheet 1

1. WAP to display hello world.

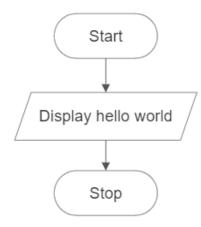
Objective

The objective of this program is to write a code that displays the message "Hello, World!" on the console.

> Algorithm

- i. Start
- ii. Display "Hello, World!"
- iii. Stop

> Flowchart



> Code

```
#include <stdio.h>
int main() {
   printf("Hello, World!\n");
   return 0;
}
```

> Output

Hello, World!

Discussion and Conclusion

This program displays the message "Hello, World!" on the console. The printf function is used to print the message. The \n is used to add a new line after the message. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.

2. WAP to display your name, roll number and address

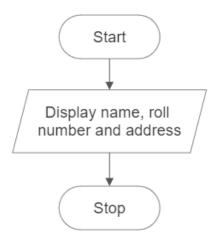
Objective

The objective of this program is to write a code that displays your name, roll number, and address on the console.

> Algorithm

- i. Start
- ii. Display name, roll number and address
- iii. Stop

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
   printf("Name: Tilak Thapa\n");
   printf("Roll Number: PUR079BCT094\n");
   printf("Address: Tulsipur - 4, Dang\n");
   return 0;
}
```

> Output

Name: Tilak Thapa

Roll Number: PUR079BCT094 Address: Tulsipur - 4, Dang

> Discussion and Conclusion

This program displays my name, roll number, and address on the console. The printf function is used to print each piece of information. The newline character \n is used to add a new line after each line of output. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.

3. WAP to add two integer variables and print sum

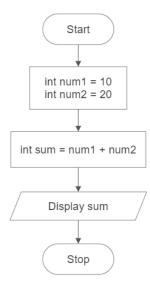
➢ Objective

The objective of this program is to write a code that adds two predefined integer variables and prints their sum.

> Algorithm

- i. Start.
- ii. Declare two integer variables, num1 and num2, and initialize them with predefined values.
- iii. Calculate the sum of num1 and num2 and store it in a variable called sum.
- iv. Print the value of sum.
- v. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
  int num1 = 10;
  int num2 = 20;
  int sum = num1 + num2;
  printf("Sum: %d\n", sum);
  return 0;
}
```

> Output

Sum: 30

> Discussion and Conclusion

This program adds two predefined integer variables, num1 and num2, and prints their sum. The values of num1 and num2 are initialized with the numbers 10 and 20, respectively. The sum of num1 and num2 is calculated and stored in the sum variable using the addition operator (+). The printf function is used to display the value of sum. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file. The objective of the program was achieved, and the code executed successfully.

4. WAP to multiply two integer variables and print product

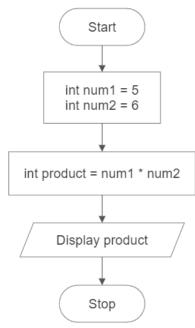
➢ Objective

The objective of this program is to write a code that multiplies two integer variables and prints their product.

> Algorithm

- i. Start.
- ii. Declare two integer variables, num1 and num2, and initialize them with predefined values.
- iii. Calculate the product of num1 and num2 and store it in a variable called product.
- iv. Print the value of product.
- v. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
   int num1 = 5;
   int num2 = 6;
   int product = num1 * num2;
   printf("Product: %d\n", product);
   return 0;
}
```

> Output

Product: 30

> Discussion and Conclusion

This program multiplies two integer variables, num1 and num2, and prints their product. The values of num1 and num2 are assigned as 5 and 6, respectively. The product of num1 and num2 is calculated and stored in the product variable using the multiplication operator (*). The printf function is used to display the value of product. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file. The objective of the program was achieved, and the code executed successfully.

5. WAP to calculate and display the simple interest.

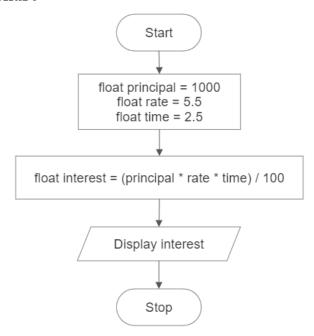
Objective

The objective of this program is to write a code that calculates and displays the simple interest based on predefined values for principal amount, rate, and time.

> Algorithm

- i. Start.
- ii. Declare and initialize three variables: principal, rate, and time with predefined values.
- iii. Calculate the simple interest using the formula: interest = (principal * rate * time) / 100 and assign the value to variable called interest.
- iv. Print the value of the interest.
- v. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
    float principal = 1000;
    float rate = 5.5;
    float time = 2.5;
    float interest = (principal * rate * time) / 100;
    printf("Simple Interest: Rs %f\n", interest);
    return 0;
}
```

> Output

Interest: Rs 137.500000

> Discussion and Conclusion

This program calculates and displays the simple interest based on predefined values for the principal amount, rate of interest, and time period. The values of principal, rate, and time are initialized as 1000, 5.5, and 2.5, respectively. The simple interest is calculated using the formula: interest = (principal * rate * time) / 100. The calculated interest value is then printed using the printf function. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.

6. WAP to calculate the area of the circle

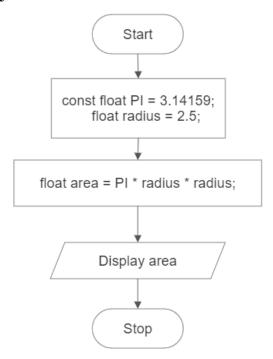
Objective

The objective of this program is to write a code that calculates the area of a circle based on a predefined radius.

> Algorithm

- i. Start.
- ii. Declare a constant variable for PI and a variable for the radius and assign their values.
- iii. Calculate the area of the circle using the formula: area = pi * radius * radius and assign the value to a variable called area.
- iv. Print the value of the area.
- v. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
   const float PI = 3.14159;
   float radius = 2.5;
   float area = PI * radius * radius;
   printf("Area of the circle: %.2f sq unit.\n", area);
   return 0;
}
```

> Output

Area of the circle: 19.63 sq unit.

Discussion and Conclusion:

This program calculates the area of a circle based on a predefined radius. The value of radius is assigned as 2.5. The area of the circle is calculated using the formula: area = PI * radius * radius, where PI is a constant value representing the mathematical constant pi (approximately 3.14159). The calculated area value is then printed using the printf function. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file

Lab Sheet 2

1. WAP to declare integer, float and character variable. Initialize them with certain value and print those values. Also display the size of variables.

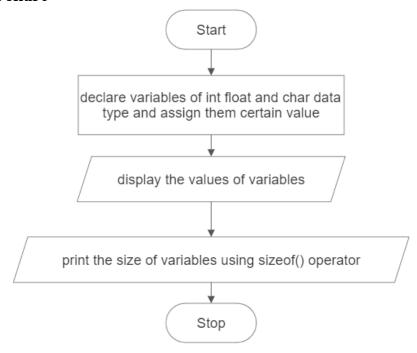
➤ Objective

The objective of this program is to write a code that declares integer, float, and character variables, initializes them with certain values, and prints the values. Additionally, the program will display the size of each variable.

Algorithm

- i. Start.
- ii. Declare an integer variable and assign certain value.
- iii. Declare a float variable and assign certain value.
- iv. Declare a character variable and assign certain value.
- v. Print the values of the variables using the printf function.
- vi. Use the sizeof() operator to determine the size of each variable and print the sizes of the variables.
- vii. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
  int integerVariable = 10;
  float floatVariable = 3.14;
  char charVariable = 'A';

  printf("Integer Variable: %d\n", integerVariable);
  printf("Float Variable: %f\n", floatVariable);
  printf("Character Variable: %c\n\n", charVariable);

  printf("Size of Integer Variable: %d bytes\n", sizeof(integerVariable));
  printf("Size of Float Variable: %d bytes\n", sizeof(floatVariable));
  printf("Size of Character Variable: %d bytes\n", sizeof(charVariable));
  return 0;
}
```

> Output

```
Integer Variable: 10
Float Variable: 3.140000
Character Variable: A
Size of Integer Variable: 4 bytes
Size of Float Variable: 4 bytes
Size of Character Variable: 1 bytes
```

Discussion and Conclusion

This program declares an integer variable, a float variable, and a character variable. The variables are initialized with certain values. The values of the variables are printed using the printf function. The size of operator is used to determine the size of each variable, and the sizes are printed. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.

2. WAP to swap the values of the variable with and without using third variable.

Objective

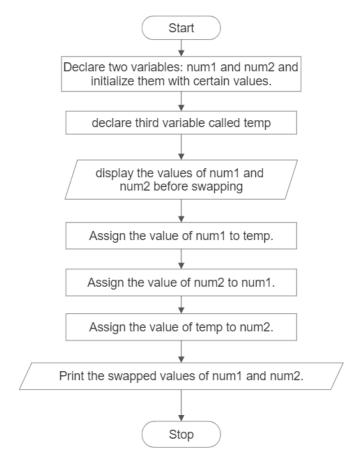
The objective of this program is to write a code that swaps the values of two variables, both with and without using a third variable.

I. Approach 1 (Using third variable)

> Algorithm

- i. Start.
- ii. Declare two variables: num1 and num2 and initialize them with certain values.
- iii. Declare a third variable, temp.
- iv. Display the value of num1 and num2 before swapping.
- v. Assign the value of num1 to temp.
- vi. Assign the value of num2 to num1.
- vii. Assign the value of temp to num2.
- viii. Print the swapped values of num1 and num2.
- ix. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
  int num1 = 10;
  int num2 = 20;
  int temp;
  printf("Before swapping:\n");
  printf("num1 = \%d\n", num1);
  printf("num2 = %d\n", num2);
  temp = num1;
  num1 = num2;
  num2 = temp;
  printf("After swapping (using third variable):\n");
  printf("num1 = \%d\n", num1);
  printf("num2 = %d\n", num2);
  return 0;
}
```

> Output

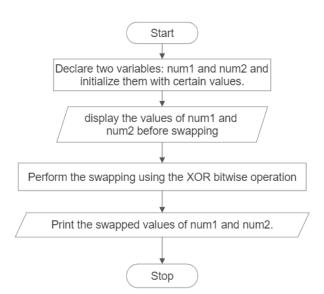
```
Before swapping:
num1 = 10
num2 = 20
After swapping (using third variable):
num1 = 20
num2 = 10
```

II. Approach 2 (Without Using Third Variable)

> Algorithm

- i. Start.
- ii. Declare two variables: num1 and num2 and initialize them with certain values.
- iii. Display the value of num1 and num2 before swapping.
- iv. Perform the swapping using the XOR bitwise operation.
- v. Print the swapped values of num1 and num2.
- vi. Stop.

> Flowchart



> Code

```
#include <stdio.h>
int main()
{
  int num1 = 10;
  int num2 = 20;

  printf("Before swapping:\n");
  printf("num1 = %d\n", num1);
  printf("num2 = %d\n", num2);

  num1 = num1 ^ num2;
  num2 = num1 ^ num2;
  num1 = num1 ^ num2;
  printf("After swapping (without using third variable):\n");
  printf("num1 = %d\n", num1);
  printf("num2 = %d\n", num2);

  return 0;
}
```

≻ Output

```
Before swapping:
num1 = 10
num2 = 20
After swapping (without using third variable):
num1 = 20
num2 = 10
```

Discussion and Conclusion

In the first part of the program, the values of num1 and num2 are swapped using a third variable. The values are stored in a temporary variable, temp, before swapping. Then, the values are exchanged by assigning num2 to num1 and temp to num2.

In the second part of the program, the values of num1 and num2 are swapped without using a third variable. This is achieved using the XOR bitwise operation. By performing XOR operations on the two variables, the original values are swapped without the need for an additional variable.

Both cases print the values of num1 and num2 before and after swapping to demonstrate the results. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.

3. WAP to calculate the area and volume of a cylinder using pre-processor directive for value of PI.

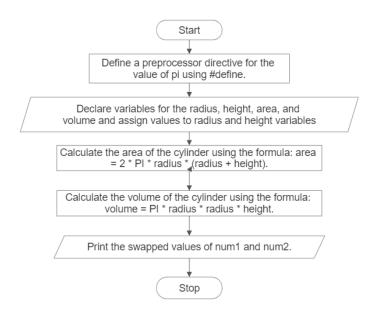
Objective

The objective of this program is to write a code that calculates the area and volume of a cylinder using a preprocessor directive for the value of pi.

> Algorithm

- i. Start.
- ii. Define a preprocessor directive for the value of pi using #define.
- iii. Declare variables for the radius, height, area, and volume.
- iv. Assign predetermined values to the radius and height variables.
- v. Calculate the area of the cylinder using the formula: area = 2 * PI * radius * (radius + height).
- vi. Calculate the volume of the cylinder using the formula: volume = PI * radius * radius * height.
- vii. Print the calculated area and volume.
- viii. Stop.

> Flowchart



> Code

```
#include <stdio.h>
#define PI 3.14159
int main()
{
    float radius = 2.5;
    float height = 5.0;
    float area, volume;

    area = 2 * PI * radius * (radius + height);
    volume = PI * radius * radius * height;

    printf("Area of the cylinder: %.2f\n", area);
    printf("Volume of the cylinder: %.2f\n", volume);

    return 0;
}
```

> Output

Area of the cylinder: 117.81 Volume of the cylinder: 98.17

Discussion and Conclusion

This program calculates the area and volume of a cylinder using a preprocessor directive for the value of pi. The values of the radius and height are predetermined and assigned to the respective variables. The area of the cylinder is calculated using the formula: area = 2 * PI * radius * (radius + height), and the volume is calculated using the formula: volume = PI * radius * radius * height. The calculated values are then printed using the printf function. The program was implemented using the VS Code IDE and compiled using gcc to generate an executable file.