DATE: LAB REPORT NO.: **1** SET: **B**
TITLE OF THE PROGRAM: **USER-DEFINED FUNCTIONS IN C**

OBJECTIVES

Area Calculation of a Rectangle using different types of User-defined Functions

I. To demonstrate the use of user-defined functions in C programming.
II. To calculate and display the area of a rectangle using different types of user-defined functions.
III. To understand the concepts of return values and arguments in user-defined functions.

REQUIREMENTS

1. C Compiler (e.g., GCC)
2. Computer System
3. IDE or Text Editor
4. OS compatible with the software

THEORY

In C programming, user-defined functions allow us to create our own functions apart from the built-in functions provided by the language. These functions can be customized to perform specific tasks. In this project, we will focus on calculating and displaying the area of a rectangle using three different types of user-defined functions.

1. **Yes Return and No Argument**: This type of function returns a value but does not require any arguments. The function declaration would look like: `` `int aor(void);` ``.

2. **No Return and Yes Argument**: This type of function does not return a value but requires one or more arguments. The function declaration would look like: `` `void aor(int, int);` ``.

3. **Yes Return and Yes Argument**: This type of function both returns a value and requires one or more arguments. The function declaration would look like: `` `int aor(int, int);` ``.

Here “aor” stands for “Area of Rectangle”.

PROCEDURE (Program Code, Comment, and Output)

1. **Yes Return and No Argument:**

Program Code:

```c
#include <stdio.h>

// Function prototype
int aor(void);

int main()
```

```
{
    int result;

    // Call the aor() function and store the returned value in 'result'
    result = aor();

    // Print the result
    printf("The area of the rectangle is: %d\n", result);

    return 0;
}

// Function to calculate area of rectangle
int aor(void)
{
    int length, width, area;

    // Prompt the user to enter the length of the rectangle
    printf("Enter the length of the rectangle: ");
    scanf("%d", &length);

    // Prompt the user to enter the width of the rectangle
    printf("Enter the width of the rectangle: ");
    scanf("%d", &width);

    // Calculate the area of the rectangle
    area = length * width;

    // Return the calculated area to the calling function
    return area;
}
```

Output:

```
Enter the length of the rectangle: 5
Enter the width of the rectangle: 6
The area of the rectangle is: 30
```

2. **No Return and Yes Argument:**

Program Code:

```
#include <stdio.h>

// Function declaration
```

```c
void aor(int, int);

int main()
{
    int length, width;

    // Prompt user for length of the rectangle
    printf("Enter the length of the rectangle: ");
    scanf("%d", &length);

    // Prompt user for width of the rectangle
    printf("Enter the width of the rectangle: ");
    scanf("%d", &width);

    // Call the function to calculate area
    aor(length, width);

    return 0;
}

// Function to calculate the area of the rectangle
void aor(int length, int width)
{
    int area;

    // Calculate the area of the rectangle
    area = length * width;

    // Print the calculated area
    printf("The area of the rectangle is: %d\n", area);
}
```

Output:

```
Enter the length of the rectangle: 5
Enter the width of the rectangle: 3
The area of the rectangle is: 15
```

3. **Yes Return and Yes Argument:**

Program Code:

```c
#include <stdio.h>

// Function prototype declaration
int aor(int, int);
```

```c
int main()
{
    int length, width, result;

    printf("Enter the length of the rectangle: ");
    scanf("%d", &length);

    printf("Enter the width of the rectangle: ");
    scanf("%d", &width);

    // Call the function to calculate the area of the rectangle
    result = aor(length, width);

    printf("The area of the rectangle is: %d\n", result);

    return 0;
}

// Function definition to calculate the area of a rectangle
int aor(int length, int width)
{
    int area;

    // Calculate the area by multiplying the length and width
    area = length * width;

    return area;
}
```

Output:

```
Enter the length of the rectangle: 5
Enter the width of the rectangle: 3
The area of the rectangle is: 15
```

CONCLUSION

In this project, we successfully implemented three types of user-defined functions to calculate and display the area of a rectangle. We observed that each type of function has its own syntax and usage. The program demonstrated the concepts of return values and arguments in user-defined functions. By using user-defined functions, we can modularize our code and perform specific tasks efficiently.