C PROGRAMMING LAB

1. Basic Terminal Method

For every program, use exactly this workflow:

```
Create  →  vi filename.c

Compile →  gcc filename.c

Output  →  ./a.out
```

Example:

```
vi program1.c
```

After writing the program in vi, save and exit:

- Press Esc
- Type :wq
- Press Enter

Then compile:

```
gcc program1.c
```

If there are no errors, run:

```
./a.out
```

PROGRAM 1: Hello World

Aim: Print a simple message.

```
#include <stdio.h>

int main()
{
    printf("Hello World");

    return 0;
}
```

Output:

```
Hello World
```

PROGRAM 2: Read and Print a Number

Aim: Read an integer from the user and display it.

```
#include <stdio.h>

int main()
{
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    printf("You entered: %d", number);

    return 0;
}
```

Sample output:

```
Enter a number: 25
You entered: 25
```

Remember: &number gives scanf the address of the variable.

PROGRAM 3: Add Two Numbers

```
#include <stdio.h>

int main()
{
    int a, b, sum;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    sum = a + b;

    printf("Sum = %d", sum);

    return 0;
}
```

Sample output:

```
Enter two numbers: 10 20
Sum = 30
```

PROGRAM 4: Find Average of Three Numbers

```
#include <stdio.h>

int main()
{
    float a, b, c, average;

    printf("Enter three numbers: ");
    scanf("%f %f %f", &a, &b, &c);

    average = (a + b + c) / 3;

    printf("Average = %.2f", average);

    return 0;
}
```

Sample output:

```
Enter three numbers: 10 20 30
Average = 20.00
```

PROGRAM 5: Even or Odd

```
#include <stdio.h>

int main()
{
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number % 2 == 0)
    {
        printf("Even number");
    }
    else
    {
        printf("Odd number");
    }

    return 0;
}
```

Sample output:

```
Enter a number: 12
Even number
```

Important: % gives the remainder. If number % 2 is 0, the number is even.

PROGRAM 6: Positive, Negative or Zero

```
#include <stdio.h>

int main()
{
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number > 0)
    {
        printf("Positive number");
    }
    else if (number < 0)
    {
        printf("Negative number");
    }
    else
    {
        printf("Zero");
    }

    return 0;
}
```

Sample output:

```
Enter a number: -15
Negative number
```

PROGRAM 7: Larger of Two Numbers

```
#include <stdio.h>

int main()
{
    int a, b;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    if (a > b)
    {
        printf("Larger number = %d", a);
    }
    else if (b > a)
    {
        printf("Larger number = %d", b);
    }
    else
    {
        printf("Both numbers are equal");
    }

    return 0;
}
```

Sample output:

```
Enter two numbers: 25 17
Larger number = 25
```

PROGRAM 8: Absolute Value

```
#include <stdio.h>

int main()
{
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number < 0)
    {
        number = -number;
    }

    printf("Absolute value = %d", number);

    return 0;
}
```

Sample output:

```
Enter a number: -25
Absolute value = 25
```

PROGRAM 9: Vowel or Not Using If

```
#include <stdio.h>

int main()

{

    char ch;

    printf("Enter a character: ");

    scanf("%c", &ch);

    if(ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u')

    {

        printf("Vowel");

    }

    else

    {

        printf("Consonant");

    }

    return 0;

}
```

Sample output:

```
Enter a character: e
Vowel

Enter a character: k

Consonant
```

PROGRAM 10: Bitwise Operators

```
#include <stdio.h>

int main()
{
    int a, b;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    printf("AND = %d\n", a & b);
    printf("OR = %d\n", a | b);
    printf("XOR = %d\n", a ^ b);
    printf("NOT of a = %d\n", ~a);
    printf("Left shift of a = %d\n", a << 1);
    printf("Right shift of a = %d\n", a >> 1);

    return 0;
}
```

Sample output:

```
Enter two numbers: 10 4
AND = 0
OR = 14
XOR = 14
NOT of a = -11
Left shift of a = 20
Right shift of a = 5
```

2. If Compilation Gives an Error

Do not type ./a.out immediately. First correct the program.

```
vi filename.c
```

Then save and compile again:

```
gcc filename.c
```

Only after successful compilation:

```
./a.out
```

Common beginner errors:

- Missing semicolon (;)
- Missing or extra { }
- Misspelling printf or scanf
- Forgetting #include <stdio.h>
- Forgetting & in scanf
- Using the wrong format specifier, such as %d or %f

ADDITIONAL PROGRAMS TO PRACTICE:

1. **Print day name using day number**
2. **Calculate grade based on marks.**
3. **Check whether a character is uppercase or lowercase.**
4. **Check whether a number is prime.**