* ***Purpose :*** **Classwork**

* ***Date :*** **23/12/2025**

* ***Author :*** **Vikas Srivastava**

* ***ID :*** **55984**

* ***Batch ID :*** **25SUB4505**

---

1. ***Code :*** Write a program to accept a person's name and age from the user and determine their education level using an if–else if ladder based on predefined age categories.

```c
/*
take name an age from the user.
    say if the age is 5+ --> elemetary school ,11+ --> middle school, 14+ --> High School, 16+ ==> Pre-University, 18+ --> Under graduation,21+
    --> Adult.
*/
#include <stdio.h>
int main() {
    char name[25];   // Array to store name
    int age;         // Variable to store age
    // Accept name from user
    printf("Enter a name: ");
    scanf("%s", name);
    // Accept age from user
    printf("Enter age: ");
    scanf("%d", &age);
    // Check age category
    if (age >= 21)
        printf("%s is an Adult.\n", name);
    else if (age >= 18)
        printf("%s is in Under Graduation.\n", name);
    else if (age >= 16)
        printf("%s is in Pre-University.\n", name);
    else if (age >= 14)
        printf("%s is in High School.\n", name);
    else if (age >= 11)
        printf("%s is in Middle School.\n", name);
    else if (age >= 5)
        printf("%s is in Elementary School.\n", name);
    else
        printf("%s is too young for school.\n", name);

    return 0;
}
```

Output :

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc NestedLoop.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter a name: Vikas
Enter age: 24
Enter age: 24
Vikas is an Adult.
```

2. ***Code :*** Write a program to accept an integer from the user and count the number of digits in it using a while loop, handling 0 as a special case.

```c
//Count of digits in a number. Where number is accepted from the user.

#include <stdio.h>

int main() {
    int num, count = 0;

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

    // Special case: if number is 0, it has 1 digit
    if (num == 0) {
        count = 1;
    } else {
        // Count digits by repeatedly dividing by 10
        while (num != 0) {
            count++;
            num = num / 10;
        }
    }

    printf("Number of digits = %d\n", count);

    return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc digitCount.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter a number: 100
Number of digits = 3
```

3. ***Code*** : Write a program to generate and display the Fibonacci series up to a user-specified number of terms using a for loop, where each term is the sum of the previous two numbers.

```c
// fibbonaci.c
//Print first n numbers in fibonacci series, where n is accepted from user

#include <stdio.h>

int main() {
    int n, first = 0, second = 1, next;

    // Ask for the number of terms
    printf("Enter the number of terms: ");
    scanf("%d", &n);

    printf("Fibonacci Series: ");

    // Loop to print Fibonacci numbers
    for (int i = 0; i < n; i++) {
        if (i <= 1) {
            next = i; // first two terms (0 and 1)
        } else {
            next = first + second; // sum of previous two numbers
            first = second;  // update first
            second = next;   // update second
        }
        printf("%d ", next);  // print the next Fibonacci number
    }

    return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc fibbonaci.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter the number of terms: 5
Fibonacci Series: 0 1 1 2 3
```

4. ***Code*** : Write a program to accept three integers from the user and determine the largest number among them using if–else if–else conditional statements.

```c
// largestOfthree.c
//largest of 3 numbers, where numbers are accepted by the user.

#include <stdio.h>

int main (){
  int num1, num2, num3;
  printf("Enter num1 : \n");
  scanf("%d", &num1);

  printf("Enter int num2 ');
  scanf("%d", &num2);

  printf("Enter num3 : \n");
  scanf("%d", &num3);

  if(num1 > num2 && num1 > num3){
    printf("%d is greater than %d and %d", num1, num2, num3 );
  }else if (num2 > num1 && num2 > num3)
  {
    printf("%d is greater than %d and %d", num2, num1, num3 );
  }
  else
  {
    printf("%d is greater than %d and %d", num3, num1, num2 );
  }
  return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc largestOfthree.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter num1 :
4
Enter num2 :
5
Enter num3 :
6
6 is greater than 4 and 5
```

5. ***Code :*** Write a program to check whether a given year is a leap year using conditional statements and logical operators based on standard leap year rules.

leapyear.c

```c
//Check whether the given Year is leap or not.

#include <stdio.h>
int main(){
int year;
printf("Enter a year : \n");
scanf("%d", &year);
if((year % 4 == 0 && year % 100 != 0) || year % 400 ==0){
  printf("Its a leap year");
}else{
  printf("Not a Leap year");
}
  return 0;
}
```

Output :

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc leapyear.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter a year :
2009
Not a Leap year
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter a year :
2000
Its a leap year
```

6. ***Code :*** Write a program to store multiple strings in an array and determine the longest string by comparing their lengths using the strlen() function.

longestStr.c

```c
//Longest string in collection of string

#include <stdio.h>
#include <string.h>

int main() {
    char *strings[] = {"apple", "banana", "watermelon", "grape", "kiwi"};
    int n = sizeof(strings) / sizeof(strings[0]);
    char *longest = strings[0];

    for (int i = 1; i < n; i++) {
        if (strlen(strings[i]) > strlen(longest)) {
            longest = strings[i];
        }
    }

    printf("The longest string is: %s\n", longest);

    return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc longestStr.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
The longest string is: watermelon
```

7. ***Code :*** Write a program to demonstrate pointer basics in C by showing the relationship between a variable, its address, a pointer storing that address, and the use of dereferencing (*) and address-of (&) operators to access values and memory locations.

ptrOne.c

```c
#include <stdio.h>

int main(){
    int var = 10;
    int *ptr = &var;

    printf("var: %d\n", var);
    printf("&var: %p\n", &var);
    printf("ptr: %p\n", ptr);
    printf("&ptr: %p\n", &ptr);
    printf("*&ptr: %p\n", *&ptr);
    printf("**&ptr: %d\n", **&ptr);

}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc ptrOne.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
var: 10
&var: 0061FF1C
ptr: 0061FF1C
&ptr: 0061FF18
*&ptr: 0061FF1C
**&ptr: 10
```

8. ***Code*** : Write a program to accept an integer from the user and reverse the number using a while loop by extracting and repositioning digits one by one.

reverseNum.c

```c
//Reverse a number. Where number is accepted from the user.

#include <stdio.h>

int main() {
    int num, rev = 0, digit;

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

    // Reverse the number using loop
    while (num != 0) {
        digit = num % 10;           // Get last digit
        rev = rev * 10 + digit;     // Build reversed number
        num = num / 10;             // Remove last digit
    }

    printf("Reversed number = %d\n", rev);

    return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc reverseNum.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter a number: 154
Reversed number = 451
```

9. ***Code*** : Write a program to calculate Simple Interest by accepting the principal amount, rate of interest, and time from the user and applying the standard formula SI=(P×R×T)/100SI = (P \times R \times T) / 100SI=(P×R×T)/100.

```c
//Simple Interest Calcalulator by accepting principal, rate and duration--> (P * R * T ) / 100

#include <stdio.h>
int main() {
    float P, R, T, SI;
    printf("Enter Principal amount: ");
    scanf("%f", &P);

    printf("Enter Rate of Interest: ");
    scanf("%f", &R);

    printf("Enter Time (in years): ");
    scanf("%f", &T);

    // Simple Interest formula
    SI = (P * R * T) / 100;

    printf("Simple Interest = %.2f\n", SI);

    return 0;
}
```

Output :

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc SimpleIntrest.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter Principal amount: 100
Enter Rate of Interest: 2
Enter Time (in years): 4
Simple Interest = 8.00
```

10. ***Code :*** Write a program to demonstrate how a single string and multiple strings can be stored using a character array and a two-dimensional character array, and then displayed using a loop.

```c
#include <stdio.h>

int main(){
  char name[] = "Sudhakar Palanivelu";

  char names[][15] = {"Name One", "Name Two", "Name Three", "Name Four", "Name Five"};

  int cnt;

  printf("One Name: %s\n", name);
  printf("Multiple names: \n\t\t");
  for (cnt = 0; cnt < 5; cnt++)
    printf("%s\n\t\t",names[cnt]);
  printf("\n");
}
```

Output :

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc stringsOne.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
One Name: Sudhakar Palanivelu
Multiple names:
                Name One
                Name Two
                Name Three
                Name Four
                Name Five
```

11. ***Code :*** Write a program to accept a number n from the user and calculate the sum of the first n natural numbers using a for loop.

SimpleIntrest.c | SumOfN.c

SumOfN.c > ...

```c
//Sum of first n numbers, where n is accepted from user

#include <stdio.h>

int main() {
    int n, i;
    int sum = 0;

    printf("Enter value of n: ");
    scanf("%d", &n);

    // Add numbers from 1 to n
    for (i = 1; i <= n; i++) {
        sum = sum + i;
    }

    printf("Sum of first %d numbers = %d\n", n, sum);

    return 0;
}
```

Output :

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc SumOfN.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter value of n: 5
Sum of first 5 numbers = 15
```

12. ***Code*** : Write a program to accept two integers from the user, calculate their sum, and display the result on the screen.

SimpleIntrest.c | SumOfTwoNum.c

SumOfTwoNum.c > ...

```c
//Sum of 2 numbers by accepting 2 numbers from the user.

#include <stdio.h>

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

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

    sum = a + b;

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

    return 0;
}
```

Output :

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc SumOfTwoNum.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter two numbers: 4
5
Sum = 9
```

13. *Code* : Write a program to accept two integers from the user, perform addition, and display the sum of the two numbers.

Swap.c

```c
//Swapping  2 numbers using temporary variable.

#include <stdio.h>
int main() {
    int a, b, temp;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);
    // Store value of a in temporary variable
    temp = a;
    // Assign value of b to a
    a = b;
    // Assign value of temp to b
    b = temp;
    printf("After swapping:\n");
    printf("a = %d\n", a);
    printf("b = %d\n", b);

    return 0;
}
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> gcc Swap.c
PS C:\Users\VIKAS SRIVASTAVA\OneDrive\Desktop\C_CPP\Day_3\Classwork> .\a.exe
Enter two numbers: 454
531
After swapping:
a = 531
b = 454
```