Assignment 1

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Assignment 1

Q1. What is the purpose of the main() function in a C program? Explain its significance.

The main() function is the entry point of a C program. When the program runs, execution starts from main(). It is significant because it serves as the starting point for program control flow and usually returns an integer to the operating system to indicate success (0) or failure (non-zero).

Q2. Explain the difference between a variable declaration and a variable initialization in C.

Declaration: Tells the compiler about the variable's type and name, but does not assign a value. For example int x;

Initialization: Declares the variable and assigns an initial value. For example int x = 10;

Q3. Write a C program to display a personalized greeting message. (Should contain 'hello' or 'welcome' in the message)

```
#include <stdio.h>

int main() {
   printf("Hello world\n");
   return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q3.c -o q3 } ; if ($?) { .\q3 }
Hello world
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

4. What are the different data types available in C? Provide examples of each data type.

Data Type	Example	Description
int	int a = 10;	Integer numbers
float	float f =3.14;	Single-precision floating-point
double	double d =3.14159;	Double-precision floating-point
char	char c = 'A';	Single character
_Bool	_Bool flag =1;	Boolean type (true/false)
void	void func() { }	Function returning no value

Q5. Explain the concept of type conversions in C. Provide examples of implicit and explicit type conversions.

In C, type conversion is the conversion of a value of one type of data to another type. This normally occurs when an expression contains different types of data or when a computer programmer wishes to alter the type of a variable. Type conversion assists in making sure calculations and assignments are functional. In C, the type conversion can be of two kinds; that is, implicit conversion and explicit conversion.

Q6. Write a C program to calculate the area of a rectangle. Prompt the user to enter the length and width, and display the result.

```
#include <stdio.h>

int main() {
    float length, width, area;

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

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

    area = length * width;

    printf("The area of the rectangle is: %.2f\n", area);

    return 0;
```

}

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\" ;
if ($?) { gcc q6.c -o q6 } ; if ($?) { .\q6 }
Enter the length of the rectangle: 34
Enter the width of the rectangle: 44
The area of the rectangle is: 1496.00
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q7. What is the role of the scanf() function in C? Provide an example of its usage.

The scanf() function in C is used to take input from the user through the keyboard. It reads formatted data and stores it in variables. The function is defined in the stdio.h header file and uses format specifiers like %d, %f, and %c to read different types of values. For example, %d is used for integers, %f for floating-point numbers, and %c for characters. When using scanf(), the address operator (&) is placed before variable names so the function can store the input value in memory.

Example program:

```
#include <stdio.h>

int main() {
    int age;

    printf("Enter your age: ");
    scanf("%d", &age);

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

    return 0;
}
```

Q8. Write a C program to convert temperature from Celsius to Fahrenheit. Prompt the user for a temperature in Celsius and display the equivalent temperature in Fahrenheit. (Formula: fahrenheit = (celsius * 9 / 5) + 32)

```
#include <stdio.h>

int main() {
    float celsius, fahrenheit;

    printf("Enter temperature in Celsius: ");
    scanf("%f", &celsius);

    fahrenheit = (celsius * 9 / 5) + 32;

    printf("Temperature in Fahrenheit: %.2f\n", fahrenheit);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\" ;
if ($?) { gcc q8.c -o q8 } ; if ($?) { .\q8 }
Enter temperature in Celsius: 99
Temperature in Fahrenheit: 210.20
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q9. Input a number representing days and print the equivalent number of weeks and days. (Example: 10 days = 1 week and 3 days)

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

```
int main() {
    int days, weeks, remainingDays;

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

    weeks = days / 7;
    remainingDays = days % 7;

    printf("%d week(s) and %d day(s)\n", weeks, remainingDays);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q9.c -o q9 } ; if ($?) { .\q9 }
Enter number of days: 55
7 week and 6 days
```

Q10. Write a C program to swap the values of two variables using a temporary variable.

```
#include <stdio.h>

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

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

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

    temp = a;
    a = b;
    b = temp;

    printf("After swapping: a = %d, b = %d\n", a, b);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q10.c -o q10 } ; if ($?) { .\q10 }
Enter first number: 3
Enter second number: 4
After swapping:
First number = 4
Second number = 3
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q11. Write a C expression that performs the following operations in a single line: increment a variable by 1, multiply it by 3, and subtract 10.

```
#include <stdio.h>
int main() {
    int num;

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

```
    num = (++num * 3) - 10;

    printf("Result = %d\n", num);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q11.c -o q11 } ; if ($?) { .\q11 }
Enter a number: 44
Result = 125
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q12. Given three variables a, b, and c, write an expression that checks if a is greater than b and c is not equal to 0.

```
#include <stdio.h>

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

    printf("Enter values of a, b, and c: ");
    scanf("%d %d %d", &a, &b, &c);

    if (a > b && c != 0) {
        printf("Condition is true\n");
    } else {
        printf("Condition is false\n");
    }

    return 0;
```

}

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\sr
" ; if ($?) { gcc q12.c -o q12 } ; if ($?) { .\q12 }
Enter values of a, b, and c: 3 4 6
Condition is false
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q13. Write a C expression that evaluates whether a number is divisible by both 2 and 3 (without using the modulus operator).

```
#include <stdio.h>

int main() {
    int num;

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

    if ((num / 2) * 2 == num && (num / 3) * 3 == num) {
        printf("The number is divisible by both 2 and 3\n");
    } else {
        printf("The number is NOT divisible by both 2 and 3\n");
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src
" ; if ($?) { gcc q13.c -o q13 } ; if ($?) { .\q13 }
Enter a number: 44
The number is NOT divisible by both 2 and 3
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q14. Create an expression that swaps the values of two variables x and y without using a temporary variable.

```
#include <stdio.h>

int main() {
    int x, y;

    printf("Enter values of x and y: ");
    scanf("%d %d", &x, &y);

    x = x + y;
    y = x - y;
    x = x - y;

    printf("After swapping:\n");
    printf("x = %d\n", x);
    printf("y = %d\n", y);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q14.c -o q14 } ; if ($?) { .\q14 }
Enter values of x and y: 4 6
After swapping:
x = 6
y = 4
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q15. Write an expression that checks if a number is both positive and even.

```c
#include <stdio.h>

int main() {
    int num;

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

    if (num > 0 && num % 2 == 0) {
        printf("The number is positive and even\n");
    } else {
        printf("The number is NOT positive and even\n");
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q15.c -o q15 } ; if ($?) { .\q15 }
Enter a number: 44
The number is positive and even
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q16. Given two variables x and y, write an expression that calculates the average of their values.#include <stdio.h>

```c
int main() {
    float x, y, average;
```

```
    printf("Enter values of x and y: ");
    scanf("%f %f", &x, &y);

    average = (x + y) / 2;

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

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q16.c -o q16 } ; if ($?) { .\q16 }
Enter values of x and y: 3 4
Average = 3.50
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q17. Create an expression that checks if a given character is an uppercase letter.

```
#include <stdio.h>

int main() {
    char ch;

    printf("Enter a character: ");
    scanf(" %c", &ch);

    if (ch >= 'A' && ch <= 'Z') {
        printf("The character is an uppercase letter\n");
```

```
    } else {
        printf("The character is NOT an uppercase letter\n");
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q17.c -o q17 } ; if ($?) { .\q17 }
Enter a character: w
The character is NOT an uppercase letter
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q18. Write a C expression that calculates the sum of the squares of three different numbers.

```
#include <stdio.h>

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

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

    sum = a*a + b*b + c*c;

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

    return 0;
```

}

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src
" ; if ($?) { gcc q18.c -o q18 } ; if ($?) { .\q18 }
Enter three numbers: 4 5 6
Sum of squares = 77
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q19. Given three variables a, b, and c, write an expression that checks if a is equal to b and b is not equal to c.

```
#include <stdio.h>

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

    printf("Enter values of a, b, and c: ");
    scanf("%d %d %d", &a, &b, &c);

    if (a == b && b != c) {
        printf("Condition is true\n");
    } else {
        printf("Condition is false\n");
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q19.c -o q19 } ; if ($?) { .\q19 }
Enter values of a, b, and c: 3 4 5
Condition is false
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q20. Write an expression that checks if a number is a multiple of either 3 or 5.

```
#include <stdio.h>


int main() {
    int num;


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


    if (num % 3 == 0 || num % 5 == 0) {
        printf("The number is a multiple of 3 or 5\n");
    } else {
        printf("The number is NOT a multiple of 3 or 5\n");
    }


    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q20.c -o q20 } ; if ($?) { .\q20 }
Enter a number: 3
The number is a multiple of 3 or 5
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q21. Create an expression that swaps the values of three variables x, y, and z in a cyclic order (i.e., x becomes y, y becomes z, and z becomes x).

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

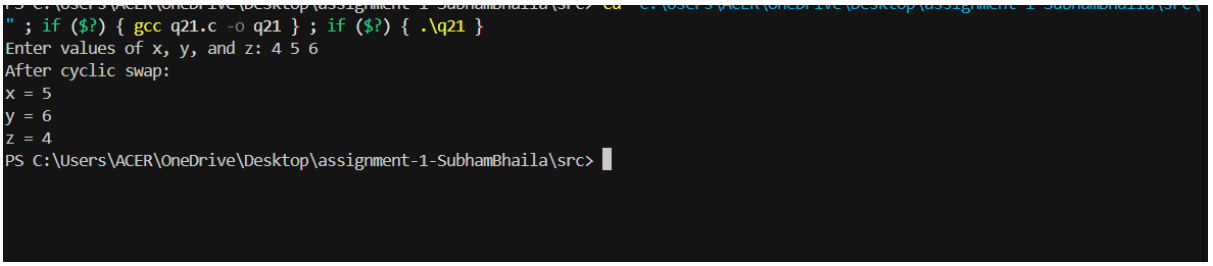
```
int main() {
    int x, y, z, temp;

    printf("Enter values of x, y, and z: ");
    scanf("%d %d %d", &x, &y, &z);

    temp = x;
    x = y;
    y = z;
    z = temp;

    printf("After cyclic swap:\n");
    printf("x = %d\n", x);
    printf("y = %d\n", y);
    printf("z = %d\n", z);

    return 0;
}
```



Q22. Write a C expression that calculates the square root of the sum of two numbers, rounded to the nearest integer.

```c
#include <stdio.h>
#include <math.h>

int main() {
    double a, b, result;

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

    result = round(sqrt(a + b));

    printf("Result = %.0lf\n", result);

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q22.c -o q22 } ; if ($?) { .\q22 }
Enter two numbers: 3 4
Result = 3
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q23. Given a variable num, write an expression that checks if it is a power of 2.

```c
#include <math.h>
#include <stdio.h>

int main() {
    int num = 16;
```

```
    if (num > 0 && floor(log2(num)) == ceil(log2(num))) {
        printf("%d is a power of 2\n", num);
    } else {
        printf("%d is not a power of 2\n", num);
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q23.c -o q23 } ; if ($?) { .\q23 }
16 is a power of 2
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src>
```

Q24. Create an expression that checks if a given number is a perfect square. do not use loop

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

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

    if (num < 0) {
        printf("%d is not a perfect square (negative numbers can't be perfect squares)\n", num);
    } else {
        int root = (int)sqrt(num);
```

```
        if (root * root == num) {
            printf("%d is a perfect square\n", num);
        } else {
            printf("%d is not a perfect square\n", num);
        }
    }

    return 0;
}
```

```
PS C:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src> cd "c:\Users\ACER\OneDrive\Desktop\assignment-1-SubhamBhaila\src\
" ; if ($?) { gcc q24.c -o q24 } ; if ($?) { .\q24 }
Enter a number:
```