Assignment 5

Function Type 1

```
#include <stdio.h>
#include <math.h>
#include <stdlib.h> // for exit()
// Function declarations

// Function declarations

// Assignment 1
void assignment_1();
void fahrenheit_to_celsius();
void find_area_and_perimeter();
void input_three_digit_number();
void check_even_or_odd();
void calculate_total_salary();
void check_marriage_eligibility();

// Assignment 2
void assignment_2();
void item_price_with_discount();
void find_greatest_of_three();
void calculator_with_operator();
void display_menu();
```

```
void check_student_discount();

// Assignment 3
void assignment_3();
void print_1_to_10();
void print_table_for_number();
void sum_in_range();
void check_prime_number();
void check_armstrong_number();
void check_perfect_number();
void factorial_of_number();
void check_strong_number();
void check_palindrome_number();
void add_first_and_last_digits();

// Assignment 4
void assignment_4();
void prime_numbers_in_range();
void armstrong_numbers_in_range();
void perfect_numbers_in_range();
void strong_numbers_in_range();
void generate_fibonacci_series();

int main()
{
```

```
    int choice;
    while (1)
    {
        printf("\n================ MAIN MENU ================\n");
        printf("1) Assignment 1\n2) Assignment 2\n3) Assignment 3\n4) Assignment 4\n0) Exit\n");
        printf("Enter Your Assignment No: ");
        scanf("%d", &choice);

        switch (choice)
        {
        case 1:
            assignment_1();
            break;
        case 2:
            assignment_2();
            break;
        case 3:
            assignment_3();
            break;
        case 4:
            assignment_4();
            break;
        case 0:
            exit(0);
```

```
        default:
            printf("Invalid Choice. Try again.\n");
        }
    }
    return 0;
}

// Type 1: Without return type, no parameters
//
========================================================
========== Type 1: Without return type, no
parameters  ================================================
====================

// ================= Assignment 1 =================
void assignment_1()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 1 ----------------\n");
        printf("1) Celsius to Fahrenheit\n");
        printf("2) Area and Perimeter\n");
        printf("3) Input 3-digit number\n");
        printf("4) Even or Odd\n");
        printf("5) Total Salary Calculation\n");
```

```
printf("6) Marriage Eligibility\n");
printf("0) Back to Main Menu\n");
printf("Enter your choice: ");
scanf("%d", &ch);

switch (ch)
{
case 1:
   fahrenheit_to_celsius();
   break;
case 2:
   find_area_and_perimeter();
   break;
case 3:
   input_three_digit_number();
   break;
case 4:
   check_even_or_odd();
   break;
case 5:
   calculate_total_salary();
   break;
case 6:
   check_marriage_eligibility();
   break;
```

```
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
    printf("\n---------- End of Assignment 1 ----------\n");
}

void fahrenheit_to_celsius()
{

    int celsius, fahrenheit;
    printf("\n1. Convert Celsius to Fahrenheit\n");
    printf("Enter temperature in Celsius: ");
    scanf("%d", &celsius);
    fahrenheit = (celsius * 9 / 5) + 32;
    printf("Temperature in Fahrenheit: %d°F\n", fahrenheit);
}

void find_area_and_perimeter()
{
    int choice, length, width, radius;
    float area, perimeter;
    const float pi = 3.14f;
```

```
  printf("\n2. Area and Perimeter Calculation\n");
  printf("1) Rectangle\n2) Circle\n");
  printf("Enter choice: ");
  scanf("%d", &choice);

  if (choice == 1)
  {
    printf("Enter length: ");
    scanf("%d", &length);
    printf("Enter width: ");
    scanf("%d", &width);
    area = length * width;
    perimeter = 2 * (length + width);
    printf("Rectangle Area: %.2f\nRectangle Perimeter: %.2f\n", area,
perimeter);
  }
  else if (choice == 2)
  {
    printf("Enter radius: ");
    scanf("%d", &radius);
    area = pi * radius * radius;
    perimeter = 2 * pi * radius;
    printf("Circle Area: %.2f\nCircle Perimeter: %.2f\n", area, perimeter);
  }
```

```
    else
    {
        printf("Invalid choice.\n");
    }
}

void input_three_digit_number()
{
    int no, n1, n2, n3, sum;
    printf("\n3. Sum and Reverse of a 3-digit Number\n");
    printf("Enter a 3-digit number: ");
    scanf("%d", &no);

    if (no >= 100 && no <= 999)
    {
        n1 = no / 100;
        n2 = (no / 10) % 10;
        n3 = no % 10;
        sum = n1 + n2 + n3;
        printf("Digits: %d, %d, %d\n", n1, n2, n3);
        printf("Sum of digits: %d\n", sum);
        printf("Reverse of number: %d%d%d\n", n3, n2, n1);
    }
    else
    {
```

```
        printf("Invalid input. Not a 3-digit number.\n");
    }
}

void check_even_or_odd()
{
    int no;
    printf("\n4. Even or Odd\n");
    printf("Enter a number: ");
    scanf("%d", &no);
    if (no % 2 == 0)
        printf("%d is Even\n", no);
    else
        printf("%d is Odd\n", no);
}

void calculate_total_salary()
{
    double basic, da, ta, hra, totalSalary;
    printf("\n5. Total Salary Calculation\n");
    printf("Enter Basic Salary: ");
    scanf("%lf", &basic);

    if (basic <= 5000)
    {
```

```
        da = basic * 0.10;
        ta = basic * 0.20;
        hra = basic * 0.25;
    }
    else
    {
        da = basic * 0.15;
        ta = basic * 0.25;
        hra = basic * 0.30;
    }

    totalSalary = basic + da + ta + hra;
    printf("Total Salary = %.2lf\n", totalSalary);
}

void check_marriage_eligibility()
{
    int male_age, female_age;
    printf("\n6. Marriage Eligibility Check\n");
    printf("Enter Male Age: ");
    scanf("%d", &male_age);
    printf("Enter Female Age: ");
    scanf("%d", &female_age);

    if (male_age >= 21)
```

```
        printf("Male is eligible for marriage.\n");
    else
        printf("Male is NOT eligible for marriage.\n");

    if (female_age >= 18)
        printf("Female is eligible for marriage.\n");
    else
        printf("Female is NOT eligible for marriage.\n");
}

// ================= Assignment 2 =================
void assignment_2()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 2 ----------------\n");
        printf("1) Item Price with Discount\n");
        printf("2) Greatest of Three Numbers\n");
        printf("3) Calculator with Operator\n");
        printf("4) Display Menu\n");
        printf("5) Check Student Discount\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);
```

```
        switch (ch)
        {
        case 1:
            item_price_with_discount();
            break;
        case 2:
            find_greatest_of_three();
            break;
        case 3:
            calculator_with_operator();
            break;
        case 4:
            display_menu();
            break;
        case 5:
            check_student_discount();
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}
```

```
void item_price_with_discount()
{
   int price, discountRate, discount, finalPrice;

   printf("\nQ1. Price Item Discount\n");
   printf("Enter the price of the item: ");
   scanf("%d", &price);

   if (price <= 1000)
   {
      discountRate = 5;
   }
   else if (price <= 5000)
   {
      discountRate = 10;
   }
   else
   {
      discountRate = 20;
   }

   discount = (price * discountRate) / 100;
   finalPrice = price - discount;
```

```
    printf("Discount: %d\n", discount);
    printf("Final Price after discount: %d\n", finalPrice);
}

void find_greatest_of_three()
{
    int a, b, c;

    printf("\nQ2. Greatest of Three Numbers\n");
    printf("Enter three numbers: ");
    scanf("%d %d %d", &a, &b, &c);

    if (a >= b)
    {
        if (a >= c)
            printf("Greatest number: %d\n", a);
        else
            printf("Greatest number: %d\n", c);
    }
    else
    {
        if (b >= c)
            printf("Greatest number: %d\n", b);
        else
            printf("Greatest number: %d\n", c);
```

```
    }

    if (a == b && b == c)
    {
        printf("All numbers are equal.\n");
    }
}
void calculator_with_operator()
{

    int num1, num2, result;
    char op;

    printf("\nQ3. Calculator using Operator\n");
    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);
    printf("Enter an operator (+, -, *, /, %%): ");
    scanf(" %c", &op);

    switch (op)
    {
    case '+':
        result = num1 + num2;
        printf("Result: %d\n", result);
        break;
```

```
case '-':
    result = num1 - num2;
    printf("Result: %d\n", result);
    break;
case '*':
    result = num1 * num2;
    printf("Result: %d\n", result);
    break;
case '/':
    if (num2 != 0)
    {
        result = num1 / num2;
        printf("Result: %d\n", result);
    }
    else
    {
        printf("Error: Division by zero is not allowed.\n");
    }
    break;
case '%':
    if (num2 != 0)
    {
        result = num1 % num2;
        printf("Result: %d\n", result);
    }
```

```
        else
        {
            printf("Error: Division by zero is not allowed.\n");
        }
        break;
    default:
        printf("Invalid operator!\n");
        break;
    }
}
void display_menu()
{
    int choice;

    printf("\nQ4. Menu: Even/Odd or Basic Salary\n");
    printf("1. Check Even/Odd\n2. Calculate Basic Salary\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);

    if (choice == 1)
    {
        int number;
        printf("Enter a number: ");
        scanf("%d", &number);
        if (number % 2 == 0)
```

```
        printf("%d is Even.\n", number);
    else
        printf("%d is Odd.\n", number);
  }
  else if (choice == 2)
  {
    double basic, hra, da, gross;

    printf("Enter Basic Salary: ");
    scanf("%lf", &basic);

    hra = 0.20 * basic;
    da = 0.50 * basic;
    gross = basic + hra + da;

    printf("Gross Salary: %.2lf\n", gross);
  }
  else
  {
    printf("Invalid choice!\n");
  }
}
void check_student_discount()
{
  int price, isStudent;
```

```
double discount = 0.0, finalPrice;

printf("\nQ5. Student Discount\n");
printf("Enter the total purchase amount: ");
scanf("%d", &price);

printf("Are you a student? (1 = Yes, 2 = No): ");
scanf("%d", &isStudent);

if (isStudent == 1)
{
   if (price > 500)
   {
      discount = 0.20 * price;
      printf("20%% student discount applied.\n");
   }
   else
   {
      discount = 0.10 * price;
      printf("10%% student discount applied.\n");
   }
}
else if (isStudent == 2)
{
   if (price > 600)
```

```
        {
            discount = 0.15 * price;
            printf("15%% non-student discount applied.\n");
        }
        else
        {
            printf("No discount applicable.\n");
        }
    }
    else
    {
        printf("Invalid input for student status.\n");
        return;
    }

    finalPrice = price - discount;
    printf("Final price after discount: %.2lf\n", finalPrice);
}

// ================= Assignment 3 =================
void assignment_3()
{
    int ch;
    while (1)
    {
```

```
printf("\n---------- Assignment 3 ----------\n");
printf("1) Print 1 to 10\n");
printf("2) Print Table for Number\n");
printf("3) Sum in Range\n");
printf("4) Check Prime Number\n");
printf("5) Check Armstrong Number\n");
printf("6) Check Perfect Number\n");
printf("7) Factorial of Number\n");
printf("8) Check Strong Number\n");
printf("9) Check Palindrome Number\n");
printf("10) Add First and Last Digits\n");
printf("0) Back to Main Menu\n");
printf("Enter your choice: ");
scanf("%d", &ch);

switch (ch)
{
case 1:
   print_1_to_10();
   break;
case 2:
   print_table_for_number();
   break;
case 3:
   sum_in_range();
```

```
    break;
case 4:
    check_prime_number();
    break;
case 5:
    check_armstrong_number();
    break;
case 6:
    check_perfect_number();
    break;
case 7:
    factorial_of_number();
    break;
case 8:
    check_strong_number();
    break;
case 9:
    check_palindrome_number();
    break;
case 10:
    add_first_and_last_digits();
    break;
case 0:
    return;
default:
```

```
            printf("Invalid choice. Try again.\n");
        }
    }
}

void print_1_to_10()
{

    // Q1. Print numbers from 1 to 10
    printf("\nQ1. Numbers from 1 to 10:\n");
    for (int i = 1; i <= 10; i++)
    {
        printf("%d ", i);
    }
    printf("\n");
}
void print_table_for_number()
{

    // Q2. Print multiplication table for a given number
    int num;
    printf("\nQ2. Enter a number to print its table: ");
    scanf("%d", &num);
    for (int i = 1; i <= 10; i++)
    {
```

```
        printf("%d x %d = %d\n", num, i, num * i);
    }
}
void sum_in_range()
{

    // Q3. Calculate sum of numbers in given range
    int start, end, sum = 0;
    printf("\nQ3. Enter start and end range: ");
    scanf("%d %d", &start, &end);
    for (int i = start; i <= end; i++)
    {
        sum += i;
    }
    printf("Sum is: %d\n", sum);
}
void check_prime_number()
{

    // Q4. Check number is prime or not
    int num, isPrime = 1;
    printf("\nQ4. Enter a number to check if prime: ");
    scanf("%d", &num);
    if (num <= 1)
    {
```

```
        isPrime = 0;
    }
    else
    {
        for (int i = 2; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                isPrime = 0;
                break;
            }
        }
    }
    if (isPrime)
        printf("%d is a Prime number.\n", num);
    else
        printf("%d is not a Prime number.\n", num);
}
void check_armstrong_number()
{

    // Q5. Check number is Armstrong or not
    int num, original, temp, digits = 0, sum = 0;
    printf("\nQ5. Enter a number to check Armstrong: ");
    scanf("%d", &num);
```

```
original = num;
temp = num;

while (temp > 0)
{
   temp /= 10;
   digits++;
}

temp = num;
while (temp > 0)
{
   int rem = temp % 10, power = 1;
   for (int i = 0; i < digits; i++)
   {
      power *= rem;
   }
   sum += power;
   temp /= 10;
}

if (original == sum)
   printf("%d is an Armstrong number.\n", original);
else
   printf("%d is not an Armstrong number.\n", original);
```

```
}
void check_perfect_number()
{

   // Q6. Check number is perfect or not
   int num, sum = 0;
   printf("\nQ6. Enter a number to check Perfect: ");
   scanf("%d", &num);
   for (int i = 1; i <= num / 2; i++)
   {
      if (num % i == 0)
         sum += i;
   }

   if (sum == num)
      printf("%d is a Perfect number.\n", num);
   else
      printf("%d is not a Perfect number.\n", num);
}
void factorial_of_number()
{

   // Q7. Find factorial of a number
   int num, factorial = 1;
   printf("\nQ7. Enter a number to find factorial: ");
```

```
    scanf("%d", &num);
    for (int i = 1; i <= num; i++)
    {
        factorial *= i;
    }
    printf("Factorial of %d is %d\n", num, factorial);
}
void check_strong_number()
{
    // Q8. Check number is strong or not
    int num, original, sum = 0;
    printf("\nQ8. Enter a number to check Strong: ");
    scanf("%d", &num);
    original = num;

    while (num > 0)
    {
        int digit = num % 10;
        int fact = 1;
        for (int i = 1; i <= digit; i++)
        {
            fact *= i;
        }
        sum += fact;
        num /= 10;
```

```
    }

    if (sum == original)
        printf("%d is a Strong number.\n", original);
    else
        printf("%d is not a Strong number.\n", original);
}
void check_palindrome_number()
{

    // Q9. Check number is palindrome or not
    int num, original, reversed = 0;
    printf("\nQ9. Enter a number to check Palindrome: ");
    scanf("%d", &num);
    original = num;

    while (num > 0)
    {
        reversed = reversed * 10 + (num % 10);
        num /= 10;
    }

    if (original == reversed)
        printf("%d is a Palindrome number.\n", original);
    else
```

```
        printf("%d is not a Palindrome number.\n", original);
}
void add_first_and_last_digits()
{

    // Q10. Add first and last digit of a number
    int num, firstDigit, lastDigit;
    printf("\nQ10. Enter a number to add first and last digit: ");
    scanf("%d", &num);
    lastDigit = num % 10;

    while (num >= 10)
    {
        num /= 10;
    }
    firstDigit = num;
    printf("Sum of first and last digit is: %d + %d = %d\n", firstDigit, lastDigit,
firstDigit + lastDigit);
}

// ================= Assignment 4 =================
void assignment_4()
{
    int ch;
    while (1)
```

```
{
    printf("\n---------- Assignment 4 ----------\n");
    printf("1) Prime Numbers in Range\n");
    printf("2) Armstrong Numbers in Range\n");
    printf("3) Perfect Numbers in Range\n");
    printf("4) Strong Numbers in Range\n");
    printf("5) Generate Fibonacci Series\n");
    printf("0) Back to Main Menu\n");
    printf("Enter your choice: ");
    scanf("%d", &ch);

    switch (ch)
    {
    case 1:
        prime_numbers_in_range();
        break;
    case 2:
        armstrong_numbers_in_range();
        break;
    case 3:
        perfect_numbers_in_range();
        break;
    case 4:
        strong_numbers_in_range();
        break;
```

```
        case 5:
            generate_fibonacci_series();
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}

void prime_numbers_in_range()
{

    // Q1. Print prime numbers in range
    int start = 1, end = 1000;
    printf("\nQ1. Prime numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        if (num < 2)
            continue;

        int is_prime = 1;
        for (int i = 2; i * i <= num; i++)
```

```
        {
            if (num % i == 0)
            {
                is_prime = 0;
                break;
            }
        }

        if (is_prime)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void armstrong_numbers_in_range()
{
    // Q2. Print Armstrong numbers in range
    int start = 1, end = 1000;
    printf("\nQ2. Armstrong numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int original = num, sum = 0, digits = 0, temp = num;
```

```
        while (temp > 0)
        {
            temp /= 10;
            digits++;
        }

        temp = num;
        while (temp > 0)
        {
            int digit = temp % 10;
            sum += pow(digit, digits);
            temp /= 10;
        }

        if (sum == original)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void perfect_numbers_in_range()
{
```

```
    // Q3. Print Perfect numbers in range
    int start = 1, end = 1000;
    printf("\nQ3. Perfect numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int sum = 0;
        for (int i = 1; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                sum += i;
            }
        }

        if (sum == num)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void strong_numbers_in_range()
{
```

```
// Q4. Print Strong numbers in range
int start = 1, end = 1000;
printf("\nQ4. Strong numbers between %d and %d:\n", start, end);

for (int num = start; num <= end; num++)
{
   int original = num, sum = 0, temp = num;

   while (temp > 0)
   {
      int digit = temp % 10;
      int factorial = 1;

      for (int i = 1; i <= digit; i++)
      {
         factorial *= i;
      }

      sum += factorial;
      temp /= 10;
   }

   if (sum == original)
   {
      printf("%d ", num);
```

```
        }
    }
    printf("\n--------------------------------\n");
}

void generate_fibonacci_series()
{
    // Q5. Print Fibonacci series (optional)
    int n = 10;
    int first = 0, second = 1;

    printf("\nQ5. First %d terms of Fibonacci Series:\n", n);

    for (int i = 0; i < n; i++)
    {
        printf("%d ", first);
        int next = first + second;
        first = second;
        second = next;
    }
    printf("\n--------------------------------\n");
}
```

Function Type 2

```
#include <stdio.h>
#include <math.h>
#include <stdlib.h> // for exit()
#include <string.h>

// Function declarations

// Assignment 1
void assignment_1();
int fahrenheit_to_celsius();
int find_area_and_perimeter();
int input_three_digit_number();
int check_even_or_odd();
double calculate_total_salary();
int check_marriage_eligibility();

// Assignment 2
int assignment_2();
int item_price_with_discount();
int find_greatest_of_three();
int calculator_with_operator();
int display_menu();
double check_student_discount();
```

```
// Assignment 3
void assignment_3();
void print_1_to_10();
void print_table_for_number();
int sum_in_range();
int check_prime_number();
int check_armstrong_number();
int check_perfect_number();
int factorial_of_number();
int check_strong_number();
int check_palindrome_number();
int add_first_and_last_digits();

// Assignment 4
void assignment_4();
void prime_numbers_in_range();
void armstrong_numbers_in_range();
void perfect_numbers_in_range();
void strong_numbers_in_range();
void generate_fibonacci_series();

int main()
{
   int choice;
```

```
  while (1)
  {
    printf("\n================ MAIN MENU ================\n");
    printf("1) Assignment 1\n2) Assignment 2\n3) Assignment 3\n4) Assignment 4\n0) Exit\n");
    printf("Enter Your Assignment No: ");
    scanf("%d", &choice);

    switch (choice)
    {
    case 1:
      assignment_1();
      break;
      case 2:
      assignment_2();
      break;
      case 3:
      assignment_3();
      break;
      case 4:
      assignment_4();
      break;
      case 0:
      exit(0);
      default:
```

```
            printf("Invalid Choice. Try again.\n");
        }
    }
    return 0;
}

// Type 1: Without return type, no parameters
//
========================================================
========== Type 2: With return type, no
parameters  ================================================
====================

// ================= Assignment 1 =================
void assignment_1()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 1 ----------------\n");
        printf("1) Celsius to Fahrenheit\n");
        printf("2) Area and Perimeter\n");
        printf("3) Input 3-digit number\n");
        printf("4) Even or Odd\n");
        printf("5) Total Salary Calculation\n");
        printf("6) Marriage Eligibility\n");
```

```
printf("0) Back to Main Menu\n");
printf("Enter your choice: ");
scanf("%d", &ch);

switch (ch)
{
   case 1:
   fahrenheit_to_celsius();
   break;
   case 2:
   find_area_and_perimeter();
   break;
   case 3:
   input_three_digit_number();
   break;
   case 4:
   check_even_or_odd();
   break;
   case 5:
   calculate_total_salary();
   break;
   case 6:
   check_marriage_eligibility();
   break;
   case 0:
```

```
            return;
            default:
            printf("Invalid choice. Try again.\n");
        }
    }
    printf("\n---------- End of Assignment 1 ----------\n");
}

int fahrenheit_to_celsius()
{
    int celsius, fahrenheit;
    printf("\n1. Convert Celsius to Fahrenheit\n");
    printf("Enter temperature in Celsius: ");
    scanf("%d", &celsius);
    fahrenheit = (celsius * 9 / 5) + 32;
    printf("Temperature in Fahrenheit: %d°F\n", fahrenheit);
    return fahrenheit;
}

int find_area_and_perimeter()
{
    int choice, length, width, radius;
    float area, perimeter;
    const float pi = 3.14f;
```

```
    printf("\n2. Area and Perimeter Calculation\n");
    printf("1) Rectangle\n2) Circle\n");
    printf("Enter choice: ");
    scanf("%d", &choice);

    if (choice == 1)
    {
        printf("Enter length: ");
        scanf("%d", &length);
        printf("Enter width: ");
        scanf("%d", &width);
        area = length * width;
        perimeter = 2 * (length + width);
        printf("Rectangle Area: %.2f\nRectangle Perimeter: %.2f\n", area,
perimeter);
    }
    else if (choice == 2)
    {
        printf("Enter radius: ");
        scanf("%d", &radius);
        area = pi * radius * radius;
        perimeter = 2 * pi * radius;
        printf("Circle Area: %.2f\nCircle Perimeter: %.2f\n", area, perimeter);
    }
    else
```

```
    {
        printf("Invalid choice.\n");
        return 0;
    }
    return 1;
}

int input_three_digit_number()
{
    int no, n1, n2, n3, sum;
    printf("\n3. Sum and Reverse of a 3-digit Number\n");
    printf("Enter a 3-digit number: ");
    scanf("%d", &no);

    if (no >= 100 && no <= 999)
    {
        n1 = no / 100;
        n2 = (no / 10) % 10;
        n3 = no % 10;
        sum = n1 + n2 + n3;
        printf("Digits: %d, %d, %d\n", n1, n2, n3);
        printf("Sum of digits: %d\n", sum);
        printf("Reverse of number: %d%d%d\n", n3, n2, n1);
        return sum;
    }
```

```
    else
    {
        printf("Invalid input. Not a 3-digit number.\n");
        return -1;
    }
}

int check_even_or_odd()
{
    int no;
    printf("\n4. Even or Odd\n");
    printf("Enter a number: ");
    scanf("%d", &no);
    if (no % 2 == 0)
    {
        printf("%d is Even\n", no);
        return 1;
    }
    else
    {
        printf("%d is Odd\n", no);
        return 0;
    }
}
```

```
double calculate_total_salary()
{
   double basic, da, ta, hra, totalSalary;
   printf("\n5. Total Salary Calculation\n");
   printf("Enter Basic Salary: ");
   scanf("%lf", &basic);

   if (basic <= 5000)
   {
      da = basic * 0.10;
      ta = basic * 0.20;
      hra = basic * 0.25;
   }
   else
   {
      da = basic * 0.15;
      ta = basic * 0.25;
      hra = basic * 0.30;
   }

   totalSalary = basic + da + ta + hra;
   printf("Total Salary = %.2lf\n", totalSalary);
   return totalSalary;
}
```

```
int check_marriage_eligibility()
{
   int male_age, female_age;
   printf("\n6. Marriage Eligibility Check\n");
   printf("Enter Male Age: ");
   scanf("%d", &male_age);
   printf("Enter Female Age: ");
   scanf("%d", &female_age);

   int eligible = 1;

   if (male_age < 21)
   {
      printf("Male is NOT eligible for marriage.\n");
      eligible = 0;
   }
   else
   {
      printf("Male is eligible for marriage.\n");
   }

   if (female_age < 18)
   {
      printf("Female is NOT eligible for marriage.\n");
      eligible = 0;
```

```
    }
    else
    {
        printf("Female is eligible for marriage.\n");
    }

    return eligible;
}

// ================= Assignment 2 =================

int assignment_2()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 2 ----------------\n");
        printf("1) Item Price with Discount\n");
        printf("2) Greatest of Three Numbers\n");
        printf("3) Calculator with Operator\n");
        printf("4) Display Menu\n");
        printf("5) Check Student Discount\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);
```

```
    switch (ch)
    {
    case 1:
        item_price_with_discount();
        break;
    case 2:
        find_greatest_of_three();
        break;
    case 3:
        calculator_with_operator();
        break;
    case 4:
        display_menu();
        break;
    case 5:
        check_student_discount();
        break;
    case 0:
        return 0;
    default:
        printf("Invalid choice. Try again.\n");
    }
}
return 0;
```

```
}

int item_price_with_discount()
{
   int price, discountRate, discount, finalPrice;

   printf("\nQ1. Price Item Discount\n");
   printf("Enter the price of the item: ");
   scanf("%d", &price);

   if (price <= 1000)
      discountRate = 5;
   else if (price <= 5000)
      discountRate = 10;
   else
      discountRate = 20;

   discount = (price * discountRate) / 100;
   finalPrice = price - discount;

   printf("Discount: %d\n", discount);
   printf("Final Price after discount: %d\n", finalPrice);

   return finalPrice;
}
```

```
int find_greatest_of_three()
{
   int a, b, c, greatest;

   printf("\nQ2. Greatest of Three Numbers\n");
   printf("Enter three numbers: ");
   scanf("%d %d %d", &a, &b, &c);

   if (a >= b && a >= c)
      greatest = a;
   else if (b >= c)
      greatest = b;
   else
      greatest = c;

   printf("Greatest number: %d\n", greatest);

   if (a == b && b == c)
      printf("All numbers are equal.\n");

   return greatest;
}

int calculator_with_operator()
```

```
{
    int num1, num2, result = 0;
    char op;

    printf("\nQ3. Calculator using Operator\n");
    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);
    printf("Enter an operator (+, -, *, /, %%): ");
    scanf(" %c", &op);

    switch (op)
    {
    case '+':
        result = num1 + num2;
        printf("Result: %d\n", result);
        break;
    case '-':
        result = num1 - num2;
        printf("Result: %d\n", result);
        break;
    case '*':
        result = num1 * num2;
        printf("Result: %d\n", result);
        break;
    case '/':
```

```
    if (num2 != 0)
    {
        result = num1 / num2;
        printf("Result: %d\n", result);
    }
    else
    {
        printf("Error: Division by zero is not allowed.\n");
    }
    break;
case '%':
    if (num2 != 0)
    {
        result = num1 % num2;
        printf("Result: %d\n", result);
    }
    else
    {
        printf("Error: Division by zero is not allowed.\n");
    }
    break;
default:
    printf("Invalid operator!\n");
    break;
}
```

```
    return result;
}

int display_menu()
{
    int choice;

    printf("\nQ4. Menu: Even/Odd or Basic Salary\n");
    printf("1. Check Even/Odd\n2. Calculate Basic Salary\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);

    if (choice == 1)
    {
        int number;
        printf("Enter a number: ");
        scanf("%d", &number);
        if (number % 2 == 0)
            printf("%d is Even.\n", number);
        else
            printf("%d is Odd.\n", number);

        return number;
    }
```

```
    else if (choice == 2)
    {
        double basic, hra, da, gross;

        printf("Enter Basic Salary: ");
        scanf("%lf", &basic);

        hra = 0.20 * basic;
        da = 0.50 * basic;
        gross = basic + hra + da;

        printf("Gross Salary: %.2lf\n", gross);
        return (int)gross;
    }
    else
    {
        printf("Invalid choice!\n");
    }

    return 0;
}

double check_student_discount()
{
    int price, isStudent;
```

```
double discount = 0.0, finalPrice;

printf("\nQ5. Student Discount\n");
printf("Enter the total purchase amount: ");
scanf("%d", &price);

printf("Are you a student? (1 = Yes, 2 = No): ");
scanf("%d", &isStudent);

if (isStudent == 1)
{
   if (price > 500)
   {
      discount = 0.20 * price;
      printf("20%% student discount applied.\n");
   }
   else
   {
      discount = 0.10 * price;
      printf("10%% student discount applied.\n");
   }
}
else if (isStudent == 2)
{
   if (price > 600)
```

```
        {
            discount = 0.15 * price;
            printf("15%% non-student discount applied.\n");
        }
        else
        {
            printf("No discount applicable.\n");
        }
    }
    else
    {
        printf("Invalid input for student status.\n");
        return price;
    }

    finalPrice = price - discount;
    printf("Final price after discount: %.2lf\n", finalPrice);

    return finalPrice;
}

// ================= Assignment 3 =================

void assignment_3()
{
```

```
int ch;
while (1)
{
   printf("\n---------------- Assignment 3 ----------------\n");
   printf("1) Print 1 to 10\n");
   printf("2) Print Table for Number\n");
   printf("3) Sum in Range\n");
   printf("4) Check Prime Number\n");
   printf("5) Check Armstrong Number\n");
   printf("6) Check Perfect Number\n");
   printf("7) Factorial of Number\n");
   printf("8) Check Strong Number\n");
   printf("9) Check Palindrome Number\n");
   printf("10) Add First and Last Digits\n");
   printf("0) Back to Main Menu\n");
   printf("Enter your choice: ");
   scanf("%d", &ch);

   switch (ch)
   {
   case 1:
      print_1_to_10();
      break;
   case 2:
      print_table_for_number();
```

```
    break;
  case 3:
    printf("Sum in range: %d\n", sum_in_range());
    break;
  case 4:
    if (check_prime_number())
      printf("It's a Prime Number.\n");
    else
      printf("It's not a Prime Number.\n");
    break;
  case 5:
    if (check_armstrong_number())
      printf("It's an Armstrong Number.\n");
    else
      printf("It's not an Armstrong Number.\n");
    break;
  case 6:
    if (check_perfect_number())
      printf("It's a Perfect Number.\n");
    else
      printf("It's not a Perfect Number.\n");
    break;
  case 7:
    printf("Factorial: %d\n", factorial_of_number());
    break;
```

```
      case 8:
        if (check_strong_number())
          printf("It's a Strong Number.\n");
        else
          printf("It's not a Strong Number.\n");
        break;
      case 9:
        if (check_palindrome_number())
          printf("It's a Palindrome Number.\n");
        else
          printf("It's not a Palindrome Number.\n");
        break;
      case 10:
        printf("Sum of first and last digits: %d\n", add_first_and_last_digits());
        break;
      case 0:
        return;
      default:
        printf("Invalid choice. Try again.\n");
      }
    }
}

// Q1
void print_1_to_10()
```

```
{
    printf("\nQ1. Numbers from 1 to 10:\n");
    for (int i = 1; i <= 10; i++)
    {
        printf("%d ", i);
    }
    printf("\n");
}

// Q2
void print_table_for_number()
{
    int num;
    printf("\nQ2. Enter a number to print its table: ");
    scanf("%d", &num);
    for (int i = 1; i <= 10; i++)
    {
        printf("%d x %d = %d\n", num, i, num * i);
    }
}

// Q3
int sum_in_range()
{
    int start, end, sum = 0;
```

```
    printf("\nQ3. Enter start and end range: ");
    scanf("%d %d", &start, &end);
    for (int i = start; i <= end; i++)
    {
        sum += i;
    }
    return sum;
}

// Q4
int check_prime_number()
{
    int num, isPrime = 1;
    printf("\nQ4. Enter a number to check if prime: ");
    scanf("%d", &num);
    if (num <= 1)
        return 0;
    for (int i = 2; i <= num / 2; i++)
    {
        if (num % i == 0)
            return 0;
    }
    return 1;
}
```

```
// Q5
int check_armstrong_number()
{
   int num, original, temp, digits = 0, sum = 0;
   printf("\nQ5. Enter a number to check Armstrong: ");
   scanf("%d", &num);
   original = num;
   temp = num;
   while (temp > 0)
   {
      temp /= 10;
      digits++;
   }
   temp = num;
   while (temp > 0)
   {
      int rem = temp % 10, power = 1;
      for (int i = 0; i < digits; i++)
      {
         power *= rem;
      }
      sum += power;
      temp /= 10;
   }
   return (original == sum);
```

```
}

// Q6
int check_perfect_number()
{
   int num, sum = 0;
   printf("\nQ6. Enter a number to check Perfect: ");
   scanf("%d", &num);
   for (int i = 1; i <= num / 2; i++)
   {
      if (num % i == 0)
         sum += i;
   }
   return (sum == num);
}

// Q7
int factorial_of_number()
{
   int num, factorial = 1;
   printf("\nQ7. Enter a number to find factorial: ");
   scanf("%d", &num);
   for (int i = 1; i <= num; i++)
   {
      factorial *= i;
```

```
    }
    return factorial;
}

// Q8
int check_strong_number()
{
    int num, original, sum = 0;
    printf("\nQ8. Enter a number to check Strong: ");
    scanf("%d", &num);
    original = num;
    while (num > 0)
    {
        int digit = num % 10, fact = 1;
        for (int i = 1; i <= digit; i++)
        {
            fact *= i;
        }
        sum += fact;
        num /= 10;
    }
    return (sum == original);
}

// Q9
```

```
int check_palindrome_number()
{
   int num, original, reversed = 0;
   printf("\nQ9. Enter a number to check Palindrome: ");
   scanf("%d", &num);
   original = num;
   while (num > 0)
   {
      reversed = reversed * 10 + (num % 10);
      num /= 10;
   }
   return (original == reversed);
}

// Q10
int add_first_and_last_digits()
{
   int num, firstDigit, lastDigit;
   printf("\nQ10. Enter a number to add first and last digit: ");
   scanf("%d", &num);
   lastDigit = num % 10;
   while (num >= 10)
   {
      num /= 10;
   }
```

```
    firstDigit = num;
    return firstDigit + lastDigit;
}

// ================= Assignment 4 =================

void assignment_4()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 4 ----------------\n");
        printf("1) Prime Numbers in Range\n");
        printf("2) Armstrong Numbers in Range\n");
        printf("3) Perfect Numbers in Range\n");
        printf("4) Strong Numbers in Range\n");
        printf("5) Generate Fibonacci Series\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        switch (ch)
        {
        case 1:
            prime_numbers_in_range();
```

```
            break;
        case 2:
            armstrong_numbers_in_range();
            break;
        case 3:
            perfect_numbers_in_range();
            break;
        case 4:
            strong_numbers_in_range();
            break;
        case 5:
            generate_fibonacci_series();
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}

// 1. Prime Numbers in Range
void prime_numbers_in_range()
{
    int start = 1, end = 1000;
```

```
    printf("\nQ1. Prime numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        if (num < 2) continue;

        int is_prime = 1;
        for (int i = 2; i * i <= num; i++)
        {
            if (num % i == 0)
            {
                is_prime = 0;
                break;
            }
        }

        if (is_prime)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

// 2. Armstrong Numbers in Range
```

```
void armstrong_numbers_in_range()
{
   int start = 1, end = 1000;
   printf("\nQ2. Armstrong numbers between %d and %d:\n", start, end);

   for (int num = start; num <= end; num++)
   {
      int original = num, sum = 0, digits = 0, temp = num;

      while (temp > 0)
      {
         temp /= 10;
         digits++;
      }

      temp = num;
      while (temp > 0)
      {
         int digit = temp % 10;
         sum += pow(digit, digits);
         temp /= 10;
      }

      if (sum == original)
      {
```

```
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

// 3. Perfect Numbers in Range
void perfect_numbers_in_range()
{
    int start = 1, end = 1000;
    printf("\nQ3. Perfect numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int sum = 0;
        for (int i = 1; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                sum += i;
            }
        }

        if (sum == num)
        {
```

```
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

// 4. Strong Numbers in Range
void strong_numbers_in_range()
{
    int start = 1, end = 1000;
    printf("\nQ4. Strong numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int original = num, sum = 0, temp = num;

        while (temp > 0)
        {
            int digit = temp % 10;
            int factorial = 1;

            for (int i = 1; i <= digit; i++)
            {
                factorial *= i;
            }
```

```
            sum += factorial;
            temp /= 10;
        }

        if (sum == original)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

// 5. Fibonacci Series
void generate_fibonacci_series()
{
    int n = 10;
    int first = 0, second = 1;

    printf("\nQ5. First %d terms of Fibonacci Series:\n", n);

    for (int i = 0; i < n; i++)
    {
        printf("%d ", first);
        int next = first + second;
```

```
        first = second;
        second = next;
    }
    printf("\n--------------------------------\n");
}
```

Function Type 3

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

// Assignment 1
void assignment_1();
void fahrenheit_to_celsius(int celsius);
void find_area_and_perimeter(int choice, int length, int width, int radius);
void input_three_digit_number(int no);
void check_even_or_odd(int no);
void calculate_total_salary(double basic);
void check_marriage_eligibility(int male_age, int female_age);

// Assignment 2
void assignment_2();
void item_price_with_discount(int price);
void find_greatest_of_three(int a, int b, int c);
void calculator_with_operator(int num1, int num2, char op);
void display_menu(int choice, int number, double basic);
void check_student_discount(int price, int isStudent);

// Assignment 3
void assignment_3();
void print_1_to_10();
```

```
void print_table_for_number(int num);
void sum_in_range(int start, int end);
void check_prime_number(int num);
void check_armstrong_number(int num);
void check_perfect_number(int num);
void factorial_of_number(int num);
void check_strong_number(int num);
void check_palindrome_number(int num);
void add_first_and_last_digits(int num);

// Assignment 4
void assignment_4();
void prime_numbers_in_range(int start, int end);
void armstrong_numbers_in_range(int start, int end);
void perfect_numbers_in_range(int start, int end);
void strong_numbers_in_range(int start, int end);
void generate_fibonacci_series(int n);

int main()
{
   int choice;
   while (1)
   {
      printf("\n================ MAIN MENU ================\n");
```

```
    printf("1) Assignment 1\n2) Assignment 2\n3) Assignment 3\n4) Assignment 4\n0) Exit\n");
    printf("Enter Your Assignment No: ");
    scanf("%d", &choice);

    switch (choice)
    {
    case 1:
      assignment_1();
      break;
    case 2:
      assignment_2();
      break;
    case 3:
      assignment_3();
      break;
    case 4:
      assignment_4();
      break;
    case 0:
      exit(0);
    default:
      printf("Invalid Choice. Try again.\n");
    }
  }
```

```
    return 0;
}

void assignment_1()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 1 ----------------\n");
        printf("1) Celsius to Fahrenheit\n");
        printf("2) Area and Perimeter\n");
        printf("3) Input 3-digit number\n");
        printf("4) Even or Odd\n");
        printf("5) Total Salary Calculation\n");
        printf("6) Marriage Eligibility\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        int num, choice, length, width, radius;
        double basic;
        int male_age, female_age;

        switch (ch)
        {
```

```
case 1:
   printf("Enter temperature in Celsius: ");
   scanf("%d", &num);
   fahrenheit_to_celsius(num);
   break;
case 2:
   printf("1) Rectangle\n2) Circle\nEnter choice: ");
   scanf("%d", &choice);
   if (choice == 1)
   {
      printf("Enter length: ");
      scanf("%d", &length);
      printf("Enter width: ");
      scanf("%d", &width);
   }
   else if (choice == 2)
   {
      printf("Enter radius: ");
      scanf("%d", &radius);
   }
   find_area_and_perimeter(choice, length, width, radius);
   break;
case 3:
   printf("Enter a 3-digit number: ");
   scanf("%d", &num);
```

```
            input_three_digit_number(num);
            break;
        case 4:
            printf("Enter a number: ");
            scanf("%d", &num);
            check_even_or_odd(num);
            break;
        case 5:
            printf("Enter Basic Salary: ");
            scanf("%lf", &basic);
            calculate_total_salary(basic);
            break;
        case 6:
            printf("Enter Male Age: ");
            scanf("%d", &male_age);
            printf("Enter Female Age: ");
            scanf("%d", &female_age);
            check_marriage_eligibility(male_age, female_age);
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
    }
}
```

```
}

// ================= Assignment 1 =================

void fahrenheit_to_celsius(int celsius)
{
   int fahrenheit = (celsius * 9 / 5) + 32;
   printf("Temperature in Fahrenheit: %d°F\n", fahrenheit);
}

void find_area_and_perimeter(int choice, int length, int width, int radius)
{
   float area, perimeter;
   const float pi = 3.14f;

   if (choice == 1)
   {
      area = length * width;
      perimeter = 2 * (length + width);
      printf("Rectangle Area: %.2f\nRectangle Perimeter: %.2f\n", area,
perimeter);
   }
   else if (choice == 2)
   {
      area = pi * radius * radius;
```

```
        perimeter = 2 * pi * radius;
        printf("Circle Area: %.2f\nCircle Perimeter: %.2f\n", area, perimeter);
    }
    else
    {
        printf("Invalid shape choice.\n");
    }
}

void input_three_digit_number(int no)
{
    if (no >= 100 && no <= 999)
    {
        int n1 = no / 100;
        int n2 = (no / 10) % 10;
        int n3 = no % 10;
        int sum = n1 + n2 + n3;
        printf("Digits: %d, %d, %d\n", n1, n2, n3);
        printf("Sum of digits: %d\n", sum);
        printf("Reverse of number: %d%d%d\n", n3, n2, n1);
    }
    else
    {
        printf("Invalid input. Not a 3-digit number.\n");
    }
```

```
}

void check_even_or_odd(int no)
{
   if (no % 2 == 0)
      printf("%d is Even\n", no);
   else
      printf("%d is Odd\n", no);
}

void calculate_total_salary(double basic)
{
   double da, ta, hra, totalSalary;
   if (basic <= 5000)
   {
      da = basic * 0.10;
      ta = basic * 0.20;
      hra = basic * 0.25;
   }
   else
   {
      da = basic * 0.15;
      ta = basic * 0.25;
      hra = basic * 0.30;
   }
```

```
    totalSalary = basic + da + ta + hra;
    printf("Total Salary = %.2lf\n", totalSalary);
}

void check_marriage_eligibility(int male_age, int female_age)
{
    if (male_age >= 21)
        printf("Male is eligible for marriage.\n");
    else
        printf("Male is NOT eligible for marriage.\n");

    if (female_age >= 18)
        printf("Female is eligible for marriage.\n");
    else
        printf("Female is NOT eligible for marriage.\n");
}

// ================= Assignment 2 =================

void assignment_2()
{
    int ch;

    while (1)
```

```
{
    printf("\n---------- Assignment 2 ----------\n");
    printf("1) Item Price with Discount\n");
    printf("2) Greatest of Three Numbers\n");
    printf("3) Calculator with Operator\n");
    printf("4) Display Menu\n");
    printf("5) Check Student Discount\n");
    printf("0) Back to Main Menu\n");
    printf("Enter your choice: ");
    scanf("%d", &ch);

    if (ch == 0)
        return;

    switch (ch)
    {
    case 1:
    {
        int price;
        printf("Enter the price of the item: ");
        scanf("%d", &price);
        item_price_with_discount(price);
        break;
    }
    case 2:
```

```
    {
        int a, b, c;
        printf("Enter three numbers: ");
        scanf("%d %d %d", &a, &b, &c);
        find_greatest_of_three(a, b, c);
        break;
    }
    case 3:
    {
        int num1, num2;
        char op;
        printf("Enter two numbers: ");
        scanf("%d %d", &num1, &num2);
        printf("Enter an operator (+, -, *, /, %%): ");
        scanf(" %c", &op);
        calculator_with_operator(num1, num2, op);
        break;
    }
    case 4:
    {
        int choice, number = 0;
        double basic = 0;
        printf("1. Check Even/Odd\n2. Calculate Basic Salary\nEnter your
choice: ");
        scanf("%d", &choice);
```

```
    if (choice == 1)
    {
        printf("Enter a number: ");
        scanf("%d", &number);
    }
    else if (choice == 2)
    {
        printf("Enter Basic Salary: ");
        scanf("%lf", &basic);
    }
    display_menu(choice, number, basic);
    break;
}
case 5:
{
    int price, isStudent;
    printf("Enter the total purchase amount: ");
    scanf("%d", &price);
    printf("Are you a student? (1 = Yes, 2 = No): ");
    scanf("%d", &isStudent);
    check_student_discount(price, isStudent);
    break;
}
default:
    printf("Invalid choice. Try again.\n");
```

```
    }
  }
}

void item_price_with_discount(int price)
{
  int discountRate, discount, finalPrice;

  if (price <= 1000)
    discountRate = 5;
  else if (price <= 5000)
    discountRate = 10;
  else
    discountRate = 20;

  discount = (price * discountRate) / 100;
  finalPrice = price - discount;

  printf("Discount: %d\n", discount);
  printf("Final Price after discount: %d\n", finalPrice);
}

void find_greatest_of_three(int a, int b, int c)
{
  if (a == b && b == c)
```

```
    {
        printf("All numbers are equal.\n");
        return;
    }

    if (a >= b && a >= c)
        printf("Greatest number: %d\n", a);
    else if (b >= c)
        printf("Greatest number: %d\n", b);
    else
        printf("Greatest number: %d\n", c);
}

void calculator_with_operator(int num1, int num2, char op)
{
    int result;
    switch (op)
    {
    case '+':
        result = num1 + num2;
        printf("Result: %d\n", result);
        break;
    case '-':
        result = num1 - num2;
        printf("Result: %d\n", result);
```

```
        break;
    case '*':
        result = num1 * num2;
        printf("Result: %d\n", result);
        break;
    case '/':
        if (num2 != 0)
            printf("Result: %d\n", num1 / num2);
        else
            printf("Error: Division by zero is not allowed.\n");
        break;
    case '%':
        if (num2 != 0)
            printf("Result: %d\n", num1 % num2);
        else
            printf("Error: Division by zero is not allowed.\n");
        break;
    default:
        printf("Invalid operator!\n");
    }
}

void display_menu(int choice, int number, double basic)
{
    if (choice == 1)
```

```
    {
        if (number % 2 == 0)
            printf("%d is Even.\n", number);
        else
            printf("%d is Odd.\n", number);
    }
    else if (choice == 2)
    {
        double hra = 0.20 * basic;
        double da = 0.50 * basic;
        double gross = basic + hra + da;
        printf("Gross Salary: %.2lf\n", gross);
    }
    else
    {
        printf("Invalid choice!\n");
    }
}

void check_student_discount(int price, int isStudent)
{
    double discount = 0.0;

    if (isStudent == 1)
    {
```

```
    if (price > 500)
    {
        discount = 0.20 * price;
        printf("20%% student discount applied.\n");
    }
    else
    {
        discount = 0.10 * price;
        printf("10%% student discount applied.\n");
    }
}
else if (isStudent == 2)
{
    if (price > 600)
    {
        discount = 0.15 * price;
        printf("15%% non-student discount applied.\n");
    }
    else
    {
        printf("No discount applicable.\n");
    }
}
else
{
```

```
        printf("Invalid input for student status.\n");
        return;
    }

    double finalPrice = price - discount;
    printf("Final price after discount: %.2lf\n", finalPrice);
}

// ================= Assignment 3 =================

void assignment_3()
{
    int ch, num, start, end;
    while (1)
    {
        printf("\n---------------- Assignment 3 ----------------\n");
        printf("1) Print 1 to 10\n");
        printf("2) Print Table for Number\n");
        printf("3) Sum in Range\n");
        printf("4) Check Prime Number\n");
        printf("5) Check Armstrong Number\n");
        printf("6) Check Perfect Number\n");
        printf("7) Factorial of Number\n");
        printf("8) Check Strong Number\n");
        printf("9) Check Palindrome Number\n");
```

```
printf("10) Add First and Last Digits\n");
printf("0) Back to Main Menu\n");
printf("Enter your choice: ");
scanf("%d", &ch);

switch (ch)
{
case 1:
   print_1_to_10(); // No input required
   break;
case 2:
   printf("Enter a number: ");
   scanf("%d", &num);
   print_table_for_number(num);
   break;
case 3:
   printf("Enter start and end range: ");
   scanf("%d %d", &start, &end);
   sum_in_range(start, end);
   break;
case 4:
   printf("Enter a number: ");
   scanf("%d", &num);
   check_prime_number(num);
   break;
```

```
case 5:
    printf("Enter a number: ");
    scanf("%d", &num);
    check_armstrong_number(num);
    break;
case 6:
    printf("Enter a number: ");
    scanf("%d", &num);
    check_perfect_number(num);
    break;
case 7:
    printf("Enter a number: ");
    scanf("%d", &num);
    factorial_of_number(num);
    break;
case 8:
    printf("Enter a number: ");
    scanf("%d", &num);
    check_strong_number(num);
    break;
case 9:
    printf("Enter a number: ");
    scanf("%d", &num);
    check_palindrome_number(num);
    break;
```

```
        case 10:
            printf("Enter a number: ");
            scanf("%d", &num);
            add_first_and_last_digits(num);
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}

void print_1_to_10()
{
    printf("\nQ1. Numbers from 1 to 10:\n");
    for (int i = 1; i <= 10; i++)
    {
        printf("%d ", i);
    }
    printf("\n");
}

void print_table_for_number(int num)
{
```

```
    printf("\nQ2. Table of %d:\n", num);
    for (int i = 1; i <= 10; i++)
    {
        printf("%d x %d = %d\n", num, i, num * i);
    }
}

void sum_in_range(int start, int end)
{
    int sum = 0;
    for (int i = start; i <= end; i++)
    {
        sum += i;
    }
    printf("Sum from %d to %d is: %d\n", start, end, sum);
}

void check_prime_number(int num)
{
    int isPrime = 1;
    if (num <= 1)
    {
        isPrime = 0;
    }
    else
```

```
    {
        for (int i = 2; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                isPrime = 0;
                break;
            }
        }
    }
    if (isPrime)
        printf("%d is a Prime number.\n", num);
    else
        printf("%d is not a Prime number.\n", num);
}

void check_armstrong_number(int num)
{
    int original = num, temp = num, digits = 0, sum = 0;

    while (temp > 0)
    {
        temp /= 10;
        digits++;
    }
```

```
    temp = num;
    while (temp > 0)
    {
        int rem = temp % 10, power = 1;
        for (int i = 0; i < digits; i++)
        {
            power *= rem;
        }
        sum += power;
        temp /= 10;
    }

    if (original == sum)
        printf("%d is an Armstrong number.\n", original);
    else
        printf("%d is not an Armstrong number.\n", original);
}

void check_perfect_number(int num)
{
    int sum = 0;
    for (int i = 1; i <= num / 2; i++)
    {
        if (num % i == 0)
```

```
            sum += i;
    }

    if (sum == num)
        printf("%d is a Perfect number.\n", num);
    else
        printf("%d is not a Perfect number.\n", num);
}

void factorial_of_number(int num)
{
    int factorial = 1;
    for (int i = 1; i <= num; i++)
    {
        factorial *= i;
    }
    printf("Factorial of %d is %d\n", num, factorial);
}

void check_strong_number(int num)
{
    int original = num, sum = 0;
    while (num > 0)
    {
        int digit = num % 10, fact = 1;
```

```
        for (int i = 1; i <= digit; i++)
        {
            fact *= i;
        }
        sum += fact;
        num /= 10;
    }

    if (sum == original)
        printf("%d is a Strong number.\n", original);
    else
        printf("%d is not a Strong number.\n", original);
}

void check_palindrome_number(int num)
{
    int original = num, reversed = 0;
    while (num > 0)
    {
        reversed = reversed * 10 + (num % 10);
        num /= 10;
    }

    if (original == reversed)
        printf("%d is a Palindrome number.\n", original);
```

```
    else
        printf("%d is not a Palindrome number.\n", original);
}

void add_first_and_last_digits(int num)
{
    int lastDigit = num % 10, firstDigit = num;
    while (firstDigit >= 10)
    {
        firstDigit /= 10;
    }
    printf("Sum of first and last digit: %d + %d = %d\n", firstDigit, lastDigit,
firstDigit + lastDigit);
}

// ================= Assignment 4 =================

void assignment_4()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 4 ----------------\n");
        printf("1) Prime Numbers in Range\n");
        printf("2) Armstrong Numbers in Range\n");
```

```
printf("3) Perfect Numbers in Range\n");
printf("4) Strong Numbers in Range\n");
printf("5) Generate Fibonacci Series\n");
printf("0) Back to Main Menu\n");
printf("Enter your choice: ");
scanf("%d", &ch);

switch (ch)
{
case 1:
   prime_numbers_in_range(1, 1000);
   break;
case 2:
   armstrong_numbers_in_range(1, 1000);
   break;
case 3:
   perfect_numbers_in_range(1, 1000);
   break;
case 4:
   strong_numbers_in_range(1, 1000);
   break;
case 5:
   generate_fibonacci_series(10);
   break;
case 0:
```

```
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}

void prime_numbers_in_range(int start, int end)
{
    printf("\nQ1. Prime numbers between %d and %d:\n", start, end);
    for (int num = start; num <= end; num++)
    {
        if (num < 2)
            continue;

        int is_prime = 1;
        for (int i = 2; i * i <= num; i++)
        {
            if (num % i == 0)
            {
                is_prime = 0;
                break;
            }
        }
```

```
        if (is_prime)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void armstrong_numbers_in_range(int start, int end)
{
    printf("\nQ2. Armstrong numbers between %d and %d:\n", start, end);
    for (int num = start; num <= end; num++)
    {
        int original = num, sum = 0, digits = 0, temp = num;

        while (temp > 0)
        {
            temp /= 10;
            digits++;
        }

        temp = num;
        while (temp > 0)
        {
            int digit = temp % 10;
```

```
            sum += pow(digit, digits);
            temp /= 10;
        }

        if (sum == original)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void perfect_numbers_in_range(int start, int end)
{
    printf("\nQ3. Perfect numbers between %d and %d:\n", start, end);
    for (int num = start; num <= end; num++)
    {
        int sum = 0;
        for (int i = 1; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                sum += i;
            }
        }
```

```
        if (sum == num)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void strong_numbers_in_range(int start, int end)
{
    printf("\nQ4. Strong numbers between %d and %d:\n", start, end);
    for (int num = start; num <= end; num++)
    {
        int original = num, sum = 0, temp = num;

        while (temp > 0)
        {
            int digit = temp % 10;
            int factorial = 1;

            for (int i = 1; i <= digit; i++)
            {
                factorial *= i;
            }
```

```
            sum += factorial;
            temp /= 10;
        }

        if (sum == original)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

void generate_fibonacci_series(int n)
{
    int first = 0, second = 1;
    printf("\nQ5. First %d terms of Fibonacci Series:\n", n);

    for (int i = 0; i < n; i++)
    {
        printf("%d ", first);
        int next = first + second;
        first = second;
        second = next;
    }
```

```
    printf("\n--------------------------------\n");
}
```

Function Type 4

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

// Assignment 1
void assignment_1();
int fahrenheit_to_celsius(int celsius);
int find_area_and_perimeter(int choice, int a, int b);
int input_three_digit_number(int no);
int check_even_or_odd(int no);
double calculate_total_salary(double basic);
int check_marriage_eligibility(int male_age, int female_age);

// Assignment 2
int assignment_2();
void item_price_with_discount(int price);
void find_greatest_of_three(int a, int b, int c);
void calculator_with_operator(int num1, int num2, char op);
void display_menu(int choice, int number, double basic);
void check_student_discount(int price, int isStudent);

// Assignment 3
void assignment_3();
void print_1_to_10();
```

```
void print_table_for_number(int num);
void sum_in_range(int start, int end);
void check_prime_number(int num);
void check_armstrong_number(int num);
void check_perfect_number(int num);
void factorial_of_number(int num);
void check_strong_number(int num);
void check_palindrome_number(int num);
void add_first_and_last_digits(int num);

// Assignment 4
void assignment_4();
void prime_numbers_in_range(int start, int end);
void armstrong_numbers_in_range(int start, int end);
void perfect_numbers_in_range(int start, int end);
void strong_numbers_in_range(int start, int end);
void generate_fibonacci_series(int n);

int main()
{
   int choice;
   while (1)
   {
      printf("\n================ MAIN MENU ================\n");
```

```
    printf("1) Assignment 1\n2) Assignment 2\n3) Assignment 3\n4) Assignment 4\n0) Exit\n");
    printf("Enter Your Assignment No: ");
    scanf("%d", &choice);

    switch (choice)
    {
    case 1:
      assignment_1();
      break;
    case 2:
      assignment_2();
      break;
    case 3:
      assignment_3();
      break;
    case 4:
      assignment_4();
      break;
    case 0:
      exit(0);
    default:
      printf("Invalid Choice. Try again.\n");
    }
  }
```

```
    return 0;
}

// Assignment 1
void assignment_1()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 1 ----------------\n");
        printf("1) Celsius to Fahrenheit\n");
        printf("2) Area and Perimeter\n");
        printf("3) Input 3-digit number\n");
        printf("4) Even or Odd\n");
        printf("5) Total Salary Calculation\n");
        printf("6) Marriage Eligibility\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        int val1, val2, result;
        double basic, total;

        switch (ch)
        {
```

```
case 1:
   printf("Enter temperature in Celsius: ");
   scanf("%d", &val1);
   result = fahrenheit_to_celsius(val1);
   printf("Temperature in Fahrenheit: %d°F\n", result);
   break;

case 2:
   printf("1) Rectangle\n2) Circle\nEnter choice: ");
   scanf("%d", &val1);
   if (val1 == 1)
   {
      printf("Enter length and width: ");
      scanf("%d %d", &val2, &result);
   }
   else if (val1 == 2)
   {
      printf("Enter radius: ");
      scanf("%d", &val2);
      result = 0;
   }
   else
   {
      printf("Invalid shape choice.\n");
      break;
```

```
    }
    find_area_and_perimeter(val1, val2, result);
    break;

case 3:
    printf("Enter a 3-digit number: ");
    scanf("%d", &val1);
    input_three_digit_number(val1);
    break;

case 4:
    printf("Enter a number: ");
    scanf("%d", &val1);
    check_even_or_odd(val1);
    break;

case 5:
    printf("Enter Basic Salary: ");
    scanf("%lf", &basic);
    total = calculate_total_salary(basic);
    printf("Total Salary = %.2lf\n", total);
    break;

case 6:
    printf("Enter Male Age: ");
```

```
            scanf("%d", &val1);
            printf("Enter Female Age: ");
            scanf("%d", &val2);
            check_marriage_eligibility(val1, val2);
            break;

        case 0:
            return;

        default:
            printf("Invalid choice. Try again.\n");
      }
   }
   printf("\n---------- End of Assignment 1 ----------\n");
}


int fahrenheit_to_celsius(int celsius)
{
   return (celsius * 9 / 5) + 32;
}

int find_area_and_perimeter(int choice, int a, int b)
{
   float area, perimeter;
```

```
    const float pi = 3.14f;


    if (choice == 1)
    {
        area = a * b;
        perimeter = 2 * (a + b);
        printf("Rectangle Area: %.2f\nRectangle Perimeter: %.2f\n", area,
perimeter);
    }
    else if (choice == 2)
    {
        area = pi * a * a;
        perimeter = 2 * pi * a;
        printf("Circle Area: %.2f\nCircle Perimeter: %.2f\n", area, perimeter);
    }
    else
    {
        printf("Invalid choice.\n");
        return 0;
    }
    return 1;
}


int input_three_digit_number(int no)
{
```

```
    int n1, n2, n3, sum;

    if (no >= 100 && no <= 999)
    {
        n1 = no / 100;
        n2 = (no / 10) % 10;
        n3 = no % 10;
        sum = n1 + n2 + n3;
        printf("Digits: %d, %d, %d\n", n1, n2, n3);
        printf("Sum of digits: %d\n", sum);
        printf("Reverse of number: %d%d%d\n", n3, n2, n1);
        return sum;
    }
    else
    {
        printf("Invalid input. Not a 3-digit number.\n");
        return -1;
    }
}

int check_even_or_odd(int no)
{
    if (no % 2 == 0)
    {
        printf("%d is Even\n", no);
```

```
        return 1;
    }
    else
    {
        printf("%d is Odd\n", no);
        return 0;
    }
}

double calculate_total_salary(double basic)
{
    double da, ta, hra;
    if (basic <= 5000)
    {
        da = basic * 0.10;
        ta = basic * 0.20;
        hra = basic * 0.25;
    }
    else
    {
        da = basic * 0.15;
        ta = basic * 0.25;
        hra = basic * 0.30;
    }
    return basic + da + ta + hra;
```

```
}

int check_marriage_eligibility(int male_age, int female_age)
{
   int eligible = 1;

   if (male_age < 21)
   {
      printf("Male is NOT eligible for marriage.\n");
      eligible = 0;
   }
   else
   {
      printf("Male is eligible for marriage.\n");
   }

   if (female_age < 18)
   {
      printf("Female is NOT eligible for marriage.\n");
      eligible = 0;
   }
   else
   {
      printf("Female is eligible for marriage.\n");
   }
```

```
    return eligible;
}

// Assignment 2
int assignment_2()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 2 ----------------\n");
        printf("1) Item Price with Discount\n");
        printf("2) Greatest of Three Numbers\n");
        printf("3) Calculator with Operator\n");
        printf("4) Display Menu\n");
        printf("5) Check Student Discount\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        if (ch == 0) break;

        switch (ch)
        {
        case 1: {
```

```
    int price;
    printf("Enter the price of the item: ");
    scanf("%d", &price);
    item_price_with_discount(price);
    break;
}
case 2: {
    int a, b, c;
    printf("Enter three numbers: ");
    scanf("%d %d %d", &a, &b, &c);
    find_greatest_of_three(a, b, c);
    break;
}
case 3: {
    int num1, num2;
    char op;
    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);
    printf("Enter an operator (+, -, *, /, %%): ");
    scanf(" %c", &op);
    calculator_with_operator(num1, num2, op);
    break;
}
case 4: {
    int choice, number = 0;
```

```
    double basic = 0;
    printf("1. Check Even/Odd\n2. Calculate Basic Salary\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);
    if (choice == 1) {
        printf("Enter a number: ");
        scanf("%d", &number);
    } else if (choice == 2) {
        printf("Enter Basic Salary: ");
        scanf("%lf", &basic);
    }
    display_menu(choice, number, basic);
    break;
}
case 5: {
    int price, isStudent;
    printf("Enter the total purchase amount: ");
    scanf("%d", &price);
    printf("Are you a student? (1 = Yes, 2 = No): ");
    scanf("%d", &isStudent);
    check_student_discount(price, isStudent);
    break;
}
default:
    printf("Invalid choice. Try again.\n");
```

```
    }
  }
  return 0;
}

void item_price_with_discount(int price)
{
  int discountRate, discount, finalPrice;

  printf("\nQ1. Price Item Discount\n");

  if (price <= 1000)
    discountRate = 5;
  else if (price <= 5000)
    discountRate = 10;
  else
    discountRate = 20;

  discount = (price * discountRate) / 100;
  finalPrice = price - discount;

  printf("Discount: %d\n", discount);
  printf("Final Price after discount: %d\n", finalPrice);
}
```

```
void find_greatest_of_three(int a, int b, int c)
{
   int greatest;

   printf("\nQ2. Greatest of Three Numbers\n");

   if (a >= b && a >= c)
      greatest = a;
   else if (b >= c)
      greatest = b;
   else
      greatest = c;

   printf("Greatest number: %d\n", greatest);

   if (a == b && b == c)
      printf("All numbers are equal.\n");
}

void calculator_with_operator(int num1, int num2, char op)
{
   int result;

   printf("\nQ3. Calculator using Operator\n");
```

```
switch (op)
{
case '+':
   result = num1 + num2;
   printf("Result: %d\n", result);
   break;
case '-':
   result = num1 - num2;
   printf("Result: %d\n", result);
   break;
case '*':
   result = num1 * num2;
   printf("Result: %d\n", result);
   break;
case '/':
   if (num2 != 0)
      printf("Result: %d\n", num1 / num2);
   else
      printf("Error: Division by zero is not allowed.\n");
   break;
case '%':
   if (num2 != 0)
      printf("Result: %d\n", num1 % num2);
   else
      printf("Error: Division by zero is not allowed.\n");
```

```
        break;
    default:
        printf("Invalid operator!\n");
    }
}

void display_menu(int choice, int number, double basic)
{
    printf("\nQ4. Menu: Even/Odd or Basic Salary\n");

    if (choice == 1)
    {
        if (number % 2 == 0)
            printf("%d is Even.\n", number);
        else
            printf("%d is Odd.\n", number);
    }
    else if (choice == 2)
    {
        double hra = 0.20 * basic;
        double da = 0.50 * basic;
        double gross = basic + hra + da;
        printf("Gross Salary: %.2lf\n", gross);
    }
    else
```

```
    {
        printf("Invalid choice!\n");
    }
}

void check_student_discount(int price, int isStudent)
{
    double discount = 0.0, finalPrice;

    printf("\nQ5. Student Discount\n");

    if (isStudent == 1)
    {
        if (price > 500)
        {
            discount = 0.20 * price;
            printf("20%% student discount applied.\n");
        }
        else
        {
            discount = 0.10 * price;
            printf("10%% student discount applied.\n");
        }
    }
    else if (isStudent == 2)
```

```
    {
        if (price > 600)
        {
            discount = 0.15 * price;
            printf("15%% non-student discount applied.\n");
        }
        else
        {
            printf("No discount applicable.\n");
        }
    }
    else
    {
        printf("Invalid input for student status.\n");
        return;
    }

    finalPrice = price - discount;
    printf("Final price after discount: %.2lf\n", finalPrice);
}

// Assignment 3
void assignment_3()
{
    int ch, num, start, end;
```

```
while (1)
{
   printf("\n---------------- Assignment 3 ----------------\n");
   printf("1) Print 1 to 10\n");
   printf("2) Print Table for Number\n");
   printf("3) Sum in Range\n");
   printf("4) Check Prime Number\n");
   printf("5) Check Armstrong Number\n");
   printf("6) Check Perfect Number\n");
   printf("7) Factorial of Number\n");
   printf("8) Check Strong Number\n");
   printf("9) Check Palindrome Number\n");
   printf("10) Add First and Last Digits\n");
   printf("0) Back to Main Menu\n");
   printf("Enter your choice: ");
   scanf("%d", &ch);

   switch (ch)
   {
   case 1:
      print_1_to_10();
      break;
   case 2:
      printf("Enter a number: ");
      scanf("%d", &num);
```

```
        print_table_for_number(num);
        break;
    case 3:
        printf("Enter start and end range: ");
        scanf("%d %d", &start, &end);
        sum_in_range(start, end);
        break;
    case 4:
        printf("Enter a number: ");
        scanf("%d", &num);
        check_prime_number(num);
        break;
    case 5:
        printf("Enter a number: ");
        scanf("%d", &num);
        check_armstrong_number(num);
        break;
    case 6:
        printf("Enter a number: ");
        scanf("%d", &num);
        check_perfect_number(num);
        break;
    case 7:
        printf("Enter a number: ");
        scanf("%d", &num);
```

```
            factorial_of_number(num);
            break;
        case 8:
            printf("Enter a number: ");
            scanf("%d", &num);
            check_strong_number(num);
            break;
        case 9:
            printf("Enter a number: ");
            scanf("%d", &num);
            check_palindrome_number(num);
            break;
        case 10:
            printf("Enter a number: ");
            scanf("%d", &num);
            add_first_and_last_digits(num);
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}
```

```
// Q1
void print_1_to_10()
{
   printf("\nQ1. Numbers from 1 to 10:\n");
   for (int i = 1; i <= 10; i++)
   {
      printf("%d ", i);
   }
   printf("\n");
}

// Q2
void print_table_for_number(int num)
{
   printf("\nQ2. Table for %d:\n", num);
   for (int i = 1; i <= 10; i++)
   {
      printf("%d x %d = %d\n", num, i, num * i);
   }
}

// Q3
void sum_in_range(int start, int end)
{
   int sum = 0;
```

```
    for (int i = start; i <= end; i++)
    {
        sum += i;
    }
    printf("\nQ3. Sum from %d to %d = %d\n", start, end, sum);
}

// Q4
void check_prime_number(int num)
{
    if (num <= 1)
    {
        printf("Q4. Not a Prime Number.\n");
        return;
    }
    for (int i = 2; i <= num / 2; i++)
    {
        if (num % i == 0)
        {
            printf("Q4. Not a Prime Number.\n");
            return;
        }
    }
    printf("Q4. It's a Prime Number.\n");
}
```

```
// Q5
void check_armstrong_number(int num)
{
   int original = num, temp = num, digits = 0, sum = 0;

   while (temp > 0)
   {
      digits++;
      temp /= 10;
   }

   temp = num;
   while (temp > 0)
   {
      int rem = temp % 10, power = 1;
      for (int i = 0; i < digits; i++)
      {
         power *= rem;
      }
      sum += power;
      temp /= 10;
   }

   if (sum == original)
```

```
        printf("Q5. It's an Armstrong Number.\n");
    else
        printf("Q5. It's not an Armstrong Number.\n");
}

// Q6
void check_perfect_number(int num)
{
    int sum = 0;
    for (int i = 1; i <= num / 2; i++)
    {
        if (num % i == 0)
            sum += i;
    }
    if (sum == num)
        printf("Q6. It's a Perfect Number.\n");
    else
        printf("Q6. It's not a Perfect Number.\n");
}

// Q7
void factorial_of_number(int num)
{
    int factorial = 1;
    for (int i = 1; i <= num; i++)
```

```
    {
        factorial *= i;
    }
    printf("Q7. Factorial of %d = %d\n", num, factorial);
}

// Q8
void check_strong_number(int num)
{
    int original = num, sum = 0;

    while (num > 0)
    {
        int digit = num % 10, fact = 1;
        for (int i = 1; i <= digit; i++)
        {
            fact *= i;
        }
        sum += fact;
        num /= 10;
    }

    if (sum == original)
        printf("Q8. It's a Strong Number.\n");
    else
```

```
        printf("Q8. It's not a Strong Number.\n");
}

// Q9
void check_palindrome_number(int num)
{
    int original = num, reversed = 0;
    while (num > 0)
    {
        reversed = reversed * 10 + (num % 10);
        num /= 10;
    }

    if (original == reversed)
        printf("Q9. It's a Palindrome Number.\n");
    else
        printf("Q9. It's not a Palindrome Number.\n");
}

// Q10
void add_first_and_last_digits(int num)
{
    int lastDigit = num % 10;
    while (num >= 10)
    {
```

```
        num /= 10;
    }
    int firstDigit = num;
    printf("Q10. Sum of first and last digits = %d\n", firstDigit + lastDigit);
}

// Assignment 4
void assignment_4()
{
    int ch;
    while (1)
    {
        printf("\n---------------- Assignment 4 ----------------\n");
        printf("1) Prime Numbers in Range\n");
        printf("2) Armstrong Numbers in Range\n");
        printf("3) Perfect Numbers in Range\n");
        printf("4) Strong Numbers in Range\n");
        printf("5) Generate Fibonacci Series\n");
        printf("0) Back to Main Menu\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        switch (ch)
        {
        case 1:
```

```
            prime_numbers_in_range(1, 1000);
            break;
        case 2:
            armstrong_numbers_in_range(1, 1000);
            break;
        case 3:
            perfect_numbers_in_range(1, 1000);
            break;
        case 4:
            strong_numbers_in_range(1, 1000);
            break;
        case 5:
            generate_fibonacci_series(10);
            break;
        case 0:
            return;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}

// Q1. Prime Numbers in Range
void prime_numbers_in_range(int start, int end)
{
```

```
    printf("\nQ1. Prime numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        if (num < 2)
            continue;

        int is_prime = 1;
        for (int i = 2; i * i <= num; i++)
        {
            if (num % i == 0)
            {
                is_prime = 0;
                break;
            }
        }

        if (is_prime)
        {
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}
```

```
// Q2. Armstrong Numbers in Range
void armstrong_numbers_in_range(int start, int end)
{
   printf("\nQ2. Armstrong numbers between %d and %d:\n", start, end);

   for (int num = start; num <= end; num++)
   {
      int original = num, sum = 0, digits = 0, temp = num;

      while (temp > 0)
      {
         temp /= 10;
         digits++;
      }

      temp = num;
      while (temp > 0)
      {
         int digit = temp % 10;
         sum += pow(digit, digits);
         temp /= 10;
      }

      if (sum == original)
      {
```

```
            printf("%d ", num);
        }
    }
    printf("\n--------------------------------\n");
}

// Q3. Perfect Numbers in Range
void perfect_numbers_in_range(int start, int end)
{
    printf("\nQ3. Perfect numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int sum = 0;
        for (int i = 1; i <= num / 2; i++)
        {
            if (num % i == 0)
            {
                sum += i;
            }
        }

        if (sum == num)
        {
            printf("%d ", num);
```

```
        }
    }
    printf("\n--------------------------------\n");
}

// Q4. Strong Numbers in Range
void strong_numbers_in_range(int start, int end)
{
    printf("\nQ4. Strong numbers between %d and %d:\n", start, end);

    for (int num = start; num <= end; num++)
    {
        int original = num, sum = 0, temp = num;

        while (temp > 0)
        {
            int digit = temp % 10;
            int factorial = 1;

            for (int i = 1; i <= digit; i++)
            {
                factorial *= i;
            }

            sum += factorial;
```

```
        temp /= 10;
    }

    if (sum == original)
    {
        printf("%d ", num);
    }
  }
  printf("\n--------------------------------\n");
}

// Q5. Fibonacci Series
void generate_fibonacci_series(int n)
{
  int first = 0, second = 1;

  printf("\nQ5. First %d terms of Fibonacci Series:\n", n);

  for (int i = 0; i < n; i++)
  {
    printf("%d ", first);
    int next = first + second;
    first = second;
    second = next;
  }
```

```
    printf("\n--------------------------------\n");
}
```