Assignment 10

Functions in C

```c
#include <stdio.h>


// Function to calculate the area of a circle

double CircleArea(double radius) {

    return 3.14159265359 * radius * radius;

}


// Function to calculate simple interest

double SimpleInterest(double principal, double rate, double time) {

    return (principal * rate * time) / 100;

}


// Function to check whether a given number is even or odd

int isEven(int num) {

    return (num % 2 == 0) ? 1 : 0;

}


// Function to print first N natural numbers

void NaturalNumbers(int N) {

    for (int i = 1; i <= N; i++) {

        printf("%d ", i);

    }

    printf("\n\n");

}
```

```c
// Function to print first N odd natural numbers

void OddNumbers(int N) {

    for (int i = 1; i <= N; i++) {

        printf("%d ", 2 * i - 1);

    }

    printf("\n\n");

}


// Function to calculate the factorial of a number

int Factorial(int num) {

    if (num == 0 || num == 1) {

        return 1;

    }

    int factorial = 1;

    for (int i = 2; i <= num; i++) {

        factorial *= i;

    }

    return factorial;

}


// Function to calculate the number of combinations (n choose 1)

int Combinations(int n, int r) {

    int numerator = Factorial(n);

    int denominator = Factorial(r) * Factorial(n - r);

    return numerator / denominator;

}


// Function to calculate the number of arrangements (n permute r)
```

```c
int Arrangements(int n, int r) {

    return Factorial(n) / Factorial(n - r);}

// Function to check whether a given number contains a given digit or not

int containsDigit(int number, int digit) {

    while (number > 0) {

        if (number % 10 == digit) {

            return 1;

        }

        number /= 10;

    }

    return 0;

}


// Function to print all prime factors of a given number

void PrimeFactors(int number) {

    int divisor = 2;

    while (number > 1) {

        if (number % divisor == 0) {

            printf("%d ", divisor);

            number /= divisor;

        } else {

            divisor++;

        }

    }

    printf("\n");

}
```

```c
// Driver

int main() {

    double circleRadius, principalAmount, interestRate, timePeriod;

    int N, num, factNum, combinationsN, arrangementsN, combinationsR,
arrangementsR, containsDigitNumber, digitToCheck, primeFactorNumber;


    printf("Enter the radius of the circle: ");

    scanf("%lf", &circleRadius);

    printf("Area of a circle with radius %.2lf: %.2lf\n\n", circleRadius,
      CircleArea(circleRadius));


    printf("Enter the principal amount: ");

    scanf("%lf", &principalAmount);

    printf("Enter the interest rate (in percentage): ");

    scanf("%lf", &interestRate);

    printf("Enter the time period (in years): ");

    scanf("%lf", &timePeriod);

    printf("Simple interest with principal %.2lf, rate %.2lf%%, and time %.2lf
      years: %.2lf\n\n"

    , principalAmount, interestRate, timePeriod, SimpleInterest(principalAmount,
      interestRate, timePeriod));


    printf("Enter N for natural numbers: ");

    scanf("%d", &N);

    printf("First %d natural numbers: ", N);

    NaturalNumbers(N);
```

```c
    printf("First %d odd natural numbers: ", N);

    OddNumbers(N);



    printf("Enter a number to check if it's even or odd: ");

    scanf("%d", &num);

    printf("Is %d even? %s\n\n", num, isEven(num) ? "Yes" : "No");



    printf("Enter a number to calculate its factorial: ");

    scanf("%d", &factNum);

    printf("Factorial of %d: %d\n\n", factNum, Factorial(factNum));


    printf("Enter n and r for combinations (n choose r): ");

    scanf("%d", &combinationsN);

    scanf("%d", &combinationsR);

    printf("Number of combinations of %d items chosen 1 at a time: %d\n\n",
combinationsN, Combinations(combinationsN, combinationsR));



    printf("Enter n and r for arrangements (n permute r): ");

    scanf("%d", &arrangementsN);

    scanf("%d", &arrangementsR);

    printf("Number of arrangements of %d items chosen %d at a time: %d\n\n",
arrangementsN, arrangementsN, Arrangements(arrangementsN, arrangementsR));



    printf("Enter a number to check for a specific digit: ");

    scanf("%d", &containsDigitNumber);

    printf("Enter a digit to check in the number: ");

    scanf("%d", &digitToCheck);

    printf("Does %d contain the digit %d? %s\n\n", containsDigitNumber,
digitToCheck, containsDigit(containsDigitNumber, digitToCheck) ? "Yes" : "No");
```

```c
    printf("Enter a number to find its prime factors: ");

    scanf("%d", &primeFactorNumber);

    printf("Prime factors of %d: ", primeFactorNumber);

      PrimeFactors(primeFactorNumber);}
```

```
Enter the radius of the circle: 7
Area of a circle with radius 7.00: 153.94

Enter the principal amount: 10000
Enter the interest rate (in percentage): 16
Enter the time period (in years): 5
Simple interest with principal 10000.00, rate 16.00%, and time 5.00 years: 8000.00

Enter N for natural numbers: 10
First 10 natural numbers: 1 2 3 4 5 6 7 8 9 10

First 10 odd natural numbers: 1 3 5 7 9 11 13 15 17 19

Enter a number to check if it's even or odd: 59
Is 59 even? No

Enter a number to calculate its factorial: 6
Factorial of 6: 720

Enter n and r for combinations (n choose r): 10
2
Number of combinations of 10 items chosen 1 at a time: 45

Enter n and r for arrangements (n permute r): 12
3
Number of arrangements of 12 items chosen 12 at a time: 1320

Enter a number to check for a specific digit: 15648
Enter a digit to check in the number: 8
Does 15648 contain the digit 8? Yes

Enter a number to find its prime factors: 56
Prime factors of 56: 2 2 2 7
```