Assignment 10

Functions in 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");

}

// 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)

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");

}

// 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);

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");

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

scanf("%d", &primeFactorNumber);

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

PrimeFactors(primeFactorNumber);}

