**Exercise-I:Managing I/O Operations, Control Structures**

I/O Operations♣

**1).Calculate the area of a circle**.

1. #include <stdio.h>
2. #include <math.h>
3. int main() {
4. float radius, area;
5. printf("Enter the radius of the circle: ");
6. scanf("%f", &radius);
7. area = M\_PI \* pow(radius, 2);
8. printf("The area of the circle is: %f\n", area);
9. return 0;
10. }

**2. Convert temperature from Fahrenheit to Celsius.**

#include <stdio.h>

int main() {

float fahrenheit, celsius;

printf("Enter temperature in Fahrenheit: ");

scanf("%f", &fahrenheit);

celsius = (fahrenheit - 32) \* 5 / 9;

printf("Temperature in Celsius is: %f\n", celsius);

return 0;

}

**3. Create a program that prints the Fibonacci series**

#include <stdio.h>

void fibonacci(int n) {

int a = 0, b = 1, next;

printf("Fibonacci series: ");

for (int i = 0; i < n; i++) {

printf("%d, ", a);

next = a + b;

a = b;

b = next;

}

printf("\n");

}

int main() {

int num\_terms;

printf("Enter the number of terms for the Fibonacci series: ");

scanf("%d", &num\_terms);

fibonacci(num\_terms);

return 0;

}

**4. Create a program that calculates the sum of digits of a number.**

#include <stdio.h>

int main() {

int number, digit, sum = 0;

printf("Enter a number: ");

scanf("%d", &number);

// Calculate the sum of digits

while (number != 0) {

digit = number % 10;

sum += digit;

number /= 10;

}

printf("The sum of digits is: %d\n", sum);

return 0;

}

**5. Create a program that calculates the factorial of a number using recursion.**

#include <stdio.h>

int factorial(int n) {

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

return 1;

} else {

return n \* factorial(n - 1);

}

}

int main() {

int number, result;

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

scanf("%d", &number);

result = factorial(number);

printf("Factorial of %d is: %d\n", number, result);

return 0;

}

**Control Statements:**

1. **Write a program to check whether a given number is positive, negative, or zero using if-elsestatements.**
2. #include <stdio.h>
3. int main() {
4. int number;
5. printf("Enter a number: ");
6. scanf("%d", &number);
7. if (number > 0)
8. printf("The number is positive.\n");
9. else if (number < 0)
10. printf("The number is negative.\n");
11. else
12. printf("The number is zero.\n");
13. return 0;
14. }

**2. Write a program to find the largest of two given numbers using if-else statements.**

#include <stdio.h>

int main() {

int num1, num2;

printf("Enter two numbers: ");

scanf("%d %d", &num1, &num2);

if (num1 > num2)

printf("The largest number is: %d\n", num1);

else

printf("The largest number is: %d\n", num2);

return 0;

}

**3. Write a program to find the largest of three given numbers using nested if-else statements.**

#include <stdio.h>

int main() {

int num1, num2, num3;

printf("Enter three numbers: ");

scanf("%d %d %d", &num1, &num2, &num3);

if (num1 >= num2 && num1 >= num3)

printf("The largest number is: %d\n", num1);

else if (num2 >= num1 && num2 >= num3)

printf("The largest number is: %d\n", num2);

else

printf("The largest number is: %d\n", num3);

return 0;

}

**4. Write a program to check whether a given year is a leap year or not using if-else statements.**

#include <stdio.h>

int main() {

int year;

printf("Enter a year: ");

scanf("%d", &year);

if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))

printf("%d is a leap year.\n", year);

else

printf("%d is not a leap year.\n", year);

return 0;

}

**5. Write a program to check whether a given character is a vowel or consonant using switch Statements.**

#include <stdio.h>

int main() {

char ch;

printf("Enter a character: ");

scanf(" %c", &ch);

switch (ch) {

case 'a':

case 'e':

case 'i':

case 'o':

case 'u':

case 'A':

case 'E':

case 'I':

case 'O':

case 'U':

printf("%c is a vowel.\n", ch);

break;

default:

printf("%c is a consonant.\n", ch);

}

return 0;

}

**6. Write a program to check whether a given number is prime or not using if-else statements.**

#include <stdio.h>

int main() {

int num, i, flag = 0;

printf("Enter a number: ");

scanf("%d", &num);

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

if (num % i == 0) {

flag = 1;

break;

}

}

if (num == 1)

printf("1 is neither prime nor composite.\n");

else if (flag == 0)

printf("%d is a prime number.\n", num);

else

printf("%d is not a prime number.\n", num);

return 0;

}

**7. Write a program to check whether a given string is a palindrome or not using if-else statements.**

#include <stdio.h>

#include <string.h>

int main() {

char str[100];

printf("Enter a string: ");

gets(str);

int len = strlen(str);

int i, j;

int isPalindrome = 1;

for (i = 0, j = len - 1; i < j; ++i, --j) {

if (str[i] != str[j]) {

isPalindrome = 0;

break;

}

}

if (isPalindrome)

printf("The string is a palindrome.\n");

else

printf("The string is not a palindrome.\n");

return 0;

}

**8. Write a program to find the roots of a quadratic equation ax^2 + bx + c = 0 using if-elseStatements**

#include <stdio.h>

#include <math.h>

int main() {

float a, b, c, discriminant, root1, root2;

printf("Enter coefficients a, b, and c: ");

scanf("%f %f %f", &a, &b, &c);

discriminant = b \* b - 4 \* a \* c;

if (discriminant > 0) {

root1 = (-b + sqrt(discriminant)) / (2 \* a);

root2 = (-b - sqrt(discriminant)) / (2 \* a);

printf("Roots are real and different. Root1 = %.2f, Root2 = %.2f\n", root1, root2);

} else if (discriminant == 0) {

root1 = root2 = -b / (2 \* a);

printf("Roots are real and the same. Root1 = Root2 = %.2f\n", root1);

} else {

float realPart = -b / (2 \* a);

float imaginaryPart = sqrt(-discriminant) / (2 \* a);

printf("Roots are complex and different. Root1 = %.2f + %.2fi, Root2 = %.2f - %.2fi\n",

realPart, imaginaryPart, realPart, imaginaryPart);

}

return 0;

}

. **9. Write a program to find the grade of a student based on their marks using if-else statements.**

#include <stdio.h>

int main() {

int marks;

printf("Enter the marks: ");

scanf("%d", &marks);

if (marks >= 90)

printf("Grade A\n");

else if (marks >= 80)

printf("Grade B\n");

else if (marks >= 70)

printf("Grade C\n");

else if (marks >= 60)

printf("Grade D\n");

else

printf("Grade F\n");

return 0;

}

**10. Write a program to calculate the electricity bill for a given number of units using if-elseStatements.**

#include <stdio.h>

int main() {

int units;

float totalBill;

printf("Enter the number of units: ");

scanf("%d", &units);

if (units <= 50)

totalBill = units \* 0.50;

else if (units <= 150)

totalBill = 50 \* 0.50 + (units - 50) \* 0.75;

else if (units <= 250)

***Loop Control Structures:***

1. **Write a program to print the first n natural numbers using a while loop.**
2. #include <stdio.h>
3. int main() {
4. int n, i = 1;
5. printf("Enter the value of n: ");
6. scanf("%d", &n);
7. while (i <= n) {
8. printf("%d ", i);
9. i++;
10. }
11. return 0;
12. }

**2. Write a program to print the multiplication table for a given number using a for loop.**

#include <stdio.h>

int main() {

int number;

printf("Enter a number: ");

scanf("%d", &number);

for (int i = 1; i <= 10; i++) {

printf("%d x %d = %d\n", number, i, number \* i);

}

return 0;

}

**3. Write a program to calculate the sum of all even numbers from 1 to n using a do-while loop.**

#include <stdio.h>

int main() {

int n, i = 2, sum = 0;

printf("Enter the value of n: ");

scanf("%d", &n);

do {

sum += i;

i += 2;

} while (i <= n);

printf("Sum of even numbers from 1 to %d is: %d\n", n, sum);

return 0;

}

**4. Write a program to find the factorial of a given number using a while loop.**

#include <stdio.h>

int main() {

int number, i = 1;

long long factorial = 1;

printf("Enter a number: ");

scanf("%d", &number);

while (i <= number) {

factorial \*= i;

i++;

}

printf("Factorial of %d is: %lld\n", number, factorial);

return 0;

}

**5. Write a program to generate the Fibonacci series up to a given number using a for loop.**

#include <stdio.h>

int main() {

int n, first = 0, second = 1, next;

printf("Enter the value of n: ");

scanf("%d", &n);

printf("Fibonacci series up to %d: ", n);

for (int i = 0; i < n; i++) {

printf("%d, ", first);

next = first + second;

first = second;

second = next;

}

printf("\n");

return 0;

}

**6. Write a program to print the sum of all prime numbers between 1 and n using a for loop.**

#include <stdio.h>

#include <stdbool.h>

int main() {

int n, sum = 0;

printf("Enter the value of n: ");

scanf("%d", &n);

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

bool isPrime = true;

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

if (num % i == 0) {

isPrime = false;

break;

}

}

if (isPrime) {

sum += num;

}

}

printf("Sum of prime numbers between 1 and %d is: %d\n", n, sum);

return 0;

}

**7. Write a program to print the sum of digits of a given number using a while loop.**

#include <stdio.h>

int main() {

int number, sum = 0, digit;

printf("Enter a number: ");

scanf("%d", &number);

while (number != 0) {

digit = number % 10;

sum += digit;

number /= 10;

}

printf("Sum of digits is: %d\n", sum);

return 0;

}

**8. Write a program to check whether a given number is a palindrome or not using a while loop.**

#include <stdio.h>

int main() {

int originalNumber, reversedNumber = 0, remainder;

printf("Enter a number: ");

scanf("%d", &originalNumber);

int temp = originalNumber;

while (temp != 0) {

remainder = temp % 10;

reversedNumber = reversedNumber \* 10 + remainder;

temp /= 10;

}

if (originalNumber == reversedNumber)

printf("%d is a palindrome.\n", originalNumber);

else

printf("%d is not a palindrome.\n", originalNumber);

return 0;

}

**9. Write a program to find the largest and smallest elements in an array using a for loop.**

#include <stdio.h>

int main() {

int n;

printf("Enter the size of the array: ");

scanf("%d", &n);

int arr[n];

printf("Enter the elements of the array:\n");

for (int i = 0; i < n; i++) {

scanf("%d", &arr[i]);

}

int largest = arr[0];

int smallest = arr[0];

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

if (arr[i] > largest)

largest = arr[i];

if (arr[i] < smallest)

smallest = arr[i];

}

printf("Largest element: %d\n", largest);

printf("Smallest element: %d\n", smallest);

return 0;

}