**Assignment-4**

***Q1* - *Write a C program to find sum of all-natural numbers between 1 to n using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** addNumbers(**int** n);

**int** main() {

**int** num;

printf("Enter a positive integer: ");

scanf("%d", &num);

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

**return** 0;

}

**int** addNumbers(**int** n) {

**if** (n != 0)

**return** n + addNumbers(n - 1);

**else**

**return** n;

}

**Output:**

**Text

Description automatically generated**

***Q2* - *Write a C program to print all even or odd numbers in given range using recursion***.

***Ans- PROGRAM:***

#include <stdio.h>

**void** printevenodd(**int** cur, **int** limit);

**int** main()

{

**int** lowerLimit, upperLimit;

printf("Enter lower limit: ");

scanf("%d", &lowerLimit);

printf("Enter upper limit: ");

scanf("%d", &upperLimit);

printf("Even/odd Numbers from %d to %d are: ", lowerLimit, upperLimit);

printevenodd(lowerLimit, upperLimit);

}

**void** printevenodd(**int** cur, **int** limit)

{

**if**(cur > limit)

**return**;

printf("%d \n", cur);

printevenodd(cur + 2, limit);

}

**Output:**

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Description automatically generated**

***Q3* - *Write a C program to find sum of all-natural numbers between 1 to n using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** addNumbers(**int** n);

**int** main() {

**int** num;

printf("Enter a positive integer: ");

scanf("%d", &num);

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

**return** 0;

}

**int** addNumbers(**int** n) {

**if** (n != 0)

**return** n + addNumbers(n - 1);

**else**

**return** n;

}

**Output:**

**Text

Description automatically generated**

***Q4 - Write a C program to find sum of all even or odd numbers in given range using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** sumOfEvenOdd(**int** start, **int** end);

**int** main()

{

**int** start, end;

/\* Input lower and upper limit from user \*/

printf("Enter lower limit: ");

scanf("%d", &start);

printf("Enter upper limit: ");

scanf("%d", &end);

printf("Sum of even/odd numbers between %d to %d = %d\n", start, end, sumOfEvenOdd(start, end));

**return** 0;

}

**int** sumOfEvenOdd(**int** start, **int** end)

{

**if**(start > end)

**return** 0;

**else**

**return** (start + sumOfEvenOdd(start + 2, end));

}

**Output:**

**Text

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***Q5-Write a C program to find reverse of any number using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** sumOfEvenOdd(**int** start, **int** end);

**int** main()

{

**int** start, end;

/\* Input lower and upper limit from user \*/

printf("Enter lower limit: ");

scanf("%d", &start);

printf("Enter upper limit: ");

scanf("%d", &end);

printf("Sum of even/odd numbers between %d to %d = %d\n", start, end, sumOfEvenOdd(start, end));

**return** 0;

}

**int** sumOfEvenOdd(**int** start, **int** end)

{

**if**(start > end)

**return** 0;

**else**

**return** (start + sumOfEvenOdd(start + 2, end));

}

**Output:**

**Text

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***Q6-*** ***Write a C program to check whether a number is palindrome or not using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

#include <math.h>

**int** reverse(**int** num);

**int** main()

{

**int** num, rev;

printf("Enter any number: ");

scanf("%d", &num);

rev = reverse(num);

printf("Reverse of %d = %d\n", num, rev);

**return** 0;

}

**int** reverse(**int** num)

{

**int** digit = (**int**) log10(num);

**if**(num == 0)

**return** 0;

**return** ((num%10 \* pow(10, digit)) + reverse(num/10));

}

**Output:**

**Text

Description automatically generated**

***Q7-*** ***Write a C program to check whether a number is palindrome or not using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

#include <math.h>

**int** reverse(**int** num);

**int** isPalindrome(**int** num);

**int** main()

{

**int** num;

printf("Enter any number: ");

scanf("%d", &num);

**if**(isPalindrome(num) == 1)

{

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

}

**else**

{

printf("%d is NOT a palindrome number.\n", num);

}

**return** 0;

}

**int** isPalindrome(**int** num)

{

**if**(num == reverse(num))

{

**return** 1;

}

**return** 0;

}

**int** reverse(**int** num)

{

**int** digit = (**int**)log10(num);

**if**(num == 0)

**return** 0;

**return** ((num%10 \* pow(10, digit)) + reverse(num/10));

}

**Output:**

**Text

Description automatically generated**

***Q8-*** ***Write a C program to generate nth Fibonacci term using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**unsigned** **long** **long** fibo(**int** num);

**int** main()

{

**int** num;

**unsigned** **long** **long** fibonacci;

printf("Enter any number to find nth fiboacci term: ");

scanf("%d", &num);

fibonacci = fibo(num);

printf("%d fibonacci term is %llu\n", num, fibonacci);

**return** 0;

}

**unsigned** **long** **long** fibo(**int** num)

{

**if**(num == 0)

**return** 0;

**else** **if**(num == 1)

**return** 1;

**else**

**return** fibo(num-1) + fibo(num-2);

}

**Output:**

**Text

Description automatically generated**

***Q9-*** ***Write a C program to find GCD (HCF) of two numbers using recursion.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** gcd(**int** a, **int** b);

**int** main()

{

**int** num1, num2, hcf;

printf("Enter any two numbers to find GCD: ");

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

hcf = gcd(num1, num2);

printf("GCD of %d and %d = %d\n", num1, num2, hcf);

**return** 0;

}

**int** gcd(**int** a, **int** b)

{

**if**(b == 0)

**return** a;

**else**

**return** gcd(b, a%b);

}

**Output:**

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***Q9-*** ***Write a C program to find LCM of two numbers using recursion using function.***

***Ans- PROGRAM:***

#include <stdio.h>

**int** lcm(**int** a, **int** b);

**int** main()

{

**int** num1, num2, LCM;

printf("Enter any two numbers to find lcm: ");

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

**if**(num1 > num2)

LCM = lcm(num2, num1);

**else**

LCM = lcm(num1, num2);

printf("LCM of %d and %d = %d\n", num1, num2, LCM);

**return** 0;

}

**int** lcm(**int** a, **int** b)

{

**static** **int** multiple = 0;

multiple += b;

**if**((multiple % a == 0) && (multiple % b == 0))

{

**return** multiple;

}

**else**

{

**return** lcm(a, b);

}

}

**Output:**

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